
Remediation Action Plan

Proposed Redevelopment

105-153 Miller Street, North Sydney NSW

**Prepared for Investa Commercial
Developments Pty Ltd**

Project 86964.05

17 June 2025

Document History

Details

Project No.	86964.05
Document Title	Remediation Action Plan
Site Address	105-153 Miller Street, North Sydney NSW
Report Prepared For	Investa Commercial Developments Pty Ltd
Filename	86964.05.R.001.Rev0

Status and Review

Status	Prepared by	Reviewed by	Date issued
Draft A	Wen-Fei Yuan / Setareh Pourkazemi	Nerilee Edwards	16 June 2025
Rev 0	Setareh Pourkazemi	Nerilee Edwards	17 June 2025

Distribution of Copies

Status	Issued to
Draft A	Investa Commercial Developments Pty Ltd
Rev 0	Investa Commercial Developments Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

Signature

Date

Author

17 June 2025

Reviewerp.p. 

17 June 2025

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Remediation Action Plan

Proposed Redevelopment

105-153 Miller Street, North Sydney NSW

1. Introduction

Douglas Partners Pty Ltd (Douglas) has prepared this remediation action plan (RAP) for a proposed redevelopment at 105-153 Miller Street, North Sydney NSW (the site). The site is shown on Drawing 1, Appendix A. The RAP was commissioned by Callan Salter of Investa Commercial Developments Pty Ltd and was undertaken in accordance with Douglas' proposal 86964.05.P.001.Rev0 dated 04 June 2025.

This RAP presents the procedures and plans which provide the means by which site remediation, if required, can be achieved. The Remediation Contractor must base their detailed work methodologies around the requirements of this RAP.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended 2013) [NEPM] (NEPC, 2013);
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020a); and
- CRC CARE *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives* (CRC CARE, 2019a).

The remediation objectives, devised in accordance with CRC (2019a), are to:

- Address potentially unacceptable risks to relevant environmental values from contamination; and
- Render the site suitable, from a contamination perspective, for the proposed development.

This RAP provides details of the work that will be required at the site to meet the remediation objectives.

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

2. Proposed development

A copy of the provided plans for the proposed development are included in Appendix A. The Sydney metro tunnel lies directly along the western boundary of the site and Victoria Cross Station is located along the northern boundary.

The proposed development includes the redevelopment and adaptive reuse of an existing heritage building at 105 Miller Street as a new mix use commercial (retail) / tertiary education institution.

Specifically, it will include:

- Adaptive reuse and restoration of the existing Miller Street wing;
- Demolition of the Denison Street wing and construction of a new 22 storey building;
- Adaptive reuse to the ground level to deliver a significantly enhanced public domain;
- Construction of a double height ground floor retail / tertiary education and the delivery of a public open space along Miller Street; and
- Basement carparking and loading dock accessed from a relocated entry off Denison Street.

No excavation or dewatering is proposed as part of the development.

3. Scope of work

The scope of work to achieve the objective is as follows:

- Summarise the findings of previous investigations used to inform the status of contamination and contamination risk at the site;
- Present a conceptual site model (CSM) to list potential and likely contamination source(s), pathway and receptor linkages to address potentially unacceptable risks to human health and relevant environmental values from contamination;
- Identify gaps in the current understanding of contamination at the site, and how these are to be addressed to support the remediation process;
- Define the anticipated extent of remediation;
- Assess potentially suitable remediation options to render the site suitable for its proposed use, and which will minimise potentially unacceptable risk to human health and/or the environment and which includes the consideration of the principles of ecologically sustainable development;
- Establish the remediation acceptance criteria (RAC) to be adopted for validation of remediation;
- Identify how successful implementation of the RAP will be validated;
- Outline waste classification, handling and tracking requirements;
- Outline environmental safeguards required to complete the remediation works;
- Include contingency plans and an unexpected finds protocol; and
- Identify the need for, and nature of, any long-term management and/or monitoring following the completion of management / remediation and, if required, provide an outline of an environmental management plan.

4. Site description

4.1 Site information

Site address	105-153 Miller Street, North Sydney NSW
Legal description	Lot 2, D.P. 792740
Area	6,640 m ²
Zoning	Zone E2 Commercial Centre
Local Council Area	North Sydney Council
Current use	Commercial
Surrounding uses	North – Metro Station / commercial East – Denison Street then commercial South – Pacific Highway then Commercial West – Miller Street then commercial

The site boundary is shown on Drawing 1.



Figure 1: Site location and site boundary

4.2 Site features

Based on the provided site plans and a site walkover undertaken by an environmental scientist during the previous detailed site investigation (DSI) (Douglas, 2025), the following key site features pertinent to contamination assessment were observed:

- A lower ground carpark level was located above a basement level;
- A former printing room was located in the carpark level;
- A boiler room was located in the basement;
- A diesel generator room was located adjacent to the boiler room;
- Two above-ground storage tanks (AST) were observed on site during the DSI, namely:
 - o An AST located within the diesel generator room. No signs of above-ground pipework were observed, indicating the potential for below ground pipework connecting the tank to the former generator and a remote fill point; and
 - o An AST labelled 'oil tank' on the site plans was present in the basement at coordinates A10-A11. The site inspection identified site signage indicating it was for diesel storage. This AST was raised above the ground and encased in concrete. No signs of above-ground pipework were observed, indicating the potential for below ground pipework connecting the tank to the former generator (possibly located in the diesel generator room), and possibly a remote fill point (if not filled directly). The dip stick indicated that the tank did not contain a significant volume of liquid.
- No solvent storage room was identified within the basement or the lower ground floor.

5. Environmental setting

Site topography	The site is at an elevation of 60 m to 64 m relative to Australian Height Datum (AHD), and slopes gently downwards to the east and southeast.
Soil landscape	According to the Sydney 1:100,000 Soils Landscape Sheet, the site is located within the Gympie erosional soil landscape which has high soil erosion hazard, localised steep slopes, shallow highly permeable soil and very low soil fertility.
Geology	According to the Sydney 1:100,000 Geology Sheet, the site is underlain by Hawkesbury Sandstone, which comprises medium to coarse grained quartz sandstone, very minor shale and laminate lenses.
Acid sulfate soils	According to NSW Acid Sulfate Soils Risk mapping data from NSW Department of Environment and Climate Change (1994 - 1998), the site is not located within or near an area associated with a risk of acid sulfate soils.
Surface water	The nearest surface water body is Sydney Harbour which is located approximately 1 km to the south and east of the site. Surface water is anticipated to enter the local stormwater system along Denison Street, and to discharge to Sydney Harbour.

Groundwater	<p>A search of the publicly available registered groundwater bore database was undertaken on 10 June 2025. The search result indicated that there is one registered groundwater bore within 500 m of the site. This registered bore (GW107764) was located approximately 430 m up-gradient of the site. The intended use of this bore was domestic bore. No information regarding standing water levels was provided in the record.</p> <p>Based on the on the regional topography the anticipated natural flow direction of groundwater beneath the site is inferred to be to the southeast, towards Sydney Harbour, the likely receiving surface water body for the groundwater flow path. However, given the presence of the adjacent metro tunnel, Victoria Cross Station and various drained deep basements in North Sydney, the local groundwater flow direction may vary from that inferred.</p> <p>Given the local geology (i.e. - Hawkesbury Sandstone), the groundwater in the fractured rock beneath the site is anticipated to be relatively fresh.</p> <p>Accordingly, potential beneficial uses could include irrigation or drinking water, although the future use of the groundwater for these purposes in the vicinity of the site is considered unlikely given the urban setting.</p>
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6. Summary of previous investigations

6.1 Reviewed reports

The following previous reports relevant to the current investigation was available for review:

- Douglas Report on Preliminary Contamination Investigation, Proposed 'Campus 105' Development, 105 Miller Street, North Sydney NSW. Ref: 86964.00.R. 001.Rev0 (Douglas, 2019);
- Douglas Report on Detailed Site Investigation (DSI), Proposed Redevelopment, 105-153 Miller Street, North Sydney NSW. Ref: 86964.04.R.001.Rev3 (Douglas, 2025); and
- JBS&G Report on Hazardous Materials Survey, 105 Miller Street, North Sydney, NSW. Ref 67072 / 162,151 Rev A (JBS&G, 2024)

6.2 PSI (Douglas, 2019)

The PSI comprised a desktop review of site information and readily available site history. No intrusive soil or groundwater investigation was conducted as part of the investigation.

The PSI recorded that the site was used for residential purposes, before the existing commercial building on site was built in 1957, and the surrounding areas have been used for commercial purposes since at least the 1980s. The PSI included a search of the public databases, which indicated that the site was not listed as a contaminated site under the Contaminated Land Management (CLM) Act 1997. A search of the database held by SafeWork NSW for the PSI did not locate any records pertaining to the storage of dangerous goods at the site.

A review of the PSI identified some potentially contaminating business activities on-site, and immediately up-gradient of the site, as follows:

On-site activities:

- Former dry-cleaning activities:
 - The previous cadastral record enquiry report identified an on-site dry cleaner was present within the site boundary from 1950-1953;
 - The previous historical aerials show that the current building was constructed between 1955 and 1965 and included the excavation of the current (3-metres) basement; and
 - Previous historic business directories identified an on-site dry cleaner was present within the site between 1971-1984. Further assessment as part of the DSI (Douglas, 2025) identified that the business address was 72 Mount Street. Though the exact location is unknown it may have been located on the southern side of the site along Mount Street.
- Former garage:
 - The historic business directories identified a motor garage and engineer business on site. The DSI identified that the company associated with the motor garage and engineers' business to be conducting merchant business activity relating to accounting, finance and administrative works indicating that contamination like business activities were not being conducted on-site.
- Former solvent storage:
 - The solvent's storage room for general cleaning purposes were located at roof level and they were stored in plastic tub bunds.
- Diesel generator:
 - During the DSI two above ground storage tanks (ASTs) were observed. One AST was located inside the generator room, with the second tank was located outside, to the east of the generator room. No signs of above-ground pipework were observed for either tank, indicating the potential for below ground pipework connecting the tanks to the generator and a remote fill point.

Off-site activities:

- Off-site dry cleaners were located at 96 and 100 Miller Street, North Sydney up-gradient to the site; and
- The businesses pertaining to boat building, plastic and chemical manufacturing and diesel engine manufacturing were listed on the historical business directories to be conducting merchant and distribution activities.

A preliminary conceptual site model (CSM) was developed based on the desktop assessment and has been considered in preparation of the CSM presented in Section 7.

On the basis of the CSM and the desktop assessment, it was concluded that the site could be made suitable for the proposed development, from a contamination standpoint subject to the following recommendations:

- Completion of a detailed site investigation (DSI) complying with SEPP55 [which has been superseded by State Environmental Planning Policy (Resilience and Hazards) 2021], including intrusive sampling of soil and groundwater;
- A hazardous building materials assessment is required for the existing buildings;
- Post-demolition inspection of the building footprints by an Environmental Consultant, for any signs of contamination (if required). Additional sampling and testing in these areas will be required to fill data gaps; and
- Any soil to be removed offsite as part of the construction is subject to a formal waste classification prior to disposal.

6.3 DSI (Douglas, 2025)

Douglas was engaged by Investa to prepare a DSI report for the proposed redevelopment at 105-153 Miller Street (the site). The objective of the investigation was to assess the suitability of the site for the proposed development and whether further investigation and/or management is required.

The scope work for the DSI comprised a review of previous reports, drilling of 10 soil boreholes (HA01 to HA10) using hand tools, and three sub slab soil vapour pins (SV1 to SV3). Two groundwater wells (BH101 / MW01 and BH102 / MW02) were constructed in the boreholes (as part of the geotechnical assessment) to assess water present at the soil / rock interface.

Test locations were selected based on targeting known or suspected contamination sources including the diesel tank, boiler / generator room, former dry cleaner, and printer shop and general fill / site condition. The soil vapour pins were targeted to areas considered most likely to be contaminated based on the results of the PSI.

Borehole locations were also modified as required based on areas of access at the time of the investigation. Boreholes are shown on Drawing 2, Appendix A, and borehole logs are included in Appendix C.

The general subsurface profile logged during the investigation was as follows:

Concrete:	In all test locations to depths of between approximately 0.20 m and 0.35 m below ground level (bgl), with a bituminous membrane layer between two slabs, at approximate depths of 0.25 m and 0.27 m bgl.
Fill / Gravel:	Coarse grey gravel in all test locations to depths of 0.39 m to 0.5 m bgl. Hand augered borehole locations HA01, HA02, HA04, HA05, HA06, HA07, HA08 and HA09 were terminated in this horizon upon refusal on inferred sandstone.
Fil / Sand:	Generally comprising pale brown sand with gravel test locations BH101, BH102, HA03 and HA10 to depths of between 0.35 m and 0.68 m bgl.
Sandstone:	Sandstone in BH101 and BH102 from 0.80 m and 0.54 m bgl to borehole termination at 22.55 m and 8.00 m bgl respectively.

There was no obvious sign of anthropogenic inclusion (e.g. demolition waste), which indicates that the potential to encounter asbestos in soil is low. The PID screening recorded values of less than 1 ppm suggesting the absence, or very low concentrations, of VOC in the samples tested.

No free groundwater was observed during drilling of boreholes. Due to insufficient water levels in groundwater BH102 / MW02, a groundwater sample was only collected from one of the groundwater wells (MW01 / BH101).

Selected soil samples and all soil vapour samples were analysed at a National Association of Testing Authorities (NATA) accredited laboratory for the identified contaminants of potential concern (CoPC).

A summary of soil, waste classification, soil vapour and groundwater laboratory results are outlined below. A summary of the laboratory results for site suitability and waste classification assessment is included in Appendix D.

Soil results:

The analytical for all contaminants tested in all samples were below the adopted site assessment criteria (SAC) for commercial and industrial land use scenario (refer to Appendix G). However, PAH and TRH were recorded in the following samples:

- HA01 / 0.35-0.45 m: Total PAH at 0.52 mg/kg, TRH F2 at 98 mg/kg, TRH F3 at 1300 mg/kg and TRH F4 at 580 mg/kg;
- HA08 / 0.4-0.45 m: TRH F2 at 68 mg/kg, TRH F3 at 830 mg/kg and TRH F4 at 370 mg/kg;
- HA09 / 0.3-0.35 m: TRH F3 at 680 mg/kg and TRH F4 at 270 mg/kg;
- HA09 / 0.35-0.4 m: Benzo(a)pyrene (BaP) at 0.2 mg/kg and total PAH at 2.6 mg/kg;
- HA10 / 0.25-0.4 m: TRH F3 at 240 mg/kg and TRH F4 at 150 mg/kg; and
- BH102 / 0.45-0.5 m: BaP at 0.06 mg/kg, total PAH at 0.2 mg/kg, TRH F3 at 250 mg/kg and TRH F4 at 160 mg/kg.

The DSI identified the bituminous membrane as a possible source of the PAH and TRH contamination in soil, based on the interpretation of chromatograms with reference to the hydrocarbon library.

Waste classification results:

- The DSI assessed the laboratory results for fill at the site to be consistent with a general solid waste – GSW (non-putrescible) classification. Further in-situ or *ex-situ* investigation including visual and analytical process is required to confirm the preliminary waste classification of any surplus soils, prior to off-site disposal.

Soil vapour results:

- The analytical results indicated that concentrations of volatile chlorinated hydrocarbons (VCH) in sub-slab vapour were below the laboratory practical quantitation limit (PQL) and adopted SAC (refer to Appendix G) for trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride for the proposed mixed-use development.

Groundwater results:

- The analytical results for groundwater sample collected from MW01 / BH101 (and BD1, a replicate of MW01) were below the adopted SAC (refer to Appendix G) with the exception of copper, nickel and zinc. The detected metal concentrations are considered likely to be ambient concentrations from diffuse urban sources.
- There were also detections of TRH (F1 and F2) and VOC (trihalomethanes) above the PQL but below the adopted SAC, noting there are no available SAC for ecological receptors. Trihalomethanes can occur from water chlorination and may be indicative of the groundwater in the well being impacted by leakage from the potable water supply. Chloroform also has a range of industrial uses and can be used in dry cleaning.
- The recorded TRH was in the light to medium fraction (F1 and F2) and could consist of the detected VOC or be indicative of contamination from a different potential source, such as the former on- and off-site sources such as the motor garages or dry cleaners. Further investigation was recommended to assess the significance of the recorded TRH and VOC.
- Based on the results of the DSI it was considered that the site can be made suitable for the proposed development subject to the further investigation and remediation.

6.4 Hazardous Materials Survey (JBS&G, 2024)

JBS&G (2024) comprised a hazardous building materials assessment for the existing building. Hazardous materials including friable asbestos, lead and synthetic mineral fibre (SMF) were detected.

7. Conceptual site model

The data collected during previous investigations generally confirmed that for certain potential contaminant sources outlined in the CSM in the DSI (Douglas, 2025), potentially complete exposure pathways to the identified receptors exist, whereas for others, they do not. No other sources of contamination have been identified as a result of the testing results to date. The source (and associated contaminants of potential concern (CoPC)), pathway and receptor linkages are summarised in Table 1, Table 2 and Table 3.

Table 1 shows the CoPC which are considered to be potentially present based on the DSI field and laboratory results.

Table 1: Summary of potential sources

Potential sources and associated CoPC
On site sources
<p>S1: Fill: Associated with levelling, demolition of former buildings on the site CoPC: metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), phenols and asbestos.</p> <p>S2: Historic and current site uses (Former on-site dry cleaners, existing above ground diesel / oil tanks and storage of solvents).</p>

Potential sources and associated CoPC
On site sources
CoPC: metals, trichloroethene (TCE), tetrachloroethene (PCE), TRH, BTEX, PAH, OCP, PCB, phenols and volatile organic compounds (VOC). S3: Existing and Former buildings CoPC: asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.

The following potential human and environmental receptors, along with relevant potential pathways, have been identified and summarised in Table 2.

Table 2: Summary of potential receptors and pathways

Potential human receptors
HR1: Construction and maintenance workers HR2: End users [commercial / retail workers / students] HR3: Adjacent site users [commercial]
Potential environmental receptors
ERI: Groundwater
Potential pathways to human receptors
HP1: Ingestion and dermal contact HP2: Inhalation of dust and/or vapours
Potential pathways to environmental receptors
EPI: Leaching of contaminants and vertical migration into groundwater

A summary of the potentially complete exposure pathways for the proposed land use is shown in the table below.

Table 3: Summary of potentially complete exposure pathways

Source and CoPC	Exposure pathway	Receptor	Risk management action
<p>S1: Fill: metals, TRH, BTEX, PAH, PCB, OCP, phenols and asbestos</p> <p>S3: Former and degradation of existing buildings on-site: asbestos, lead in paint, PCBs, SMF</p>	<p>HP1: Ingestion and dermal contact</p> <p>HP2: Inhalation of dust and/or vapours</p> <p>EPI: Lateral migration of groundwater providing base flow to water bodies</p>	<p>HR1: Current users [commercial]</p> <p>HR2: Construction and maintenance workers</p> <p>HR3: End users [commercial (retail) / tertiary education]</p> <p>ERI: Groundwater</p>	<p>An intrusive investigation is recommended to assess possible contamination including testing of the soils and groundwater</p> <p>Remove / manage hazardous building materials in accordance with the recommendations of JBS&G (2024) and regulatory requirements.</p>

Source and CoPC	Exposure pathway	Receptor	Risk management action
S2: Historic and current site uses	<p>HP1: Ingestion and dermal contact</p> <p>HP2: Inhalation of dust and/or vapours</p>	<p>HR1: Current users [commercial]</p> <p>HR2: Construction and maintenance workers</p> <p>HR3: End users [commercial (retail) / tertiary education]</p>	An intrusive investigation is recommended to assess possible contamination issues including chemical testing of the soils, soil vapour and groundwater.
	<p>EPI: Lateral migration of groundwater providing base flow to water bodies</p>	<p>ERI: Groundwater</p>	

8. Data gap investigation (DGI)

The objectives of the proposed DGI are to:

- Assess fill in targeted locations with respect to its suitability to remain on site and, where applicable, for waste classification for off-site disposal;
- Additional groundwater monitoring to assess groundwater conditions on site: and
- Additional soil vapour investigation to further assess potential impacts, including from the above ground diesel tanks, diesel generator room and boiler room.

A summary of the DGI sampling rationale is outlined in Table 4, below.

Subject to the results of the DGI, the RAP may need to be updated.

Table 4: Summary of DGI target locations and CoPC

Investigation	Purpose	Test Location	CoPC
Fill / Soil	To determine the depth and contamination status of the fill at targeted test locations.	<p>At least four (4) soil boreholes to be determined following site inspection. Locations to target:</p> <ul style="list-style-type: none"> • Oil tanks room. • Diesel generator room. • Boiler room. • Workshop / lube bay. • Area of proposed excavation, if required for <i>in situ</i> waste classification. 	Metals, TRH, PAH, BTEX, OPP, OCP, PCB, phenols, asbestos and VOC.

Investigation	Purpose	Test Location	CoPC
Soil Vapour and Indoor air	To assess the potential for vapour intrusion risks via indoor air assessment at / near areas of potential concern.	<p>At least six (6) sample locations to be determined following site inspection. Locations to target:</p> <ul style="list-style-type: none"> • The former on-site dry cleaner (soil vapour and indoor air). • Sewer / trade waste (if underground pipes present (soil vapour and indoor air). • Oil tanks room (soil vapour and/or indoor air). • Diesel generator room (indoor air). • Boiler room (indoor air). • Printing room (indoor air). 	volatile TRH, BTEX, naphthalene, VOC
Groundwater	<p>Measurement of groundwater levels and sampling and testing of groundwater quality in two existing groundwater wells installed during the DSI.</p> <p>If the existing groundwater well, BH102/MW02 is dry, convert it into a soil vapour port to supplement the soil vapour assessment during the DGI.</p>	<p>BH101/MW01 BH102/MW02</p>	Metals, TRH, BTEX, naphthalene, and VOC.

The recommended investigation scope comprises the following, to be completed by a suitably qualified Environmental Consultant:

- Site inspection and identification of suitable locations for sampling. It is recommended that not all required location will be accessible whilst the building is in use.

Fill / Soil

- Drill test locations using a combination of hand tools and/or push tube sampling to identify the full vertical extent of fill. Soil boreholes should extend to a minimum of 0.1 m into natural soil or on top of rock;

- Collect soil samples by the Environmental Consultant from the boreholes at regular depth intervals, changes in strata or upon signs of contamination (i.e. odours, staining) for analysis of the CoPC;
- Field screening for potential VOC using a photoionisation detector (PID);
- Preparation of field logs and photographs;
- Selected soil samples (including quality control samples) will be analysed for Metals, TRH, PAH, BTEX, OPP, OCP, PCB, phenols, asbestos and VOC at a NATA accredited laboratory for the CoPC identified in Table 4. Additional analysis of toxicity characteristic leaching procedure (TCLP) concentrations if required for waste classification purposes;
- Compare and report the results against the relevant SAC in Section 11; and
- Include the results as part of the data gap investigation and assess the need for further delineation, remediation or management of the identified contamination.

Soil vapour

- Drill through the concrete slab and insert sub slab soil vapour pins;
- Sample each location as follows:
 - o Connect sample tubing directly to the installed vapour pin following removal of the plastic cap;
 - o Perform shut in tests (minimum 30 seconds) following assembly of the sampling apparatus to the extent practical (i.e. connecting summa canister to the regulator), then open the canister valve to apply the vacuum (of between -29 mmHg to -30 mmHg) to the sampling train, while the regulator is still cap;
 - o Purge the soil vapour well prior to sampling by removing one volume of air / vapour from the well (~ 500 ml);
 - o Introduce liquid isopropyl alcohol (IPA) into the sampling shroud to act as a tracer gas for leaks in the soil vapour well and/or the sampling train. All samples are analysed for IPA as part of the TO 15 analysis;
 - o Take PID readings from the soil vapour pins prior to and following application of the IPA tracer gas. Take a PID reading inside the shroud to provide a field indication of potential leak;
 - o Measure general gas parameters from the soil vapour pins, including methane, oxygen and carbon dioxide, on-site using a calibrated landfill gas analyser;
 - o Collect primary samples directly from the soil vapour pin into 1 L Summa canisters with a flow regulator set by the analytical laboratory (approximately 100 ml/min). The regulators are to be supplied by the analytical laboratory and are decontaminated by the laboratory prior to shipment;
 - o Collect an intra-laboratory QC duplicate soil vapour sample;
 - o Collect a shroud sample on a carbon tube to conduct analysis for IPA and determine the concentration of the tracer compound in the shroud; and
 - o Label the sample canisters and record on chain of custody documentation. Complete field sampling sheets and transport samples to the laboratory in an appropriate sealed container.

- Analysis samples (including quality control samples) to a NATA accredited laboratory and subject samples to TO-15 analysis for the CoPC identified in Table 4.

Ambient air

- Environmental Scientist / Engineer to set out laboratory prepared canisters, open, and return approximately eight-hours later, close and collect the canisters; and
- Analysis samples (including quality control samples) to a NATA accredited laboratory and subject samples to TO-15 analysis for the CoPC identified in Table 4.

Groundwater

- Review of the results of the soil vapour and ambient air assessment by the Environmental Consultant, and determination of the need for additional groundwater investigation to assess potential contamination. The following, inter alia, would trigger the need for further investigation:
 - o volatile chlorinated hydrocarbons (TCE, 1,1,1—TCA, PCE, cis-DCE or vinyl chloride) were recorded above the PQL and assessed to potentially be sourced from soils / groundwater at the site; and
 - o petroleum compounds were recorded above the SAC, or significantly above expected background levels, and assessed to potentially be sourced from soils / groundwater at the site.
- Redevelopment of groundwater wells BH101/MW01 and BH102/MW02 prior to sampling.
- If the groundwater well, BH102/MW02 is dry, convert it into a soil vapour port and test for the CoPC associated with soil vapour as per Table 4.
- Two additional rounds of monitoring in the two existing wells including measurement of groundwater levels, sampling and testing of groundwater quality following stabilisation of field parameters.
- Analysis samples (including quality control samples) at a NATA accredited laboratory for the CoPC identified in Table 4. Additional analysis of toxicity characteristic leaching procedure (TCLP) concentrations if required for waste classification purposes.

Quality control (QC) samples

- Collect and analyse the following field QA samples:
 - o Inter-laboratory replicate samples: at a rate of 5% of primary samples. Analysis for metals, BTEX and VOC (soil, groundwater);
 - o Intra-laboratory replicate samples: at a rate of 5% of primary samples. Analysis for metals, BTEX and VOC (soil, groundwater); and
 - o Intra-laboratory replicate samples: at a rate of 10% of primary samples. Analysis for VOC (soil vapour / indoor air).
- Rinsate samples (where reusable sampling equipment is used): at a rate of one sample per sampling day. Analysis for BTEX and VOC (soil, groundwater):
 - o Trip spike samples: at a rate of one sample per sampling day. Analysis for BTEX (soil and groundwater);

- o Trip blank samples: at a rate of one sample per sampling day. Analysis for BTEX (soil and groundwater); and
- o Shroud sample: IPA (soil vapour).

Analysis and reporting

- Interpretation of the analytical results against the adopted SAC; and
- Preparation of a data gap investigation report detailing the methods and results of the investigation, and recommendations on the suitability of the site for the proposed development and need for further assessment and/or remediation.

9. Remediation extent

The extent of remediation for known/identified onsite contamination sources provisionally comprises:

- Any below ground infrastructure associated with former petroleum storage, including any below ground pipes for the above ground oil / diesel tanks; and
- Any areas of contamination identified as requiring remediation based on the results of the DGI.

10. Remediation options assessment

The objective of the remediation options assessment and evaluation is to establish a preferred remediation strategy. The process involves canvassing various remediation options which may be viable and then ranking each option based on a number of evaluation criteria. The remediation options assessment was undertaken with reference to CRC CARE Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment (CRC CARE, 2019b).

The remediation options assessment is included in Appendix F.

11. Preferred remediation strategy

11.1 Petroleum storage system infrastructure

Any underground infrastructure associated with former storage and use of petroleum products is to be decommissioned with reference to NSW EPA (2020b).¹

- Decommissioning of infrastructure by a suitably qualified Remediation Contractor in accordance with SafeWork NSW requirements and relevant Australian Standards. Prior to removal of the infrastructure, the contractor must:

¹ EPA.(2020). Underground Petroleum Storage Systems – Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019. Doc ref: EPA 2020P2700: NSW Environment Protection Authority.

- o Remove all flammable and/or combustible liquid and dispose of appropriately;
- o Remove any residual flammable vapours; and
- o Remove, or decommission *in situ*, infrastructure as per Australian Standard AS 4976-2008.
- If below ground infrastructure is present, and is removed as part of the decommissioning, the following will be conducted:
 - o The infrastructure will be exposed and examined by the Environmental Consultant for potential leaks and general condition;
 - o The surface of the resultant excavation will be assessed by the Environmental Consultant for signs of gross contamination (such as odours and staining). Soil samples will be screened on site with a PID to assess potential for volatile TRH;
 - o The Environmental Consultant will inform the contractor of any grossly contaminated material;
 - o The contractor is to excavate grossly contaminated soil prior to validation sampling;
 - o The Environmental Consultant will collect samples of the exposed soils in accordance with the NSW EPA (2020b);
 - o Any soils removed from the excavations are to be stockpiled and assessed by the Environmental Consultant as per Section 14 prior to off-site disposal;
 - o Disposal records should be provided to the Environmental Consultant for inclusion in the validation report; and
 - o The Environmental Consultant will assess the need for further groundwater investigation to validate the removal of the infrastructure based on the soil results, location, previous groundwater data and with reference to NSW EPA (2020b).
- If below ground infrastructure is present, and is not removed as part of the decommissioning, Environmental Consultant will assess the need for further groundwater investigation to validate the decommissioning of the infrastructure based on the location of the infrastructure, previous groundwater data and with reference to NSW EPA (2020b). It is anticipated that further groundwater investigation would be required; and
- The Environmental Consultant will validate the decommissioning of any underground infrastructure in accordance with NSW EPA (2020b) and the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019 (UPSS Regulation) under the POEO Act 1997.

11.2 Other contamination

If other contamination is identified as requiring remediation based on the results of the DGI the following will be conducted:

- The Environmental Consultant is to assess the results of the DGI with respect to relevant guidelines, including (as applicable):
 - o NEPC National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM] (NEPC, 2013);
 - o NSW DECC *Guidelines for the Assessment and Management of groundwater Condition* (2007); and

- o NSW EPA *Assessment and Management of Hazardous ground Gases: Contaminated Land Guidelines* (2020);
- The Environmental Consultant is to provide recommendations with respect to further assessment, remediation and/or management requirements;
- If remediation and/or management are required, a suitably qualified Environmental Consultant is to prepare an addendum to this RAP describing the works required;
- The project Principal is to submit the Addendum to the consent authority for approval; and
- Once the works in the Addendum have been approved by the consent authority, they will be implemented as part of the redevelopment.

12. Assessment criteria

12.1 Remediation acceptance criteria

The overarching remediation acceptance criterion (RAC) to be adopted for the project is for 'no unacceptable risks posed by the relevant media (i.e. soils, groundwater or soil vapour) to human health or the environment'.

The remediation works are to be validated as meeting the RAC by the Environmental Consultant by means of visual inspection, field screening, recovery and analysis of samples and review of any available plans as set out in this report.

In the absence of derivation of Tier 2 site specific target levels (SSTL), the RAC for contaminants in soil are the same as the Tier 1 site assessment criteria (SAC) as detailed in Section 11.2 and Appendix G.

12.2 Site assessment criteria

Results from the DGI and any area(s) of contamination encountered during the site redevelopment will initially be assessed using the SAC in Appendix G. This is on the provision that other considerations such as risks to groundwater are also taken into account.

The SAC should also be used as part of the assessment framework for imported soils (i.e. contaminant concentrations in imported soils must comply with the SAC).

The following considerations were made when applying the current investigation levels:

- The development comprises commercial (retail) and tertiary education;
- Fully and permanent paved surface; and
- High rise structure.

It is considered that the exposure pathways and sensitive receptors under the proposed commercial (retail) / tertiary education use are most consistent with the generic assumptions for commercial use.

The SAC are not RAC, and an exceedance of the SAC does not automatically trigger the need for remediation. Exceedances of the SAC will trigger the need for further assessment of risk by the

Environmental Consultant to determine the need for remediation in accordance with NEPC (2013) and Appendix G.

13. Validation plan

13.1 Data quality objectives

The data quality objectives (DQO) for the validation plan are included in Appendix H.

13.2 Validation assessment requirements

The following site validation work may be required:

- Field assessment by the Environmental Consultant comprising:
 - o Visual inspection, including taking photographs for record purposes;
 - o Collecting validation samples from excavations resulting from the removal of contaminated soils, including contaminated soil stockpile footprints (if relevant); and
 - o Collecting validation / characterisation samples for materials to be re-used on site.
- Surveying by the Surveyor comprising:
 - o Survey of the extent and levels of contained contamination and capping.
- Laboratory analysis of validation samples at a NATA accredited laboratory for:
 - o The CoPC relevant to the remediation area; and
 - o Quality control (QC) samples in accordance with Section 16.
- Comparison by the Environmental Consultant of the laboratory results with the SAC and/or RAC as appropriate (refer to Section 12); and
- Preparation by the Environmental Consultant of a validation report detailing the methods and results of the remediation works and validation assessment.

13.3 Visual inspections

All areas to be assessed and validated will first be subject to a visual inspection by the Environmental Consultant.

13.4 Validation sampling

The sampling frequency will depend on the volume or area to be assessed and the previous results. The following approximate sampling frequencies will be adopted but may be modified by the Environmental Consultant to take into account previous results, where applicable, and findings from the visual inspections.

- Small to medium excavations / areas (base <500 m²):
 - o Area / base of excavation: one sample per 25 m² or part thereof, with a minimum of three samples where the base of the excavation is fill rather than natural soils; and
 - o Sides of excavation: one sample per 10 m to 20 m length or part thereof with a minimum of one sample per wall. Additional samples will be collected at depths of concern where

there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in fill.

- Large excavations / areas (base ≥ 500 m²):
 - o Area / base of excavation: sampling on a grid at a density in accordance with Table 2 in NSW EPA (2022) or a minimum of 10 samples. In sub-areas with any specific signs of concern, a higher sampling density may be required; and
 - o Sides of excavation: one sample per 20 m length or part thereof with a minimum of one sample per wall. Additional samples will be collected at depths of concern where there is more than one depth of concern, with a minimum of one sample per 1.5 m depth in fill.

Where contaminated soils are stored or treated on bare soils, the footprint of the stockpile will require validation following removal of the contaminated soils. In the event that contamination extends beyond site boundaries or in areas that can't be practically chased out (e.g. under buildings), validation samples will be taken at the limit of excavation. Notwithstanding that there may be residual contamination present.

Advice may need to be obtained from a qualified geotechnical or structural engineer regarding excavation and/or structure stability if excavations approach site boundaries and/or existing structures.

Validation samples will be analysed by a NATA accredited laboratory for the relevant CoPC relevant to the remediation area.

Validation sample test results will be compared to the RAC, as per the DQO (Appendix G). Where the RAC are considered to have not been met, the remediation excavation(s) will be expanded to 'chase-out' impacted material, as advised by the Environmental Consultant, with the validation sampling then continuing into the extended excavation. This process will continue until all results are below the RAC.

14. Waste classification and disposal

Disposal of waste must be to an appropriately licensed waste facility, as per *Protection of the Environment Operations Act 1997* NSW (POEO Act) and the *Protection of the Environment (Waste) Regulation 2014* NSW.

Any waste disposed off-site must be initially classified by the Environmental Consultant in accordance with:

- NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014a);
- NSW EPA Waste Classification Guidelines, Part 2: Immobilisation of Waste (NSW EPA, 2014b);
- NSW EPA Waste Classification Guidelines, Part 4: Acid Sulfate Soils (NSW EPA, 2014c); and
- NSW EPA Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste (NSW EPA, 2016) [addendum for per- and poly-fluoroalkyl substances (PFAS)].

Samples will be collected from stockpiles / *in situ* fill at various depths to characterise the full depth of the material to be classified for disposal. The frequency of sampling and analytical suite

is to be determined by the Environmental Consultant based on the risk of contamination and heterogeneity of the material.

For stockpiles comprising similar materials and a:

- Volume up to 200 m³: a recommended minimum frequency of one sample per 25 m³, with a minimum of three per stockpile (NSW EPA, 2022); or
- Volume greater than 200 m³: a recommended minimum frequency of one sample per 25 m³, with a minimum of 12 samples OR a minimum of 10 samples and calculation of the 95% upper confidence limit of the arithmetic mean for all applicable analytes (NSW EPA, 2022). Note that this does not apply to stockpiles impacted, or potentially impacted, by asbestos. For stockpiles greater than 200 m³ which are impacted, or potentially impacted, by asbestos the Environmental Consultant shall provide guidance in accordance with NSW EPA (2022).

It may be possible to classify excavated soil / fill for reuse on another site under a relevant NSW EPA resource recovery order (RRO) so that it can be used on other sites under the requirements of the corresponding NSW EPA resource recovery exemption (RRE). For this option, the frequency of sampling should be in accordance with the relevant RRO and the contaminants to be analysed will be determined by the Environmental Consultant. The Environmental Consultant will provide a report confirming the suitability of the spoil for reuse under a RRO, or otherwise.

All waste must be tracked by the Remediation Contractor from 'cradle to grave'. Copies of all consignment notes / disposal dockets (or similar) and environment protection licences for receipt and disposal of the materials must be maintained by the Remediation Contractor as part of the site log and must be provided to the Environmental Consultant for inclusion in the validation report.

15. Imported material

Any soil, aggregate etc imported for the remediation works must have contaminant concentrations that meet the relevant criteria outlined in Section 11. Imported materials will only be accepted for use at the site if:

- It can legally be accepted onto the site (e.g. classified as virgin excavated natural material (VENM), accompanied by a report/certificate prepared by a qualified Environmental Consultant);
- Visual inspection of the imported soil confirms that the soil has no signs of concern and is consistent with those described in the supporting classification documentation;
- It has no aesthetic issues of concern, and
- The materials are validated (by inspection / sampling) by the Environmental Consultant as being suitable for use at the site.

The classification report / certificate for all material proposed for import must be reviewed and approved in writing by the Environmental Consultant prior to import. Materials to be imported may need to meet geotechnical requirements which are to be assessed by others, as required.

If permitted by the development consent and approved by the site owner, Remediation Contractor and Environmental Consultant, material classified under a NSW EPA RRO may also be

accepted, provided the material can be used on site in accordance with the corresponding RRE. This could include excavated natural material (ENM), classified under NSW EPA *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014* (NSW EPA, 2014d).

The need for check-sampling of VENM and/or RRO material is to be determined by the Environmental Consultant depending on the source of the material, adequacy of the supporting documentation provided and inspection(s) of material. Quarried material / VENM may need little or no check sampling.

Any recycled materials proposed for importation must be sampled at a frequency of one sample per 25 m³, with a minimum of three samples per load. The recycled material will not be permitted to be used on site until the results of the inspection and laboratory analysis have been approved in writing by the Environmental Consultant.

16. Quality assurance and quality control

Field quality assurance and quality control (QA/QC) testing will include the following:

- Replicate samples: 5% sample intra-laboratory and 5% inter-laboratory analysis, analysed for the same suite as primary sample;
- Rinsate samples (where re-useable sampling equipment is used), analysed for the suite of analytes analysed by the majority of the primary samples; and
- Trip spike and trip blank samples (analysed for BTEX) (approximately one per batch of samples where volatile contaminants are CoPC).

The laboratory will undertake analysis in accordance with its NATA accreditation, including in-house QA/QC procedures.

- The QC analytical results will be assessed using the following criteria:
 - o Sampling location rationale met the sampling objective;
 - o Standard operating procedures (SOP) are followed;
 - o Appropriate QA/QC samples are collected / prepared and analysed;
 - o Samples are stored under secure, temperature-controlled conditions;
 - o Chain of custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory;
 - o Conformance with specified holding times;
 - o Accuracy of spiked samples within the laboratory's acceptable range (typically 70-130% for inorganic contaminants and greater for some organic contaminants);
 - o Field and laboratory duplicate, and replicate samples will have a precision average of +/- 30% relative percentage difference (RPD); and
 - o Rinsate samples will show that the sampling equipment (if used) is free of introduced contaminants, i.e. the analytes show that the rinsate sample is within the normal range for deionised water.

17. Management and responsibilities

17.1 Site management plan

A general site management plan for the operational phase of site remediation is included in Appendix I. The management plan includes soil, noise, dust, work health safety (WHS), remediation schedule, hours of operation and incident response. The Remediation Contractor is to implement the general site management plan for the duration of remediation works by incorporating the plan into their over-arching construction environmental management plan (CEMP).

17.2 Site responsibilities

The site management plan (Appendix I) provides a summary of the general program management and associated responsibilities. Contact details for key utilities are also included in the event of needing to respond to any incidents.

17.3 Contingency plan and unexpected finds protocol

Plans for contingency situations (e.g. encountering asbestos in fill), along with an unexpected finds protocol for dealing with unexpected finds during remediation work / earthworks, are included in Appendix E.

18. Validation reporting

18.1 Documentation

The following documents will need to be collated and reviewed by the Environmental Consultant as part of the validation assessment (including those items that are prepared by the Environmental Consultant):

- Any licences and approvals required for the remediation works (Remediation Contractor);
- Waste classification report(s) (Environmental Consultant);
- Transportation Record: comprising a record of all truckloads of soil (including aggregate) entering the site, including truck identification (e.g. registration number), date, time, source site, load characteristics (e.g. type of material, i.e. quarried aggregate, etc.), approximate volume, use (e.g. general site raising, service trenches, etc.) (Remediation Contractor);
- Disposal dockets: for any soil disposed off-site including transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility / site (Remediation Contractor). Note: A record of the building materials disposed off-site is also to be kept and provided to the Principal, on request;
- Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records (Remediation Contractor);
- Records relating to any unexpected finds and contingency plans implemented (Remediation Contractor);
- Laboratory certificates and chain-of-custody documentation;

- Inspections records from the Environmental Consultant; and
- Photographic records by all contractors and consultants of the works undertaken within their purview of responsibilities (Remediation Contractor).

18.2 Reporting

A validation assessment report will be prepared by the Environmental Consultant in accordance with NSW EPA (2020).

The validation report shall describe the remediation approach adopted, methodology, results and conclusion of the assessment and make a statement regarding the suitability of the site for the proposed development.

If long term management of contamination is required a long-term environmental management plan (LTEMP) will be prepared, based on the preliminary LTEMP prepared in conjunction with this RAP (Douglas reference 86964.05.R.002).

19. Conclusions

This RAP describes the requirements to render the site suitable from a contamination perspective for the proposed mixed-use commercial / retail and tertiary education development.

It is considered that through implementation of the RAP the site can be made suitable for the proposed development.

It is also considered that conformance with this RAP will minimise the potential for environmental, public and worker health impacts during the remediation works at the site.

The remediation works undertaken will need to be documented in validation report.

If upon completion of remediation works, a long-term environmental management plan (LTEMP) is required it must be legally enforceable. Suitable methods for legal enforcement include compliance with an appropriately worded development consent condition.

20. References

CRC CARE. (2019a). *Remediation Action Plan: Development - Guideline on Establishing Remediation Objectives*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Remediation Action Plan: Development - Guideline on Performing Remediation Options Assessment*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

Douglas. (2019). *Report on Preliminary Contamination Investigation, proposed 'Campus 105' Development, 105 Miller Street, North Sydney*. (Ref: 86964.00.R.001.Rev0 dated 25 November 2019).

Douglas. (2025). *Report on detailed site investigation, Proposed Redevelopment, 105-153 Miller Street, North Sydney NSW*. (Ref: 86964.04.R.001.Rev3 dated 3 April 2025).

JBS&G Australia Pty Ltd. (2024). *Hazardous Building Materials Survey, 105 Miller Street, North Sydney- Investa Office Development Pty Ltd*. (Reference: JBS&G 67072 / 162,151 (Rev A), dated 30 September 2024).

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW DECC. (2007). *Guidelines for the Assessment and Management of Groundwater Contamination*. NSW Department of Environment and Climate Change.

NSW EPA. (2014a). *Waste Classification Guidelines, Part 1: Classifying Waste*. NSW Environment Protection Authority.

NSW EPA. (2014b). *Waste Classification Guidelines, Part 2: Immobilisation of Waste*. NSW Environment Protection Authority.

NSW EPA. (2014c). *Waste Classification Guidelines, Part 4: Acid Sulfate Soils*. NSW Environment Protection Authority.

NSW EPA. (2014d). *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014, The excavated natural material order 2014*. NSW Environment Protection Authority.

NSW EPA. (2016). *Addendum to the Waste Classification Guidelines (2014) - Part 1: Classifying Waste*. NSW Environment Protection Authority.

NSW EPA. (2020). *Assessment and Management of Hazardous Ground Gases*. NSW Environment Protection Authority.

NSW EPA. (2020a). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.

NSW EPA. (2020b). *Underground Petroleum Storage Systems - Guidelines for implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019*. Doc Ref: EPA 2020P2700: NSW Environment Protection Authority.

NSW EPA. (2022). *Sampling Design, Part 1: Application; Part 2: Interpretation*. NSW Environment Protection Authority.

21. Limitations

Douglas Partners Pty Ltd (Douglas) has prepared this report for this project at 105-153 Miller Street, North Sydney NSW in line with Douglas' proposal dated 04 June 2025 and acceptance received from Callan Salter of Investa Commercial Developments Pty Ltd. The work was carried out under Douglas' Engagement Terms. This report is provided for the exclusive use of Investa Commercial Developments Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of Douglas, does so entirely at its own risk and without recourse to Douglas for any loss or damage. In preparing this report Douglas has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after Douglas' field testing has been completed.

Douglas' advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by Douglas in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

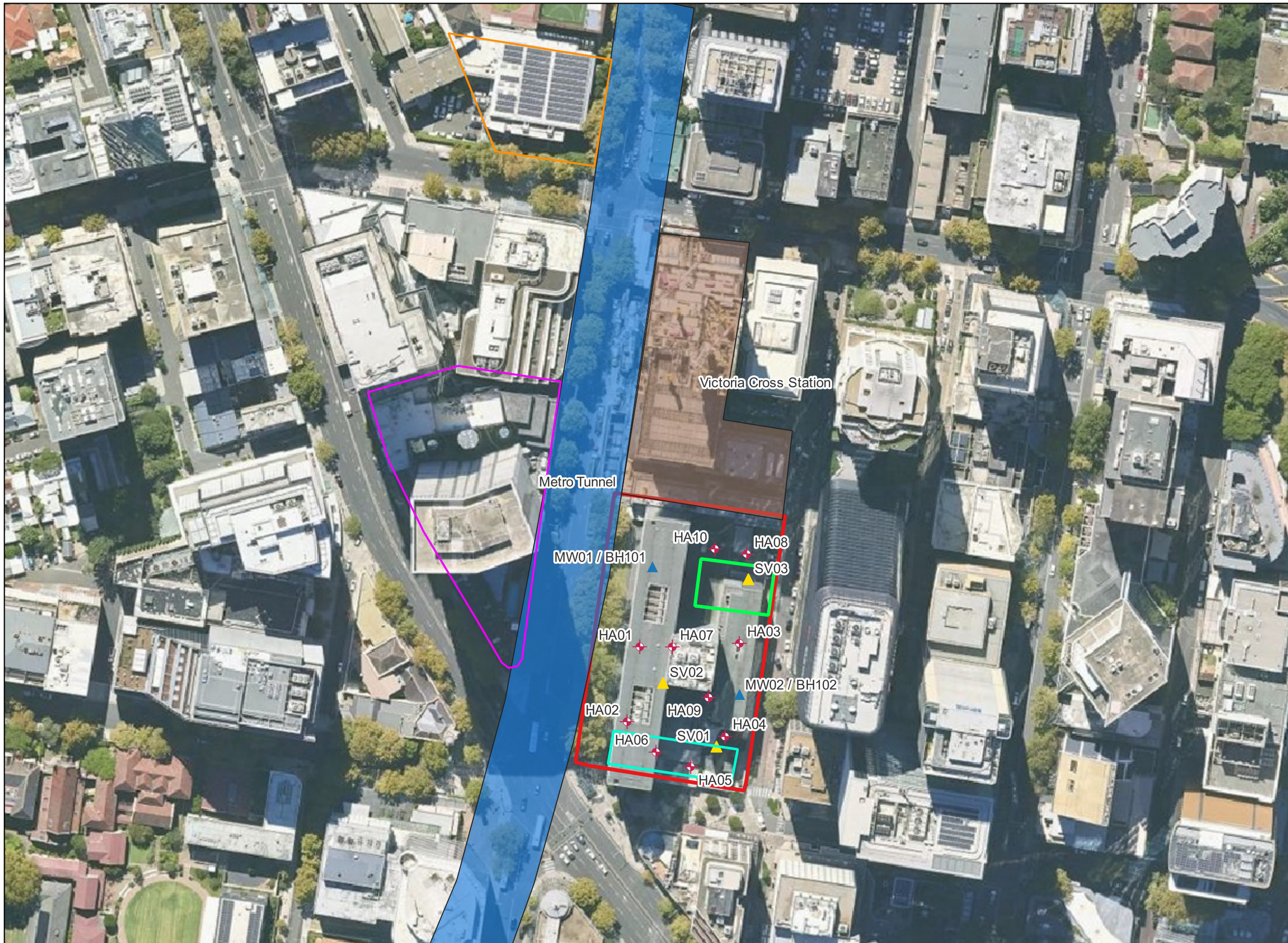
The assessment of atypical safety hazards arising from this advice is restricted to the environmental / groundwater components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. Douglas cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by Douglas. This is because this report has been written as advice and opinion rather than instructions for construction.

Appendix A

Drawings



SITE LOCATION

LEGEND

Potential contaminant sources

- Potential off-site source (Former dry-cleaners, former diesel engine distributor and former chemical manufacturer)
- Potential off-site source (Former dry cleaners, former plastic manufacturer)
- Former on-site dry cleaner
- Potential location of former on-site dry cleaner

DSI Sampling Points:

- ◆ Hand auger location
- ▲ Groundwater well location
- ▲ Soil vapour pin location

Features

- Metro Tunnel
- Victoria Cross Station
- Site Boundary

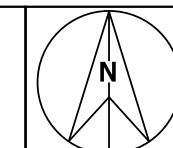
NOTE:
 1. Drawing projection in GDA2020 / MGA zone 56, adapted from aerial imagery from "MetroMap"
 2. All locations and features and approximate only

0 10 20 30 40 50 m

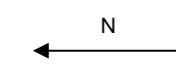
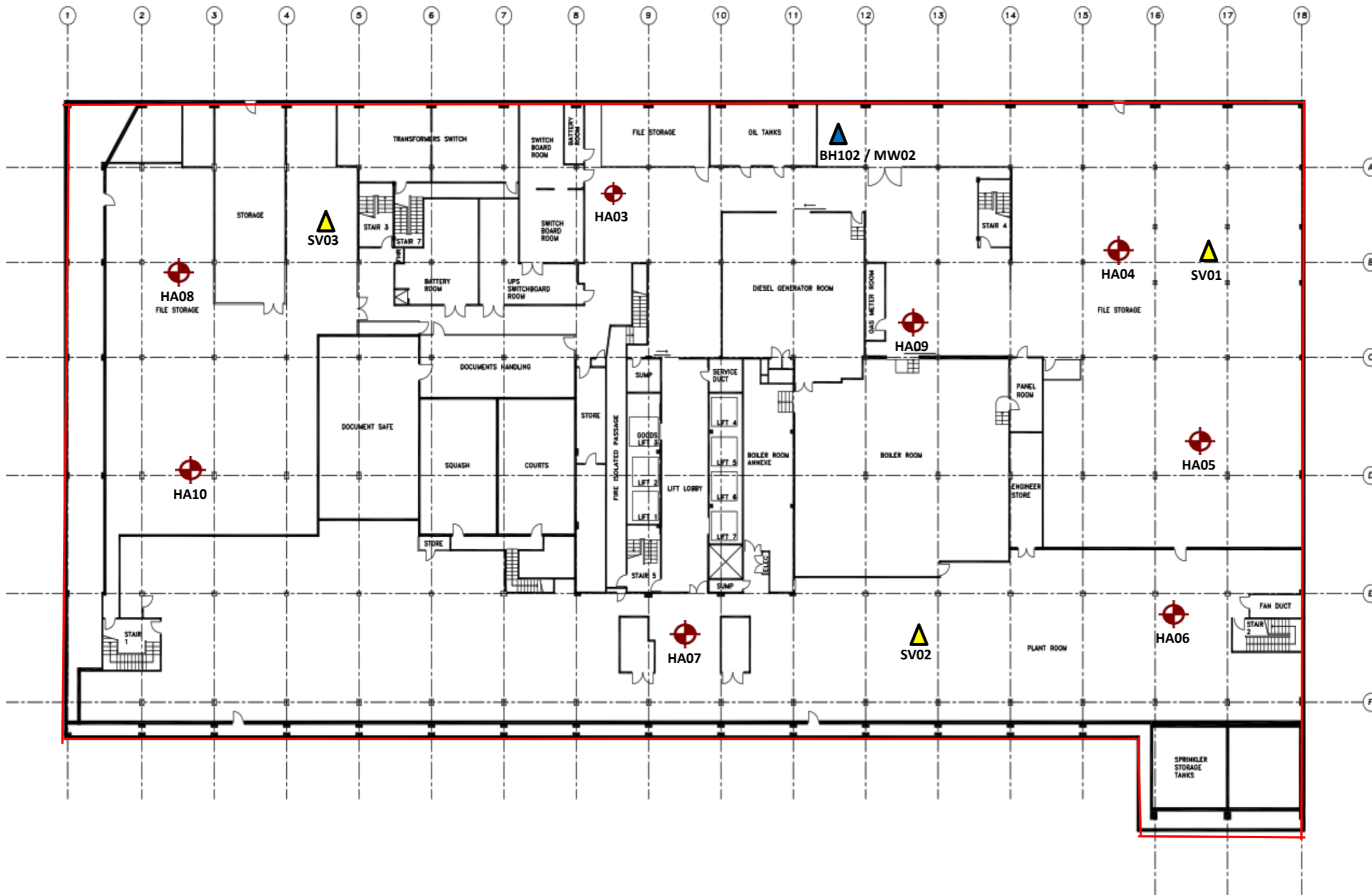


CLIENT: Investa Commercial Developments
 OFFICE: Sydney DRAWN BY: WFY/HY
 SCALE: 1:1500 @A3 DATE: 10 June 2025

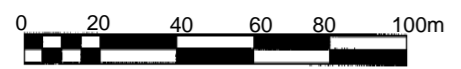
TITLE: **Site locations, boundaries and potential sources of contamination
 Proposed Redevelopment
 105 Miller Street, North Sydney, NSW**



PROJECT: **86964.05**
 DRAWING No: 1
 REVISION: 0



- LEGEND**
- Site Boundary
 - ⊕ DSI Boreholes
 - ▲ DSI Soil Vapour Ports
 - ▲ DSI Groundwater Wells



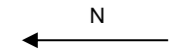
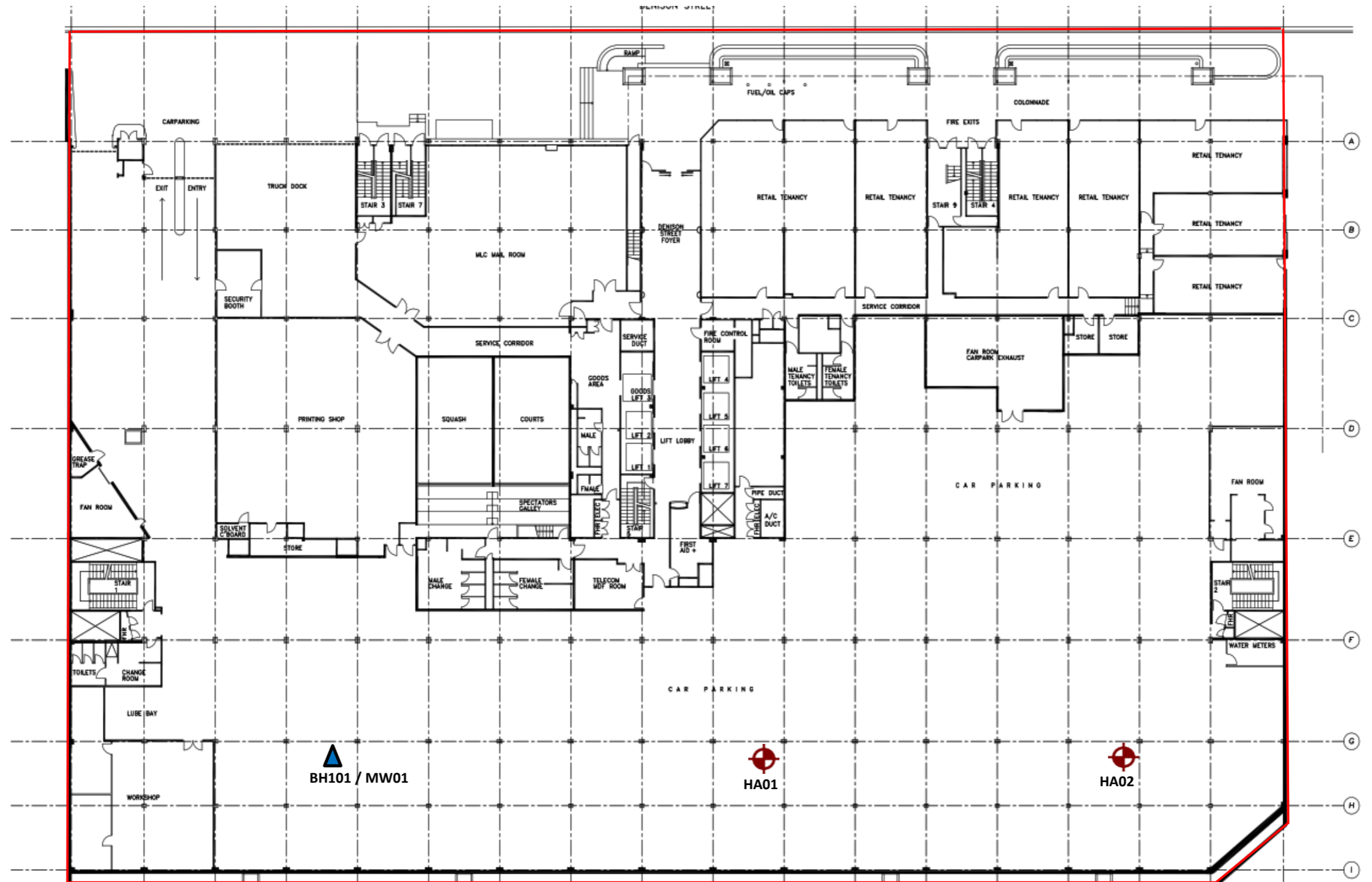
Notes: Test locations are approximate only. Basemap extracted from client supplied site plans.



CLIENT: Investa Commercial Developments Pty Ltd	
OFFICE: SYD	DRAWN BY: IR/WFY
SCALE: as shown	DATE: 10 June 2025

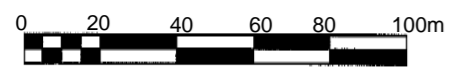
TITLE: **Test Location Plan (Basement Level)**
Proposed Redevelopment
105 Miller Street, North Sydney, NSW

PROJECT No:	86964.05
DRAWING No:	D.002
REVISION:	0



MOUNT STREET ARCADE

- LEGEND**
- Site Boundary
 - ⊕ Borehole Location
 - ▲ Groundwater Well Location



Notes: Test locations are approximate only. Basemap extracted from client supplied site plans.



CLIENT: Investa Commercial Developments Pty Ltd	
OFFICE: SYD	DRAWN BY: IR/WFY
SCALE: as shown	DATE: 10 June 2025

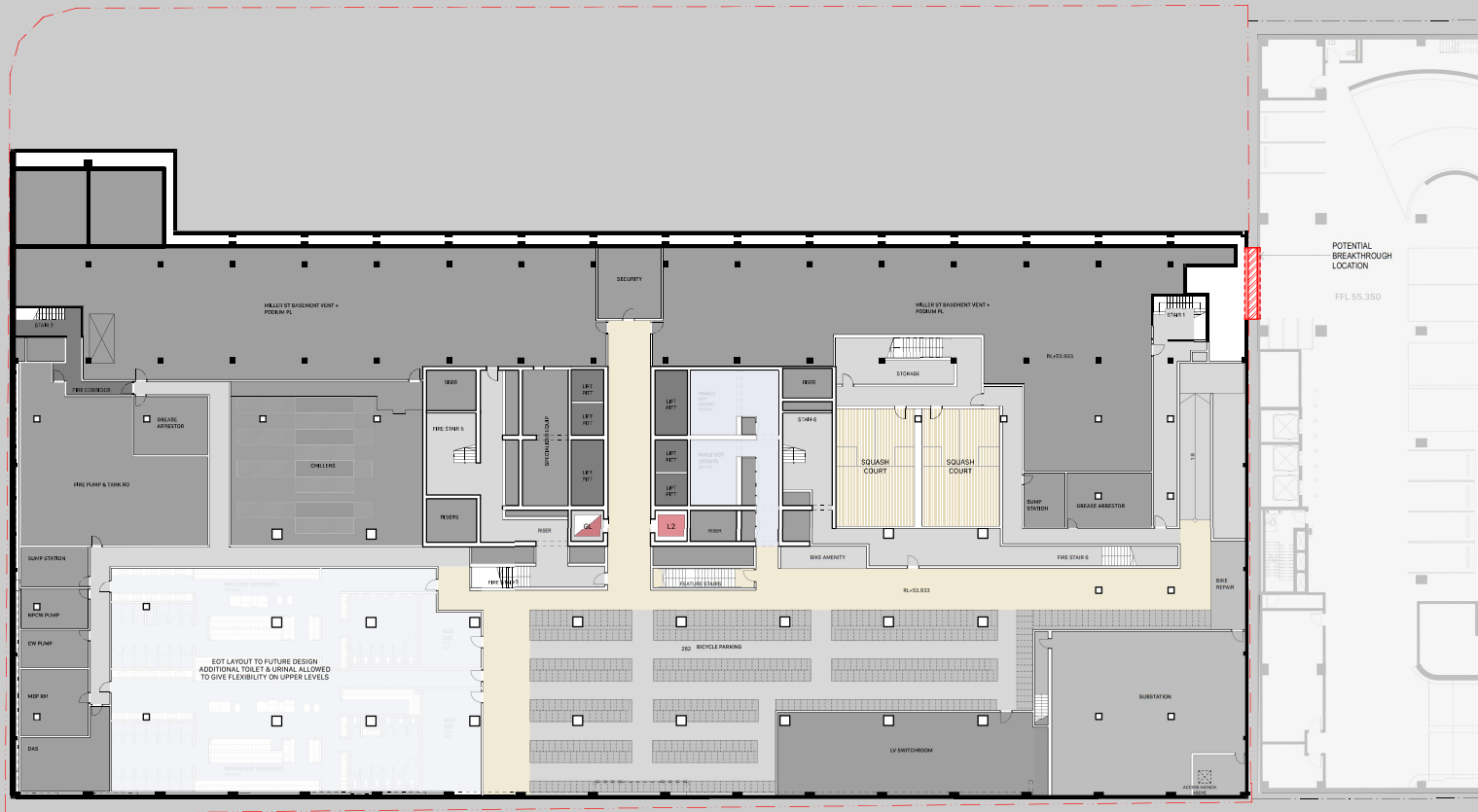
TITLE: **Test Location Plan (Lower Ground Level)**
Proposed Redevelopment
105 Miller Street, North Sydney, NSW

PROJECT No:	86964.05
DRAWING No:	D.003
REVISION:	0

- General notes**
- All dimensions and existing conditions shall be checked and verified by the contractor before proceeding with the work.
 - All levels relative to 'Australian Height Datum'.
 - Do not scale drawings.
 - Use figured dimensions only.

- Legend**
- Existing walls to be retained
 - New Construction

Notes



10	10/10/2025	GA Set for Review	CH
09	11/10/2024	GA Set for Review	CH
08	10/10/2024	Review	CH
07	10/10/2024	GA Construction and	CH
06	10/10/2024	GA Set for	CH
05	10/10/2024	GA Construction	CH
04	10/10/2024	GA Construction	CH
03	10/10/2024	GA Construction	CH
02	10/10/2024	GA Construction	CH
01	10/10/2024	GA Construction	CH

Rev	Date	Description	By
10	10/10/2025	GA Set for Review	CH
09	11/10/2024	GA Set for Review	CH
08	10/10/2024	Review	CH
07	10/10/2024	GA Construction and	CH
06	10/10/2024	GA Set for	CH
05	10/10/2024	GA Construction	CH
04	10/10/2024	GA Construction	CH
03	10/10/2024	GA Construction	CH
02	10/10/2024	GA Construction	CH
01	10/10/2024	GA Construction	CH

105 MILLER ST
Cammeraygal Country
105 Miller St
North Sydney NSW 2060

GA Floor Plans - Proposed Scale
Basement 1:200 @ A1

Project Code First Issued
FJMS 24/9/2024

Sheet No. Rev
20B1 10

2 PLAN Basement
1:200

- General notes**
- All dimensions and existing conditions shall be checked and verified by the contractor before proceeding with the work.
 - All levels relative to 'Australian Height Datum'.
 - Do not scale drawings.
 - Use figured dimensions only.

- Legend**
- Existing walls to be retained
 - New Construction

Notes



Rev	Date	Description	By
13	10/02/25	GA Set for Tender	TJA
12	11/02/25	GA Set for Tender	TJA
11	10/02/25	GA Construction m/c	CAK
10	10/02/25	GA Construction m/c	CAK
09	10/02/25	GA Construction m/c	CAK
08	12/02/24	GA Set for Tender	TEA
07	10/02/24	GA ITPD & Update Construction m/c	TEA

Rev Date Description By CHK

105 MILLER ST
Cammergall Country
105 Miller St
North Sydney NSW 2060

GA Floor Plans - Proposed Scale
Lower Ground Floor - Denison Street 1:200 @ A1

Project Code First Issued
FJMS 24/9/2024

Sheet No. Rev
201.G 13

2 PLAN LG Denison Street
1:200

Appendix B

About this Report

Introduction

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

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

Copyright

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

Borehole and Test Pit Logs

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

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

Groundwater

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

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at

the time of construction as are indicated in the report; and

- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

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

Reports

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

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

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

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

continued next page

About this Report

Site Anomalies

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

Information for Contractual Purposes

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

Site Inspection

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

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Appendix C

Borehole Logs

BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334117.0, N:6254339.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101/MW01
PROJECT No: 86964.03
DATE: 16/09/24
SHEET: 2 of 3

CONDITIONS ENCOUNTERED										SAMPLE			TESTING						
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK				DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
				ORIGIN (#)	CONSISTENCY DENSITY (%)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)									
48		[CONT] SANDSTONE: pale grey, medium to coarse grained, indistinctly bedded. Hawkesbury Sandstone																	
	11	10.00m: siltstone laminations														PLT	PL(A)=1.4MPa		
	12															PLT	PL(A)=1.6MPa		
	13	13.25m-15.20m: purple and orange staining					SW									PLT	PL(A)=1.3MPa		
	14															PLT	PL(A)=2.2MPa		
	15															PLT	PL(A)=1.3MPa		
	15.20															PLT	PL(A)=0.28MPa		
	15.58	15.58m-15.72m: siltstone band; dark grey														PLT	PL(A)=0.12MPa		
	15.72	15.88m-16.30m: siltstone clasts														PLT	PL(A)=0.28MPa		
	16															PLT	PL(A)=0.28MPa		
	16.50	SANDSTONE: pale grey-grey, medium to coarse grained; indistinctly bedded; with frequent dark grey sub-horizontal siltstone laminations. Hawkesbury Sandstone																	
	17															PLT	PL(A)=0.63MPa		
	18															PLT	PL(A)=1.1MPa		
	19						FR									PLT	PL(A)=0.94MPa		
	20															PLT	PL(A)=0.80MPa		

NOTES: ^MSoil origin is "probable" unless otherwise stated. ^CConsistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools and Proline **OPERATOR:** TightSite (BB) **LOGGED:** J.Miller
METHOD: 200mm Ø DT to 0.30m, HA to 0.43m, HQ to 0.68m, NMLC to 25.0m **CASING:** HW to 0.6m
REMARKS: No free groundwater observed whilst augering. Concrete and gatic cover on top of well. Surface level obtained from survey plans by RPS
 AAP Consulting AU2130xxxxx-001-A-Boreholes.
 Refer to explanatory notes for symbol and abbreviation definitions



Generated with CORE-GS by Geroc - Combined Log

BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334117.0, N:6254339.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101/MW01
PROJECT No: 86964.03
DATE: 16/09/24
SHEET: 3 of 3

CONDITIONS ENCOUNTERED													SAMPLE				TESTING					
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL				ROCK					SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE		
				ORIGIN (#)	CONSIS. (%) DENSITY (g/cm³)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH	RECOVERY (%)	RQD	FRACTURE SPACING (m)									DEFECTS & REMARKS	
36	21	[CONT] SANDSTONE: pale grey-grey, medium to coarse grained; indistinctly bedded; with frequent dark grey sub-horizontal siltstone laminations. Hawkesbury Sandstone					FR															
37	22	22.36m-22.42m: siltstone band; dark grey																				
36	22												20.70m: B, 5° PR, CT Clay 5mm, RF									
	22												21.60m: B, 5° UN, VNR Clay, RF									
	22												22.37m: .50mm, SLST Clast									
	23	Borehole discontinued at 22.55m depth. Target depth reached.																				
	24																					
	25																					
	26																					
	27																					
	28																					
	29																					

NOTES: ^(#) Soil origin is "probable" unless otherwise stated. ^(%) Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools and Proline

OPERATOR: TightSite (BB)

LOGGED: J.Miller

METHOD: 200mm Ø DT to 0.30m, HA to 0.43m, HQ to 0.68m, NMLC to 25.0m

CASING: HW to 0.6m

REMARKS: No free groundwater observed whilst augering. Concrete and gatic cover on top of well. Surface level obtained from survey plans by RPS
 AAP Consulting AU2130xxxxxx-001-A-Boreholes.
 Refer to explanatory notes for symbol and abbreviation definitions

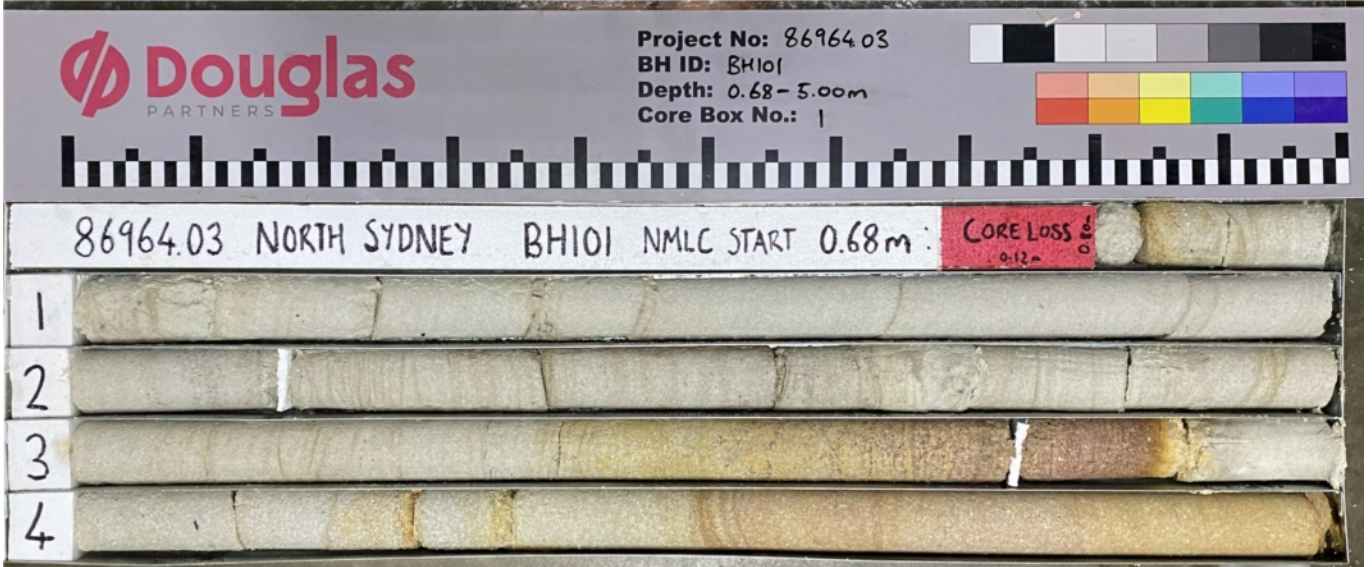


CORE PHOTO LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334117.0, N:6254339.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101/MW01
PROJECT No: 86964.03
DATE: 16/09/24
SHEET: 1 of 3



0.68-5.00 m depth



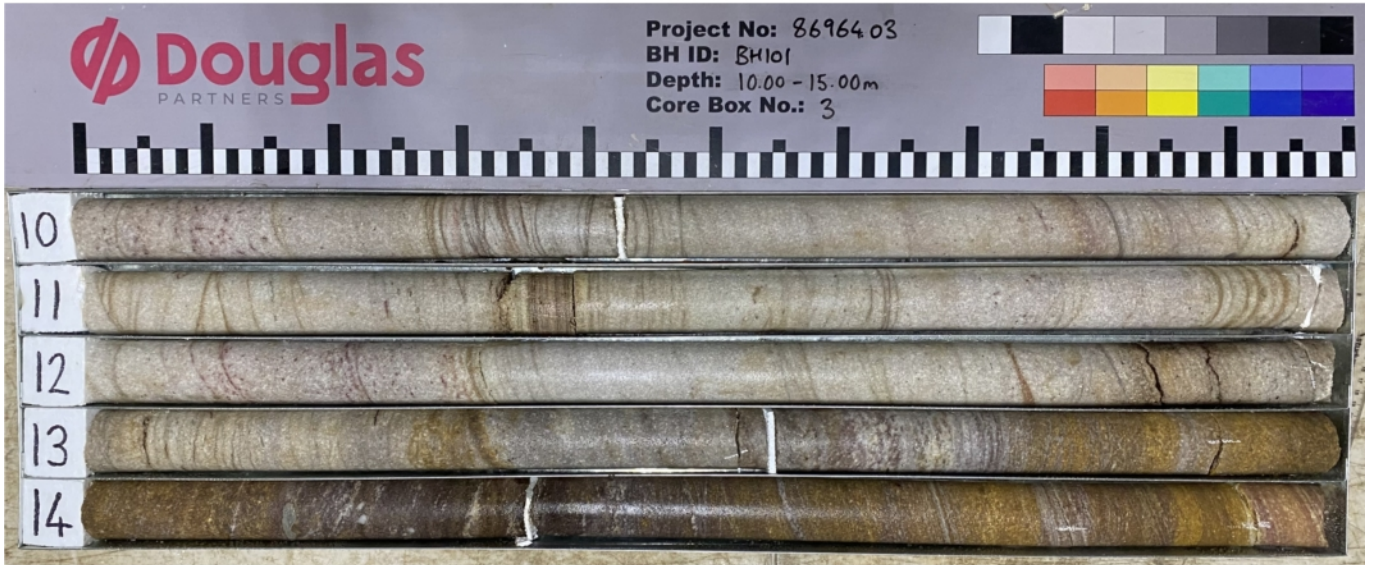
5.00-10.00 m depth

CORE PHOTO LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334117.0, N:6254339.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101/MW01
PROJECT No: 86964.03
DATE: 16/09/24
SHEET: 2 of 3



10.00-15.00 m depth



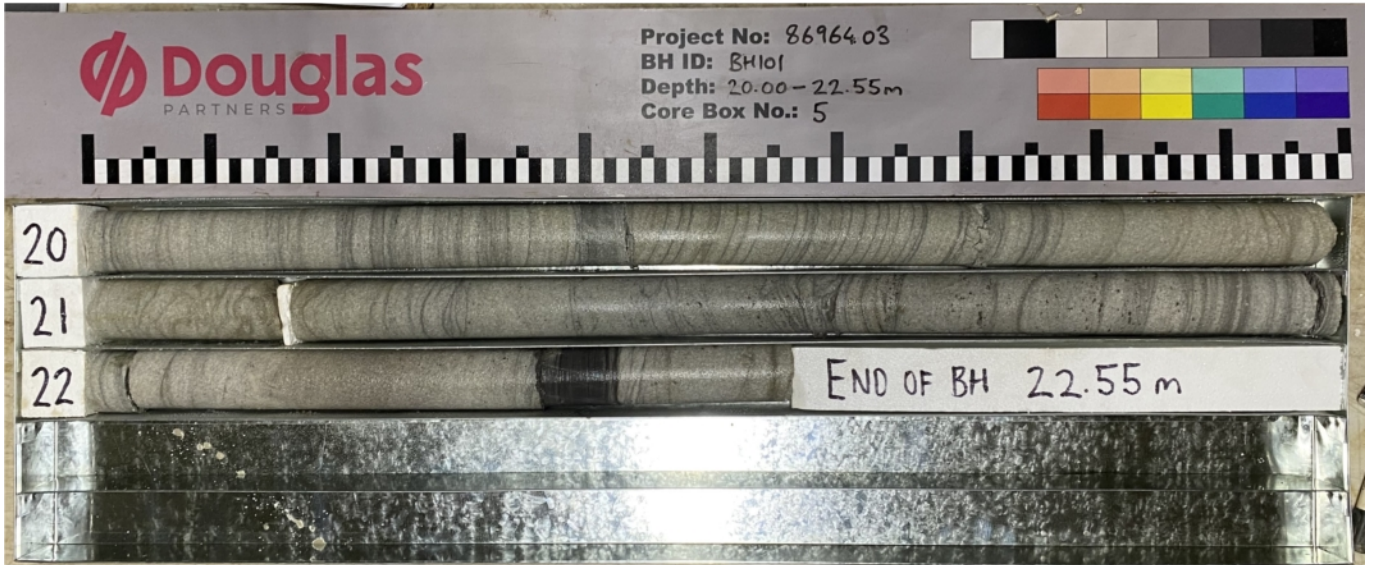
15.00-20.00 m depth

CORE PHOTO LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334117.0, N:6254339.4
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH101/MW01
PROJECT No: 86964.03
DATE: 16/09/24
SHEET: 3 of 3



20.00-22.55 m depth

BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334172.0, N:6254300.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH102/MW02
PROJECT No: 86964.03
DATE: 23/09/24
SHEET: 1 of 1

GROUNDWATER	CONDITIONS ENCOUNTERED										SAMPLE			TESTING						
	RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	SOIL			ROCK				DEFECTS & REMARKS	SAMPLE REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS	BACKFILL	WELL PIPE
					ORIGIN (#)	CONSIS. (°)	DENSITY (°)	MOISTURE	WEATH.	DEPTH (m)	STRENGTH									
	0.22		CONCRETE SLAB: 220mm thick, 5mm Ø rebar at 130mm depth; 20mm aggregate, 2mm voids																	
	0.33		CONCRETE SLAB: 80 mm thick, 20mm aggregate, 2mm voids																	
	0.50		FILL / GRAVEL: grey; coarse, sub-angular, igneous; drainage gravel.																	
	0.54		FILL / SAND, with gravel: orange-brown; medium; fine, sandstone and ironstone gravel; ripped sandstone.																	
	1.0		SANDSTONE: pale grey, medium to coarse grained, indistinctly bedded. Hawkesbury Sandstone																	
	1.5																			
	2.0																			
	2.5																			
	3.0																			
	3.5																			
	4.0																			
	4.5																			
	5.0																			
	5.5																			
	6.0																			
	6.5																			
	7.0																			
	7.5																			
	8.0		Borehole discontinued at 8.00m depth. Target depth reached.																	
	8.5																			
	9.0																			

NOTES: ° Soil origin is "probable" unless otherwise stated. ° Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand Tools and Proline

OPERATOR: TightSite (BB)

LOGGED: J.Miller

METHOD: 200mm Ø DT to 0.33m, HA to 0.54m, NMLC to 8.00m

CASING: HW to 0.6m

REMARKS: No free groundwater observed whilst augering. Concrete and gatic cover on top or well. Surface level obtained from survey plans by RPS AAP Consulting AU2130xxxxx-001-A-Boreholes. Refer to explanatory notes for symbol and abbreviation definitions

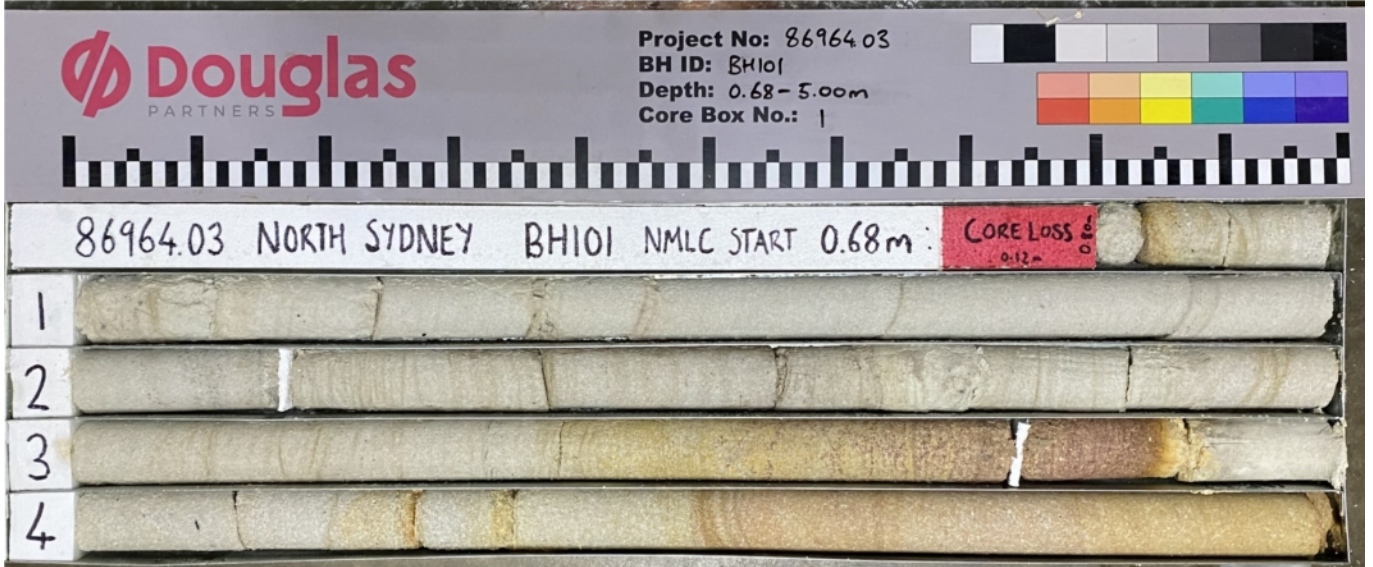


CORE PHOTO LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334172.0, N:6254300.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH102/MW02
PROJECT No: 86964.03
DATE: 23/09/24
SHEET: 1 of 3



0.68-5.00 m depth



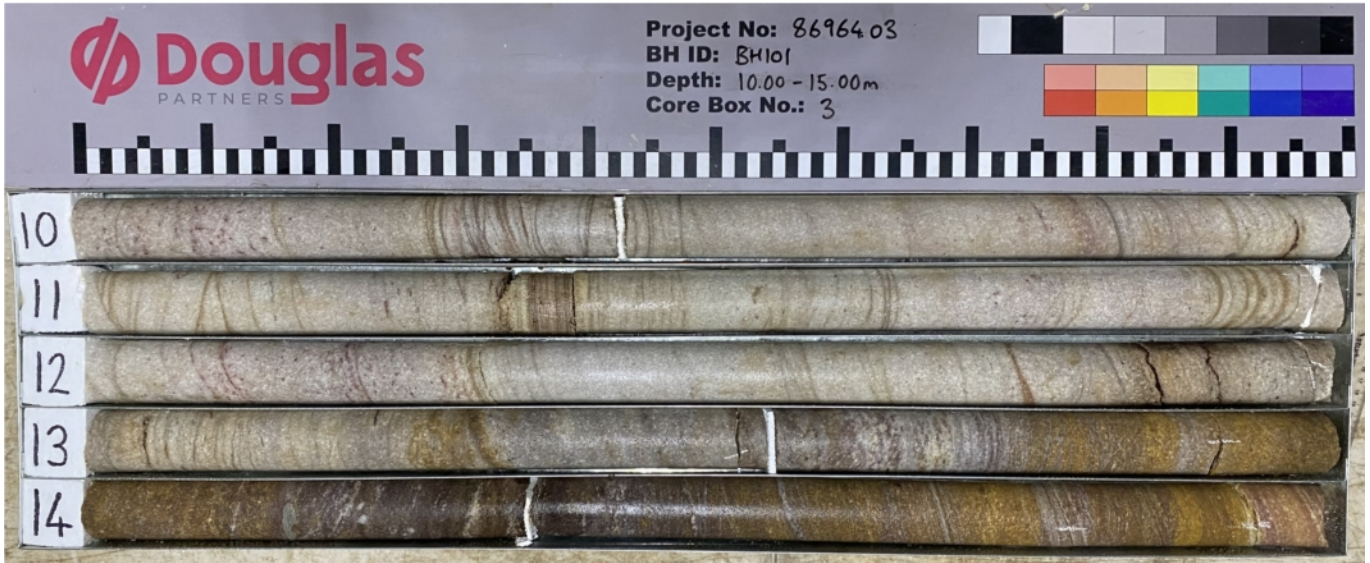
5.00-10.00 m depth

CORE PHOTO LOG

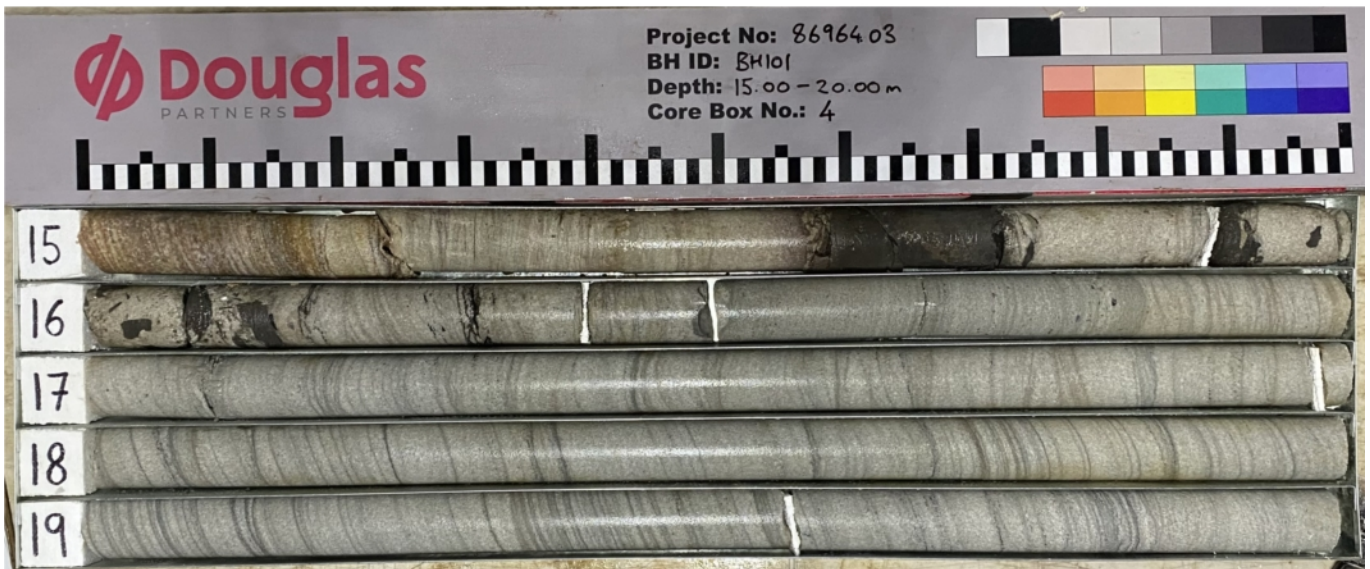
CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334172.0, N:6254300.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH102/MW02
PROJECT No: 86964.03
DATE: 23/09/24
SHEET: 2 of 3



10.00-15.00 m depth



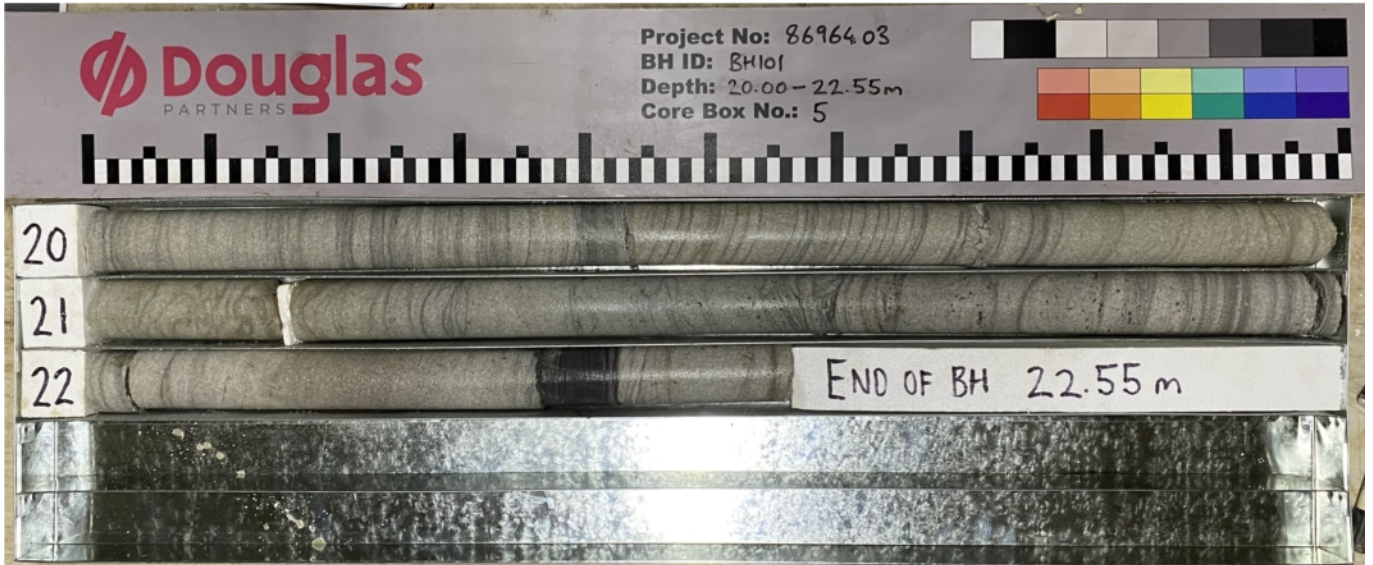
15.00-20.00 m depth

CORE PHOTO LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334172.0, N:6254300.8
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: BH102/MW02
PROJECT No: 86964.03
DATE: 23/09/24
SHEET: 3 of 3



20.00-22.55 m depth

BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334126.0, N:6254311.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA01
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS			
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY. (°)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
		CONCRETE.	[Concrete Pattern]			NA						
	0.22 0.24	BITUMEN: dark grey; 20mm bituminous membrane layer. CONCRETE.	[Bitumen Pattern]		ND							
	0.35	FILL / Silty GRAVEL: grey to dark grey; medium to coarse; low to medium plasticity silt.	[Fill Pattern]	FILL		M			ES 0.35 0.40		PID <1ppm	
Borehole discontinued at 0.50m depth. Refusal on inferred sandstone.												

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334121.0, N:6254283.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA02
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS			
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24. No free groundwater observed.		CONCRETE.	[Concrete Pattern]									
	0.22 0.24	BITUMEN: dark grey; 20mm bituminous membrane layer. CONCRETE.	[Bitumen Pattern]		ND	NA						
	0.35	FILL / GRAVEL, trace sand: grey and pale brown; medium to coarse; fine to coarse sand.	[Fill Pattern]	FILL		M		ES		0.35	PID	<1ppm
Borehole discontinued at 0.45m depth. Refusal on inferred sandstone.												

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



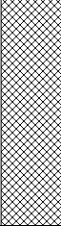



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 58.4 AHD
COORDINATE: E:334163.0, N:6254337.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA03
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

GROUNDWATER		CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS				
		RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24. No free groundwater observed.			CONCRETE.											
	0.20	0.22	BITUMEN: dark grey; 20mm bituminous membrane layer. CONCRETE.				NA							
	0.30		FILL / GRAVEL: grey; coarse.		FILL		ND			ES	0.30 - 0.40	PID	<1ppm	
	0.45		FILL / SAND, trace gravel: pale grey and yellow brown; fine to coarse; sandstone gravel.		FILL					ES	0.45 - 0.55	PID	<1ppm	
Borehole discontinued at 0.55m depth. Refusal on inferred sandstone.														

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Blind replicate collected at 0.45-0.55 m depth. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334159.0, N:6254290.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA04
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS			
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY. (g)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24. No free groundwater observed.		CONCRETE.	[Concrete Symbol]									
	0.25 0.27	BITUMEN: dark grey; 20 mm bituminous membrane layer. CONCRETE.	[Bitumen Symbol]		ND	NA						
	0.35	FILL / Silty Sandy GRAVEL: grey to dark grey; medium to coarse; low to medium plasticity silt; fine to coarse sand.	[Fill Symbol]	FILL		W		ES		0.35	PID	<1ppm
Borehole discontinued at 0.40m depth. Refusal on inferred sandstone.												

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334140.0, N:6254277.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA05
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED				SAMPLE			TESTING AND REMARKS					
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24. No free groundwater observed.		CONCRETE.	[Concrete symbol]			NA						
	0.25	BITUMEN: dark grey; 20mm bituminous membrane layer.	[Bitumen symbol]		ND							
	0.27	CONCRETE.	[Concrete symbol]									
	0.30	FILL / GRAVEL: dark grey; medium to coarse; apparently well compacted. Trace weathered sandstone at 0.45m depth.	[Fill symbol]	FILL		M				0.35		ES
										PID		<1ppm
		Borehole discontinued at 0.45m depth. Refusal on inferred sandstone.										

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334120.0, N:6254280.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA06
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

GROUNDWATER		CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS				
		RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (°)	DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE
27/08/24. No free groundwater observed.			CONCRETE.	[Concrete Pattern]				NA						
	0.25	0.27	BITUMEN: dark grey; 20mm bituminous membrane layer. CONCRETE.	[Bitumen Pattern]			ND							
	0.35		FILL / GRAVEL: grey; medium to coarse; Trace sand at 0.45 m depth.	[Fill Pattern]	FILL			M		ES	0.35 - 0.45	PID	<1ppm	
		Borehole discontinued at 0.50m depth. Refusal on inferred sandstone.												

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334124.0, N:6254324.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA07
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

GROUNDWATER		CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS		
RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY. (g)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24	No free groundwater observed.	CONCRETE.				NA						
	0.20	BITUMEN: dark grey; 20mm bituminous membrane layer.										
	0.22	CONCRETE.			ND							
	0.30	FILL / Sandy GRAVEL: grey to dark grey; medium to coarse; fine to coarse sand.		FILL		M						
									ES	0.45	PID	<1ppm
		Borehole discontinued at 0.50m depth. Refusal on inferred sandstone.										

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334159.0, N:6254364.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA08
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

GROUNDWATER		CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS				
		RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (°)	DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE
27/08/24. No free groundwater observed.			CONCRETE.	[Concrete Pattern]										
	0.25	0.27	BITUMEN: dark grey; 20mm bituminous membrane layer.	[Bitumen Pattern]				NA						
	0.35		CONCRETE.	[Concrete Pattern]										
			FILL / Silty Sandy GRAVEL: grey to dark grey; medium to coarse; low to medium plasticity silt.	[Fill Pattern]	FILL			M		ES	0.40 - 0.45		PID	<1ppm
Borehole discontinued at 0.50m depth. Refusal on inferred sandstone.														

NOTES: #Soil origin is "probable" unless otherwise stated. °Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data






BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334140.0, N:6254366.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA09
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

GROUNDWATER		CONDITIONS ENCOUNTERED					SAMPLE			TESTING AND REMARKS				
		RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. (%) DENSITY (g/cm³)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24. No free groundwater observed.				CONCRETE.										
		0.20	0.22	BITUMEN: dark grey; 20mm bituminous membrane layer. CONCRETE.			ND	M						
		0.30		FILL / Sandy GRAVEL: grey to dark grey gravel with yellow-brown sand; medium to coarse; fine to coarse sand.		FILL		NA		ES	0.30 - 0.35	PID	<1ppm	
										ES	0.35 - 0.40	PID	<1ppm	
		Borehole discontinued at 0.45m depth. Refusal on inferred sandstone.												

NOTES: #Soil origin is "probable" unless otherwise stated. %Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



BOREHOLE LOG

CLIENT: Investa Commercial Developments Pty Ltd
PROJECT: Proposed Redevelopment
LOCATION: 105 Miller Street, North Sydney, NSW

SURFACE LEVEL: 54.0 AHD
COORDINATE: E:334149.0, N:6254304.0
DATUM/GRID: MGA2020 Zone 56
DIP/AZIMUTH: 90°/---°

LOCATION ID: HA10
PROJECT No: 86964.03
DATE: 27/08/24
SHEET: 1 of 1

CONDITIONS ENCOUNTERED						SAMPLE			TESTING AND REMARKS			
GROUNDWATER RL (m)	DEPTH (m)	DESCRIPTION OF STRATA	GRAPHIC	ORIGIN (#)	CONSIS. ^(*) DENSITY. ^(*)	MOISTURE	REMARKS	TYPE	INTERVAL	DEPTH (m)	TEST TYPE	RESULTS AND REMARKS
27/08/24. No free groundwater observed.		CONCRETE.	[Concrete Symbol]									
	0.20	BITUMEN: dark grey; 20mm bituminous membrane layer.	[Bitumen Symbol]		ND							
	0.22	CONCRETE.	[Concrete Symbol]									
	0.30	FILL / Silty GRAVEL: grey and brown; medium to coarse; low to medium plasticity silt.	[Fill Symbol]	FILL					ES	0.30	PID	<1ppm
0.35	FILL / SAND: pale brown; fine to coarse; with fine to medium sized gravel.	[Fill Symbol]	FILL			M		ES	0.35	PID	<1ppm	
Borehole discontinued at 0.40m depth. Refusal on inferred sandstone.												

NOTES: ^(*)Soil origin is "probable" unless otherwise stated. ^(*)Consistency/Relative density shading is for visual reference only - no correlation between cohesive and granular materials is implied.

PLANT: Hand auger, 80 mm diameter

OPERATOR: (JCC)

LOGGED: JCC/IR

METHOD: Hand auger

CASING: Uncased

REMARKS: No free groundwater observed. Coordinates estimated using aerial imagery. Relative level estimated from publicly available LIDAR data

Refer to explanatory notes for symbol and abbreviation definitions



Appendix D

Table Summary Results

Table F2: Waste Classification Assessment

Sample ID	Depth	Sample Date	Metals							TRH		BTEX				PAH		Phenols	OCP					OPP	PCB	Asbestos					
			Total Arsenic	Cadmium	Total Chromium	Lead	Mercury (inorganic)	Nickel	Nickel TCLP	TRH C6 - C9	TRH C10-C36	Benzene	Toluene	Ethylbenzene	Total Xylenes	Benzo(a)pyrene (BaP)	Total PAH		Scheduled Chemical Waste (standard)	Total Endosulfan	Total Analysed OCP	Mirex	Total Analysed OPP			Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis (AS)	Asbestos ID in soil >0.1g/kg	Asbestos ID in soil <0.1g/kg	
		PQL	4	0.4	1	1	0.1	1		25	50	0.2	0.5	1	1	0.05	0.05	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1						
HA01	0.35 - 0.4 m	27/08/24	<4	<0.4	6	6	<0.1	20	-	<25	1,600	<0.2	<0.5	<1	<1	<0.05	0.52	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-
HA02	0.35 - 0.45 m	27/08/24	<4	<0.4	4	4	<0.1	16	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA03	0.3 - 0.4 m	27/08/24	<4	<0.4	5	2	<0.1	21	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
BD1/20240827	0 m	27/08/24	<4	<0.4	4	4	<0.1	4	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	
HA04	0.35 - 0.4 m	27/08/24	<4	<0.6	7	<2	<0.1	43	0.02	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	
HA05	0.35 - 0.45 m	27/08/24	<4	<0.4	5	4	<0.1	23	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA06	0.35 - 0.45 m	27/08/24	<4	<0.4	12	4	<0.1	53	<0.02	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA07	0.45 - 0.5 m	27/08/24	<4	<0.4	7	11	<0.1	18	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA08	0.4 - 0.45 m	27/08/24	<4	0.5	10	22	<0.1	35	-	<25	980	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	NAD	NAD	NAD	
HA09	0.3 - 0.35 m	27/08/24	<4	<0.4	11	12	<0.1	18	-	<25	770	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA09	0.35 - 0.4 m	27/08/24	<4	<0.4	5	16	<0.1	9	-	<25	<50	<0.2	<0.5	<1	<1	0.2	2.6	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	NAD	NAD	
HA10	0.3 - 0.35 m	27/08/24	<4	<0.4	<1	2	<0.1	3	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA10	0.35 - 0.4 m	27/08/24	<4	<0.4	5	20	<0.1	6	-	<25	290	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
HA01 - [TRIPLICATE]	0.35 - 0.4 m	27/08/24	<4	<0.4	7	5	<0.1	18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
BH101	0.39 - 0.43 m	18/09/24	<4	<0.4	3	5	<0.1	2	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
BH102	0.35 - 0.4 m	23/09/24	<4	<0.4	9	<1	<0.1	44	0.02	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	-	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
BH102	0.45 - 0.5 m	23/09/24	<4	<0.4	10	7	<0.1	26	-	<25	300	<0.2	<0.5	<1	<1	0.06	0.2	<5	-	-	-	-	-	-	-	-	NAD	NAD	-	-	
BH102	0.5 - 0.54 m	23/09/24	<4	<0.4	5	7	<0.1	12	-	<25	<50	<0.2	<0.5	<1	<1	<0.05	<0.05	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	-	-	
Waste Classification Criteria ^f																															
CT1			100	20	100	100	4	40	-	-	10,000	10	288	600	1000	0.8	200	288	<50	60	-	-	4	<50	-	-	-	-	-	-	
SCC1			500	100	1,900	1,500	50	1,050	-	-	10,000	18	518	1,080	1,800	10	200	518	<50	108	-	-	7.5	<50	-	-	-	-	-	-	
TCLP1			-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CT2			400	80	400	400	16	160	-	-	40,000	40	1,152	2,400	4,000	3.2	800	1,152	<50	240	-	-	16	<50	-	-	-	-	-	-	
SCC2			2,000	400	7,600	6,000	200	4,200	-	-	40,000	72	2,073	4,320	7,200	23	800	2,073	<50	432	-	-	30	<50	-	-	-	-	-	-	
TCLP2			-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

CT1 exceedance
 TCLP1 and/or SCC1 exceedance
 CT2 exceedance
 TCLP2 and/or SCC2 exceedance
 Asbestos detection
 - = Not tested, no criteria or not applicable NAD = no asbestos detected

Notes:

- a QA/QC replicate of sample listed directly below the primary sample
- b Total chromium used as initial screen for chromium(VI).
- c Total recoverable hydrocarbons (TRH) used as an initial screen for total petroleum hydrocarbons (TPH)
- d Criteria for scheduled chemicals used as an initial screen
- e Criteria for Chlorpyrifos used as initial screen
- f NSW EPA, 2014, Waste Classification Guidelines Part 1; Classifying Waste
- PQL Practical quantitation limit
- CT1 Maximum values of specific contaminant concentration (SCC) for classification without TCLP: General solid waste
- SCC1 Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
- TCLP1 Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: General solid waste
- CT2 Maximum values of specific contaminant concentration (SCC) for classification without TCLP: Restricted solid waste
- SCC2 Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste
- TCLP2 Maximum values for leachable concentration (TCLP) and specific contaminant concentration (SCC) when used together: Restricted solid waste

Table F3: Summary of Laboratory Results – Soil Vapour

		VCH							
		trans-1,2-dichloroethene (trans-DCE)	cis-1,2-dichloroethene (cis-DCE)	Trichloroethene (TCE)	Tetrachloroethene (PCE)	Vinyl chloride	1,1-dichloroethene	1,1,1-trichloroethane (1,1,1-TCA)	1,1-dichloroethane
EQL		µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
		2	2	2.7	3.4	1.3	2	2.7	2
Site Assessment Criteria									
IHIL D (soil vapour)			300	80	8000	100		230000	
Field ID	Date								
SV1	28/08/24	<2	<2	<1.6	<3.4	<0.8	<2	<2.7	<2
SV2	28/08/24	<2	<2	<1.6	<3.4	<0.8	<2	<2.7	<2
SV3	28/08/24	<2	<2	<1.6	<3.4	<0.8	<2	<2.7	<2
BD1	28/08/24	<2	<2	<1.6	<3.4	<0.8	<2	<2.7	<2

Notes:
Refer to SAC for information on modification of WHO and RSL thresholds

Table F4: Summary of Laboratory Results – Groundwater

Sample ID				HSL for vapour intrusion (4 to <8m)	ANZG (2018) 95% LOP Marine	MW01	BD1
Sample Date		PQL	Units			30/09/24	30/09/24
Metals - Dissolved	Total Arsenic	1	µg/L		24 / 13	<1	<1
	Cadmium	0.1	µg/L		0.7	<0.1	<0.1
	Total Chromium	1	µg/L		4.4	<1	<1
	Copper	1	µg/L		1.3	44	47
	Lead	1	µg/L		4.4	<1	1
	Mercury (inorganic)	0.05	µg/L		0.1	<0.05	<0.05
	Nickel	1	µg/L		7	24	29
	Zinc	1	µg/L		8	62	69
TRH	F1 ((C6-C10)-BTEX)	100	µg/L	6000		47	42
	F2 (>C10-C16 less Naphthalene)	50	µg/L	NL		<50	130
	F3 (>C16-C34)	100	µg/L			<100	<200
	F4 (>C34-C40)	100	µg/L			<100	<200
BTEX	Benzene	1	µg/L	5000	500	<1	<1
	Toluene	1	µg/L	NL	180	<1	<1
	Ethylbenzene	1	µg/L	NL	80	<1	<1
	o-Xylene	1	µg/L		350	<1	<1
	m+p-Xylene	2	µg/L			<2	<2
	Total Xylenes	1	µg/L	NL		<1	<1
PAH	Acenaphthene	0.1	µg/L			<0.1	<0.2
	Acenaphthylene	0.1	µg/L			<0.1	<0.2
	Anthracene	0.1	µg/L		0.01	<0.1	<0.2
	Benzo(a)anthracene	0.1	µg/L			<0.1	<0.2
	Naphthalene	1	µg/L	NL	50	<1	<1
	Benzo(a)pyrene (B(a)P)	0.1	mg/L		0.1	<0.1	<0.2
	Benzo(b,j+k)fluoranthene	0.2	µg/L			<0.2	<0.4
	Benzo(g,h,i)perylene	0.1	µg/L			<0.1	<0.2
	Chrysene	0.1	µg/L			<0.1	<0.2
	Dibenzo(a,h)anthracene	0.1	µg/L			<0.1	<0.2
	Fluoranthene	0.1	µg/L		1	<0.1	<0.2
	Fluorene	0.1	µg/L			<0.1	<0.2
	Indeno(1,2,3-c,d)pyrene	0.1	µg/L			<0.1	<0.2
	Phenanthrene	0.1	µg/L		0.6	<0.1	<0.2
	Pyrene	0.1	µg/L			<0.1	<0.2
	Sum of detected PAH	0.1	µg/L			<0.1	<0.2
Sum of detected PAH	0.1	µg/L			<0.1	<0.2	
OCP	DDE	0.001	µg/L			<0.001	-
	DDT	0.001	µg/L		0.0004	<0.001	-
	DDD	0.001	µg/L			<0.001	-
	Aldrin	0.001	µg/L		0.003	<0.001	-
	Dieldrin	0.001	µg/L		0.01	<0.001	-
	Aldrin + Dieldrin (calculated)	0.001	µg/L			<0.001	-
	alpha-chlordane	0.001	µg/L		0.001	<0.001	-
	gamma-Chlordane	0.001	µg/L			<0.001	-
	Endosulfan I	0.002	µg/L		0.005	<0.002	-
	Endosulfan II	0.002	µg/L			<0.002	-
	Endosulfan Sulphate	0.001	µg/L			<0.001	-
	Endrin	0.001	µg/L		0.004	<0.001	-
	Endrin Aldehyde	0.001	µg/L			<0.001	-
	Heptachlor	0.001	µg/L		0.0004	<0.001	-
	Heptachlor Epoxide	0.001	µg/L			<0.001	-
	Hexachlorobenzene	0.001	µg/L			<0.001	-
	Methoxychlor	0.001	µg/L		0.004	<0.001	-
	alpha-BHC	0.001	µg/L			<0.001	-
	beta-BHC	0.001	µg/L			<0.001	-
	delta-BHC	0.001	µg/L			<0.001	-
	Lindane	0.001	µg/L			<0.001	-
Sum of detected OCP	0.001	µg/L			<0.001	-	
Sum of detected OCP	0.001	µg/L			<0.001	-	
OPP	Azinphos methyl (Guthion)	0.02	µg/L			<0.02	-
	Bromophos-ethyl	0.05	µg/L			<0.05	-
	Chlorpyrifos	0.009	µg/L		0.009	<0.009	-
	Chlorpyrifos-methyl	0.05	µg/L			<0.05	-
	Diazinon	0.01	µg/L		0.01	<0.01	-
	Dichlorvos	0.05	µg/L			<0.05	-
	Dimethoate	0.1	µg/L		0.15	<0.1	-
	Ethion	0.05	µg/L			<0.05	-
	Ronnel (fenchlorphos)	0.05	µg/L			<0.05	-
	Fenitrothion	0.05	µg/L		0.001	<0.05	-
	Fenthion	0.05	µg/L			<0.05	-
	Malathion	0.05	µg/L		0.05	<0.05	-
	Parathion	0.004	µg/L		0.004	<0.004	-
	Parathion-methyl	0.05	µg/L			<0.05	-
	Methidathion	0.05	µg/L			<0.05	-
	Fenamiphos	0.05	µg/L			<0.05	-
	Sum of detected OPP	0.004	µg/L			<0.004	-
Sum of detected OPP	0.009	µg/L			<0.009	-	

Table F4: Summary of Laboratory Results – Groundwater

Sample ID				HSL for vapour intrusion (4 to <8m)	ANZG (2018) 95% LOP Marine	MW01	BD1
Sample Date		PQL	Units			30/09/24	30/09/24
PCB	Arochlor 1016	0.01	µg/L			<0.01	-
	Arochlor 1221	0.01	µg/L			<0.01	-
	Arochlor 1232	0.01	µg/L			<0.01	-
	Arochlor 1242	0.01	µg/L		0.3	<0.01	-
	Arochlor 1248	0.01	µg/L			<0.01	-
	Arochlor 1254	0.01	µg/L		0.01	<0.01	-
	Arochlor 1260	0.01	µg/L			<0.01	-
	Sum of detected PCB	0.01	µg/L			<0.01	-
VOC (excluding BTEX)	1,1,1,2-tetrachloroethane	1	µg/L			<1	<1
	1,1,1-trichloroethane	1	µg/L			<1	<1
	1,1,2,2-tetrachloroethane	1	µg/L			<1	<1
	tetrachloroethene	1	µg/L		70	<1	<1
	1,1,2-trichloroethane	1	µg/L			<1	<1
	1,1,2-trichloroethylene	1	µg/L			<1	<1
	1,1-dichloroethane	1	µg/L			<1	<1
	1,1-Dichloroethene	1	µg/L			<1	<1
	1,1-dichloropropene	1	µg/L			<1	<1
	1,2,3-trichlorobenzene	1	µg/L			<1	<1
	1,2,3-trichloropropane	1	µg/L			<1	<1
	1,2,4-trichlorobenzene	1	µg/L			<1	<1
	1,2,4-trimethyl benzene	1	µg/L			<1	<1
	1,2-dibromo-3-chloropropane	1	µg/L			<1	<1
	1,2-dichlorobenzene	1	µg/L			<1	<1
	1,2-dichloroethane	1	µg/L			<1	<1
	1,2-dichloropropane	1	µg/L			<1	<1
	1,3,5-trimethyl benzene	1	µg/L			<1	<1
	1,3-dichlorobenzene	1	µg/L			<1	<1
	1,3-dichloropropane	1	µg/L			<1	<1
	1,4-dichlorobenzene	1	µg/L			<1	<1
	2,2-dichloropropane	1	µg/L			<1	<1
	2-chlorotoluene	1	µg/L			<1	<1
	4-chlorotoluene	1	µg/L			<1	<1
	4-isopropyl toluene	1	µg/L			<1	<1
	Bromobenzene	1	µg/L			<1	<1
	Bromochloromethane	1	µg/L			<1	<1
	Bromodichloromethane	1	µg/L			6	6
	Bromoform	1	µg/L			<1	<1
	carbon tetrachloride	1	µg/L			240	<1
	Chloroethane	10	µg/L			<10	<10
	Vinyl Chloride	10	µg/L			100	<10
	Chloroform	1	µg/L			370	45
	Chloromethane	10	µg/L			<10	<10
	cis-1,2-dichloroethene	1	µg/L			700	<1
	cis-1,3-dichloropropene	1	µg/L			<1	<1
	Isopropylbenzene (cumene)	1	µg/L			<1	<1
	Cyclohexane	1	µg/L			<1	<1
	dibromochloromethane	1	µg/L			<1	1
	Dibromomethane	1	µg/L			<1	<1
Dichlorodifluoromethane	10	µg/L			<10	<10	
1,2-dibromoethane	1	µg/L			<1	<1	
hexachlorobutadiene	1	µg/L			<1	<1	
Bromomethane	10	µg/L			<10	<10	
Monochlorobenzene	1	µg/L			<1	<1	
n-butyl benzene	1	µg/L			<1	<1	
n-propyl benzene	1	µg/L			<1	<1	
sec-butyl benzene	1	µg/L			<1	<1	
Styrene (vinylbenzene)	1	µg/L			<1	<1	
Tert-butyl benzene	1	µg/L			<1	<1	
trans-1,2-dichloroethene	1	µg/L			<1	<1	
trans-1,3-dichloropropene	1	µg/L			<1	<1	
Trichlorofluoromethane	10	µg/L			<10	<10	
Sum of detected VOC	1	µg/L				51	52

Notes:

- No criterion / not defined / not tested / not applicable
- * QA/QC replicate of sample listed directly below the primary sample
- NL Not limiting
- PQL Practical quantitation limit

Shaded cell is exceedance of guideline value

Where one or more guideline value is exceeded, the cell is shaded to the colour of the highest guideline value exceeded

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 95% level of protection of species for marine aquatic ecosystems [NB: 99% level of protection adopted for bioaccumulative chemicals]

ANZG (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, orange text is 'unknown' level of protection

Underlining of ANZG (2018) criteria indicates a criteria with an 'unknown' level of protection.

ANZG (2018) DGV adopted for most conservative species of following analytes: DGV for xylene (m) adopted for xylene (m+p); DGV for CrVI adopted for total chromium; DGV for AsV adopted for total arsenic

ANZG (2018) DGV adopted for aluminium in freshwater is for receiving waters with pH >6.5. For receiving waters with pH <6.5 suitability of the more conservative, low reliability DGV of unknown LOP should be considered

ANZG (2018) Ammonia DGV is pH and temperature dependant. DGV for a pH of 8 provided in table.

Appendix E

Unexpected Finds Protocol

1. General

Where the site conditions are found to be different than anticipated, the proposed remediation approach may not be appropriate for the contamination encountered. In such cases the Environmental Consultant is to re-assess the contamination and remediation approach. Where necessary the Environmental Consultant will prepare an addendum to, or revision of, this RAP.

2. Contingency plan

This contingency plan has been developed to provide guidance on processes to follow if contamination (or indicators of contamination), is encountered during the redevelopment works. Any such finds shall be surveyed and the location documented.

Although the site has been subject to previous investigation(s), there remains a potential for contamination to be present between sampled locations. In the event that signs of contamination, are encountered during remediation e.g. evidence of asbestos containing material (ACM), petroleum, or other chemical odours which weren't previously identified the following protocols will apply:

- The Site Manager is to be notified and the affected area closed off by the use of barrier tape and warning signs;
- The Environmental Consultant is to be notified to inspect the area and assess the significance of the potential contamination and determine extent of remediation works (if deemed necessary) to be undertaken. An assessment report and management plan detailing this information will be compiled by the Environmental Consultant and provided to the Principal's Representative;
- The assessment results together with a suitable management plan shall be provided by the Principal's Representative to the Consent Authority (if required by the development consent);
- The agreed management / remedial strategy, based on the RAP and relevant guidelines, shall be implemented; and
- All details of the assessment and remedial works are to be included in the site validation report.

3. Unexpected finds protocol

This unexpected finds protocol (UFP) has been developed to provide guidance on processes to follow if any unexpected find is encountered during the remediation or future civil and construction works. Any unexpected finds should be surveyed and the location documented.

All site personnel are to be inducted into their responsibilities under this (UFP), which should be included or referenced in the Remediation Contractors Environmental Management Plan.

All site personnel are required to report unexpected signs of environmental concern to the Site Manager if observed during the course of their works e.g. presence of potential unexploded ordinance, unnatural staining, potential contamination sources (such as buried drums or tanks) or chemical spills.

Should signs of concern be observed, the Site Manager, as soon as practical, will:

- Stop work in the affected area and ensure the area is barricaded to prevent unauthorised access;
- Notify authorities needed to obtain emergency response for any health or environmental concerns (e.g. fire brigade);
- Notify the Principal's Representative of the occurrence;
- Notify any of the authorities that the Remediation Contractor is legally / contractually required to notify (e.g. EPA, Council); and
- Notify the Environmental Consultant.

The Principal's Representative is to notify any of the authorities which the Principal is legally / contractually required to notify (e.g. EPA, Council).

The Environmental Consultant will assess the extent and significance of the find and develop an investigation, remediation or management approach using (where possible) the principles and procedures already outlined in the RAP. Where a Site Auditor is involved, the proposed approach will be discussed and agreed with the Site Auditor prior to implementation.

4. References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

WA DoH. (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. WA Department of Health.

Appendix F

Remediation Options Assessment and Evaluation

1. Introduction

The following key guidelines and technical reports were consulted in the preparation of this remediation options assessment:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013);
- CRC CARE *National Remediation Framework Guidelines: Remediation Action Plan Development - Guideline on Performing Remediation Options Assessment* (CRC CARE, 2019a);
- CRC CARE *National Remediation Framework Guidelines: Technology Guides: Soil* (CRC CARE, 2019b); and
- CRC CARE *National Remediation Framework Guidelines: Technology Guides: Groundwater* (CRC CARE, 2019c).

The first stage of developing a remediation strategy is to establish clear and measurable remediation objectives and remediation criteria (clean-up levels). These will form the requirements against which remediation options are assessed.

The next stage of the remediation options assessment is to select technology and management options, or combinations of options, that have the potential to reduce contaminant concentrations and/or apply management controls as necessary so that the remediation objectives are achieved, and no unacceptable risk is posed by the contamination in the context of the current and proposed site use. Where several viable options have been identified, an assessment of each of the options will be required to determine which option will most adequately and sustainably meet the remediation objectives

The remediation objectives are to:

- Address potentially unacceptable risks to relevant environmental values from contamination (refer to the CSM in Section 7); and
- Render the site suitable, from a contamination perspective, for the proposed development (refer to Section 2).

2. Hierarchy of remediation options

NEPC (2013) stipulates the preferred hierarchy of options for site clean-up (remediation) and/or management which is outlined as follows:

- On-site treatment of the contamination so that it is destroyed, or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which soil is returned to the site;

or, if these two options are not practicable;

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

or,

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

3. Remediation options

Some of the most common remediation technologies or the identified potential contaminants of concern are considered in Table 1, referenced from the CRC CARE *National Remediation Framework Guidelines*. In some of the cases, a combination of remediation options outlined below may apply so that the remediation objectives are achieved and no unacceptable risk is posed by the site contamination in relation to the current / proposed development.

Table 1: Soil, soil vapour and groundwater remediation / management options

Soil – Remediation / Management Options		
Option	Pros	Cons
<p>Containment: allow soil contamination to remain at depth, covering by a capping layer or structure (i.e. a building), or containment in an engineered onsite containment cell.</p>	<ul style="list-style-type: none"> - The most cost-efficient method of soil remediation. - Suitable for site developments with no basement level. - Suitable for asbestos-contaminated soil to reduce the potential release of asbestos fibres during excavation / remediation. 	<ul style="list-style-type: none"> - This option may not be allowed by the relevant development consent authorities. - The implementation and legal enforcement of a long-term environmental management plan (LTEMP); and the responsibility of the site owner to manage such as system on a long-term basis. - Potential devaluation of the property. - Not suitable for contaminants with high leaching potential / volatile contaminants.
<p>Excavation: comprise delineation of soil contaminants followed by removal of identified contamination. Excavation may be followed by ex situ treatment and reuse on site or offsite, or disposal at an approved landfill facility.</p>	<ul style="list-style-type: none"> - Most suitable for proposed basement excavation. - Permanent removal of site contamination. - No need to comply with a long-term environmental management plan (EMP). 	<ul style="list-style-type: none"> - The high disposal costs associated with off-site disposal of the contaminated waste in a landfill facility. - Requirements for geotechnical stabilisation, classification, segregation and use or disposal and final validation.

Soil – Remediation / Management Options		
Option	Pros	Cons
<p>Chemical immobilisation and solidification (CIS): involves the addition of reagents / additives to contaminated soil to either immobilise / solidify contaminants within the soil.</p>	<ul style="list-style-type: none"> - Commonly used and widely available at low cost. - Applicable to both <i>in situ</i> / <i>ex situ</i> remediation. - Suitable for inorganic contaminants such as metals and asbestos and organic contaminants such as pesticides, petroleum hydrocarbons, polycyclic aromatic hydrocarbons, volatile and semi volatile organic compounds and polychlorinated biphenyls. 	<ul style="list-style-type: none"> - Time consuming requires bench / pilot trials prior to actual application. - Large machines may be required – not suitable for sites with limited space.
Soil Vapour - Remediation / Management Options		
Option	Pros	Cons
<p>Soil vapour extraction/treatment: to remove contaminated soil vapour from the unsaturated zone in a soil profile / fractured rock. It applies a vacuum to extraction wells (vertical) and/or trenches or wells (horizontal) which have been installed in the subsurface of the area to be remediation.</p> <p>The vacuum induces the controlled flow of soil vapour, removing volatile and some semi-volatile organic contaminants from the soil profile.</p> <p>The extracted vapour stream is remediated via technologies such as the granular activated carbon, biofiltration, combustive technologies / condensation.</p>	<ul style="list-style-type: none"> - The airway in the system may also enhance evaporation of non-aqueous phase liquids, volatilisation of contaminants dissolved in pore water, desorption of contaminants from the surface of soil particles and promote biodegradation. 	<ul style="list-style-type: none"> - Cost / labour / time intensive to design and install a site-specific system.

Soil – Remediation / Management Options		
Option	Pros	Cons
<p>Vapour barrier (with a passive venting system as required): placement of geomembrane or similar beneath the building / foundation / basement to prevent vapour intrusion.</p> <p>The vapour barrier method is normally adopted in concurrent with a passive venting system. The venting system involves the installing a venting layer beneath the building / foundation / basement. The build-up of vapours moves through the venting layer toward the sides of the building where it is vented outdoors.</p>	<ul style="list-style-type: none"> - Cost effective and ideal for new construction / development, not suitable for existing buildings / structures unless a crawl space is present. 	<ul style="list-style-type: none"> - Long-term management and maintenance of system under a LTEMP.
Groundwater - Remediation / Management Options		
Option	Pros	Cons
<p>In situ air sparging (IAS): is a process where air is injected directly into the saturated subsurface to volatilise contaminants from liquid to vapour phase for treatment / removal in the unsaturated zone and is normally combined with the soil vapour extraction / treatment system.</p> <p>In addition, it biodegrades contaminants in the saturated and unsaturated zone via stimulation by the introduction of oxygen.</p>	<ul style="list-style-type: none"> - IAS is a mature technology and relatively easy technology to implement. - It is well known to regulatory agencies. - The equipment associated with IAS is generally inexpensive and easily obtained. 	<ul style="list-style-type: none"> - The viability of the IAS is subject to the acceptable 'clean up' level, the uniformity and permeability of the local geology and the presence air will be - The risk of contaminant rebound. - Requires long-term groundwater monitoring to validate the success of IAS.
<p>In Situ chemical oxidation (ISCO): involves the injection of a chemical oxidant into the ground for the purpose of transforming contaminants such as carbon dioxide, water and inorganic chloride.</p>	<ul style="list-style-type: none"> - ISCO technologies are useful as part of a sequential or more complex remedial approach. 	<ul style="list-style-type: none"> - The complexity of many chemical reaction steps required to complete this transformation, the design of the oxidant delivery system and optimisation of the dose.

Soil – Remediation / Management Options		
Option	Pros	Cons
<p>Monitored natural attenuation (MNA): is the monitoring of naturally occurring physical, chemical and biological processes to demonstrate via multiple lines of evidence that one or any combination of those processes reduce the mass, concentration, flux or toxicity of contaminants in groundwater, to an acceptable level within an acceptable timeframe.</p>	<p>- MNA is normally introduced towards the later stage of the remediation program and is ideal for sites where the contaminant plumes are no longer increasing in size (stable) or are shrinking in size.</p>	<p>- MNA cannot applied where migration of significant groundwater contamination is occurring, or there are unacceptable impacts to receptors.</p> <p>- Significant monitoring over a minimum of two years is normally required to verify that the processes of MNA are active and effective.</p>

4. Preferred remediation strategy

If remediation for contaminated soil, groundwater or soil vapour is required, a remediation options assessment will be undertaken with reference to Table 1 above, and a preferred remediation strategy selected in conjunction with the site owner.

With reference to the current understanding of site contamination, but also noting the identified risk for additional contamination, the preferred remediation options, if required and appropriate for the identified contamination, are considered to be:

- Soil – on-site containment.
- Soil vapour - Vapour barrier (with a passive venting system as required).
- Groundwater: Monitored natural attenuation (MNA).

5. References

CRC CARE . (2019c). *Technology Guides: Groundwater* . National Remediation Framework : CRC for Contamination Assessment and Remediation of the Environment .

CRC CARE. (2019a). *CRC for Contamination Assessment and Remediation of the Environment*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

CRC CARE. (2019b). *Technology Guides: Soil* . National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

WA DoH. (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. WA Department of Health.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil*. March 2014: WorkCover NSW, NSW Government.

Appendix G

Site Assessment Criteria

1. Introduction

1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- NHMRC *Guidelines for Managing Risks In Recreational Water* (NHMRC, 2008).
- NHMRC, NRMCC *Australian Drinking Water Guidelines 6 2011, Version 3.2* (NHMRC, NRMCC, 2022).
- ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).

1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The proposed redevelopment comprises a mixed-use land use, comprising tertiary educational and commercial (retail) facilities. The scope of this report is limited to the tertiary education use. It is considered that the exposure pathways and sensitive receptors under the proposed commercial (retail) and tertiary education use are most consistent with the generic assumptions for commercial use. As such, the commercial / industrial land use criteria (HIL-D) has been adopted.

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: mixed-use development commercial(retail) / tertiary education:
 - Corresponding to land use category 'D', commercial / industrial such as shops, offices, factories and industrial sites.
- Soil type: sand.

2. Soils

2.1 Health investigation and screening levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health investigation levels (mg/kg)

Contaminant	HIL-D
Metals	
Arsenic	3000
Cadmium	900
Chromium (VI)	3600
Copper	240 000
Lead	1500
Mercury (inorganic)	730
Nickel	6000
Zinc	400 000
PAH	
B(a)P TEQ	40
Total PAH	4000

Table 2: Health screening levels (mg/kg)

Contaminant	HSL-D	HSL-D	HSL-D	HSL-D
SAND	0 m to <1 m	1 m to <2 m	2 m to <4 m	4 m+
Benzene	3	3	3	3
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	260	370	630	NL
TRH F2	NL	NL	NL	NL

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

The soil saturation concentration (C_{sat}) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds C_{sat}, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health screening levels for direct contact (mg/kg)

Contaminant	DC HSL-D	DC HSL-IMW
Benzene	430	1100
Toluene	99 000	120 000
Ethylbenzene	27 000	85 000
Xylenes	81 000	130 000
Naphthalene	11 000	29 000
TRH F1	26 000	82 000
TRH F2	20 000	62 000
TRH F3	27 000	85 000
TRH F4	38 000	120 000

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX
TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene.
IMW intrusive maintenance worker.

2.2 Asbestos in soil

The HSL for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 4.

Table 4: Health screening levels for asbestos

Form of asbestos	HSL-D
ACM	0.05%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.

* Based on site observations at the sampling points and the analytical results of surface samples.

Where insufficient sample recovery is possible for FA and AF analysis the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) will be adopted for the assessment as an initial screen.

2.3 Management limits

In addition to appropriate consideration and application of the HSL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g. penetration of, or damage to, in-ground services.

The adopted management limits are in Table 5.

Table 5: Management limits (mg/kg)

Contaminant	Soil type	ML-D
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	3500
TRH F4	Coarse	10 000

Notes: TRH F1 is TRH C₆-C₁₀ including BTEX
TRH F2 is TRH >C₁₀-C₁₆ including naphthalene.

3. Soil vapour

3.1 Interim soil vapour health investigation levels

Soil vapour interim HIL for specific chlorinated VOC were published by NEPC (2013) to assess the vapour intrusion exposure pathway.

The interim HIL for chlorinated VOC methodology employs a simple though conservative approach using an attenuation factor that relates the concentration of a volatile contaminant in indoor air to the concentration in soil gas immediately below a building foundation slab.

The interim health investigation levels (IHIL) derived from NEPC (2013) are in Table 6.

Table 6: Soil vapour interim health investigation levels, chlorinated hydrocarbons (µg/m³)

Chemical	IHIL-D
TCE	80
1,1,1-TCA	230 000
PCE	8000
cis-DCE	300
VC	100

Notes: TCE trichloroethene
1,1,1-TCA 1,1,1-trichloroethane
PCE tetrachloroethene
cis-DCE cis-1,2-dichloroethene
VC chloromethane / vinyl chloride.

3.2 Health screening levels

Soil vapour HSL for petroleum hydrocarbons were published by NEPC (2013) to assess the vapour intrusion exposure pathway.

The HSL derived from NEPC (2013) are in Table 7.

Table 7: Soil vapour health screening levels for vapour intrusion ($\mu\text{g}/\text{m}^3$)

Contaminant	HSL-D	HSL-D	HSL-D	HSL-D	HSL-D
SAND	0-1 m	1-2 m	2-4 m	4-8 m	>8 m
Benzene	4000	10000	30 000	6 5000	130 000
Toluene	4 800 000	16 000 000	39 000 000	84 000 000	NL
Ethylbenzene	1 300 000	4 600 000	11 000 000	25 000 000	53 000 000
Xylene Total	840 000	3 200 000	8 000 000	18 000 000	37 000 000
Naphthalene	3000	15 000	35 000	75 000	150 000
TRH F1	680 000	2 800 000	7 000 000	15 000 000	32 000 000
TRH F2	500 000	2 400 000	NL	NL	NL

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

The maximum possible soil vapour concentrations have been calculated based on vapour pressures of the pure chemicals. Where soil vapour HSL exceed these values, a soil-specific source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

4. Groundwater

4.1 Introduction

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (CSM). The receptors, exposure points and pathways are summarised in Table 8.

Table 8: Summary of potential receptors and potential risks

Receptor	Location	Exposure point	Exposure pathway
Surface water aquatic ecosystem	Down-gradient from site.	Receiving surface water body at the groundwater discharge point (Parramatta River).	Exposure to contaminants.
Occupants of buildings	On site and down-gradient from site.	Enclosed buildings (existing)	Inhalation of VOC (including TRH and BTEX) overlying VOC impacted groundwater via the vapour intrusion pathway.

The rationale for the selection of GIL is in Table 9.

Table 9: Groundwater investigation level rationale

Receptor / beneficial use	GIL	Source	Comments / rationale
Aquatic ecosystem	DGV	ANZG (2018)	Marine water 99% LOP for bioaccumulative contaminants 95% LOP for non-bioaccumulative contaminants
Building occupants (vapour intrusion)	HSL	NEPC (2013)	8 m+

Notes: DGV default guideline value
% LOP percentage level of protection of species
HSL health screening level
GV guideline value.

4.2 Groundwater investigation levels for aquatic ecosystems

The DGV for the protection of aquatic ecosystems derived from ANZG (2018) are in Table 10.

Table 10: Groundwater investigation levels for protection of aquatic ecosystems (µg/L)

Contaminant	Marine DGV 95% LOP	Notes
Metals / metalloids		
Arsenic	24 / 13	Levels provided for As III / As IV respectively as adopted from freshwater criteria in absence of marine criteria. Unknown reliability.
Cadmium	0.7	99% LOP adopted as recommended due to potential for bioaccumulation. Very high reliability.
Chromium (VI)	4.4	Chromium VI levels adopted as initial screen for total chromium. Very high reliability.
Copper	1.3	Very high reliability.
Lead	4.4	Low reliability.
Mercury (inorganic)	0.1	99% LOP adopted as recommended due to potential for bioaccumulation. Very high reliability.
Nickel	7	99% LOP adopted as recommended to protect key species from chronic toxicity. Very high reliability.
Zinc	8	Very high reliability.
BTEX		
Benzene	500	99% LOP adopted as recommended to protect key species from chronic toxicity. Moderate reliability.
Ethylbenzene	80	Unknown reliability.
m-Xylene	75	Unknown reliability.

Contaminant	Marine DGV 95% LOP	Notes
o-xylene	350	Adopted from freshwater criteria for in absence of marine criteria. Unknown reliability.
p-Xylene	200	Adopted from freshwater criteria for in absence of marine criteria. Unknown reliability.
Toluene	180	Unknown reliability.
PAH		
Anthracene	0.01	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Benzo(a)pyrene	0.1	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Fluoranthene	1	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
Naphthalene	50	99% LOP adopted as recommended to protect key species from chronic toxicity. Moderate reliability.
Phenanthrene	0.6	99% LOP adopted as recommended due to potential for bioaccumulation. Unknown reliability.
VOC		
Tetrachloroethene (PCE)	70	Unknown reliability.
Trichloroethene (TCE)	330	Unknown reliability.
cis-1,2-dichloroethene (DCE)	700	Unknown reliability.
Chloroethene (vinyl chloride / VC)	100	Unknown reliability.
Tetrachloromethane (carbon tetrachloride / CT)	240	Unknown reliability.
Trichloromethane (chloroform / TCM)	370	99% LOP adopted as recommended to protect key species from chronic toxicity. Unknown reliability.

Notes: 95% LOP for non-bioaccumulative contaminants
99% LOP for bioaccumulative contaminants.

4.3 Health screening levels for vapour intrusion

The HSL to evaluate potential vapour intrusion risks derived from NEPC (2013) are in Table 11.

Table 11: Groundwater health screening levels for vapour intrusion (µg/L)

Contaminant	HSL-D	Solubility limit
SAND	2 m to <4 m	-
Benzene	5000	59 000
Toluene	NL	61 000
Ethylbenzene	NL	3900
Xylenes	NL	21 000
Naphthalene	NL	170
TRH F1	6000	9000
TRH F2	NL	3000

Notes: TRH F1 is TRH C₆-C₁₀ minus BTEX

TRH F2 is TRH >C₁₀-C₁₆ minus naphthalene

The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

5. References

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

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater*. Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

NHMRC. (2008). *Guidelines for Managing Risks In Recreational Water*.

NHMRC, NRMCC. (2022). *Australian Drinking Water Guidelines 6 2011, Version 3.7*. Canberra: National Health and Medical Research Council, National Resource Management Ministerial Council.

Warne, M., Batley, G., van Dam, R., Chapman, J., Fox, D., Hickey, C., & Stauber, J. (2018). *Revised Method for Deriving Australian and New Zealand Water Quality Guideline Values for Toxicants*. Canberra: Australian Government Department of Agriculture and Water Resources.

Appendix H

Data Quality Objectives

1. Data quality objectives

The objective of the validation plan is to assess the results of validation testing against the remediation acceptance criteria (RAC) stated within Section 11, assess the resultant suitability of the site for the intended land use, and to provide information on any environmental impacts which may have resulted from the works.

The validation assessment will be conducted with reference to the seven step data quality objectives process (DQO) as outlined in NEPC (2013), described below.

Table 1: Data quality objectives

Step	Summary
1: State the problem	The site requires validation, and may require remediation, in order to render the site suitable for the proposed mixed use land use. The objective of the validation plan is to confirm the successful implementation of this remediation action plan. A conceptual site model (CSM) for the proposed development has been prepared (Section 7).
2: Identify the decisions / goal of the study	The CSM identified the contaminants of potential concern (CoPC) and the likely impacted media. The validation sampling results will be compared against the RAC. The success of the remediation and subsequent validation will be based on a comparison of the analytical results for all CoPC to the adopted RAC and, if necessary and appropriate, compared to the 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) concentrations.
3: Identify the information inputs	Relevant inputs to the decision include: <ul style="list-style-type: none"> • The CSM, identifying the CoPC and affected media; • Analysis for the relevant CoPC using NATA accredited laboratories and methods, where possible; • Field and laboratory QA/QC data to assess the suitability of the environmental data for the validation assessment; • Results compared with the RAC; and • A photoionisation detector (PID) to screen soils on site for VOC. PID readings will be used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The lateral boundaries of the site are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations and previous investigation used to inform the RAP.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with the RAC. Initial comparisons will be with individual results then, where appropriate, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to further assess potential risks posed by the site contamination.

Step	Summary
	<p>Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPD values should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Section 15.</p>
<p>6: Specify the performance or acceptance criteria</p>	<p>Baseline condition: Contaminants at the site and/or statistical analysis of data exceed the RAC and pose a potentially unacceptable risk to receptors (null hypothesis).</p> <p>Alternative condition: Contaminants at the site and statistical analysis of data comply with the RAC and therefore, do not pose a potentially unacceptable risk to receptors (alternative hypothesis).</p> <p>Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it will be assumed that the baseline condition is true.</p>
<p>7: Optimise the design for obtaining data</p>	<p>Sampling design and procedures to be implemented to optimise data collection for achieving the DQO include the following:</p> <ul style="list-style-type: none"> • Visual inspections in accordance with Section 13.3; • Sampling frequencies in accordance with Section 13.4; • Analysis for the CoPC at NATA accredited laboratories using NATA endorsed methods where possible; and • Adequately experienced environmental scientists/engineers conducting field work and sample analysis interpretation.

2. References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]*. Australian Government Publishing Services Canberra: National Environment Protection Council.

Appendix I

Site Management Plan

1. Introduction

This general site management plan (SMP) has been developed to minimise potentially adverse impacts on the environment, and worker and public health as a result of the proposed remediation works.

The Remediation Contractor must have in place a construction environmental management plan (CEMP) (or similar) which is specific to the equipment used for the remediation and the proposed methods to be adopted by the Remediation Contractor. This SMP has been prepared to augment the Remediation Contractor's CEMP and contains general details for aspects of the work, as per reporting requirements for a remediation action plan (RAP) under NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

Apart from the management principles outlined in this SMP, the Remediation Contractor must also ensure compliance with all relevant environmental legislation and regulations, including (but not limited to) the following:

- Contaminated Land Management Act 1997 NSW (CLM Act);
- Protection of the Environment Operations Act 1997 NSW (POEO Act);
- Protection of the Environment Legislation Amendment Act 2011 NSW;
- Protection of the Environment Operations Amendment (Scheduled Activities and Waste) Regulation 2008 NSW;
- Environmentally Hazardous Chemicals Act 1985 NSW; and
- Work Health and Safety Act 2017 NSW (WHS Act) and Work Health and Safety Regulations 2017 NSW.

2. Roles and responsibilities

2.1 Principal

The Principal is responsible for the environmental performance of the proposed remediation works, including implementation of acceptable environmental controls during remediation works. The Principal will retain the overall responsibility for ensuring this RAP is appropriately implemented. The Principal is to nominate a representative (the Principal's Representative), who is responsible for overseeing the implementation of this RAP. The actual implementation of the RAP will, however, be conducted by the Remediation Contractor on behalf of the Principal.

The Principal is responsible for providing appropriate information to the Remediation Contractor to allow them to safely plan the required works. This includes the asbestos register for the site and this RAP.

The Principal is also responsible for implementing an appropriate communications plan.

2.2 Remediation contractor

The Remediation Contractor will be the party responsible for daily implementation of this RAP and shall fulfil the responsibilities of the Remediation Contractor as defined by SafeWork NSW. It is noted that the Remediation Contractor may appoint appropriately qualified sub-contractors or sub-consultants to assist in fulfilling the requirements of the procedures. The Remediation Contractor will appoint a Site Manager.

In addition to the implementation of the RAP it will be the Remediation Contractors responsibility to:

- Obtain / ensure relevant sub-contractors obtain specific related approvals as necessary to implement the earthworks including permits for removal of asbestos-containing material, SafeWork NSW notification etc.;
- Develop or request and review any site plans to manage the works to be conducted; and
- Ensure that all remediation works and other related activities are undertaken in accordance with this RAP.
- Maintain all site records related to the implementation of this RAP including but not limited to:
 - o Tracking of all movement of soil within the site, on to site and off-site from cradle to grave;
 - o Transportation Record: comprising a record of all truckloads of soil (including aggregate) entering the site, including truck identification (e.g. registration number), date, time, source site, load characteristics (e.g. type of material, i.e. quarried aggregate, etc.), approximate volume, use (e.g. general site raising, service trenches, etc.);
 - o Disposal dockets: for any soil disposed off-site including transportation records, spoil source, spoil disposal location, receipt provided by the receiving waste facility / site;
 - o Imported materials records: records for any soil imported onto the site, including source site, classification reports, inspection records of soil upon receipt at site and transportation records;
 - o Records relating to any unexpected finds and contingency plans implemented; and
 - o Photographic records by all contractors and consultants of the works undertaken within their purview of responsibilities.
- Ensure sufficient information is provided to engage or direct all required parties, including sub-contractors, to implement the requirements of the RAP other than those that are the direct responsibility of the Remediation Contractor;
- Manage the implementation of any recommendation made by those parties in relation to work undertaken in accordance with the RAP;
- Inform, if appropriate, the relevant regulatory authorities of any non-conformances with the procedures and requirements of the RAP in accordance with the procedures outlined in this document;
- Retain records of any contingency actions;
- On completion of the project, to review the RAP records for completeness and update as necessary; and

- Recommend any modification to general documentation which would further improve the environmental outcomes of this RAP.

2.3 Surveyor

A project surveyor, if required, will be a registered surveyor engaged by the Remediation Contractor to undertake surveying works as required by this RAP.

2.4 Sub-contractors

All sub-contractors will be inducted onto the site, informed of their responsibilities in relation to this RAP and sign their agreement to abide by the RAP requirements. Where necessary, sub-contractors will also be trained in accordance with the requirements of this document. All sub-contractors must conduct their operations in accordance with the RAP as well as all applicable regulatory requirements.

2.5 Environmental consultant

The Environmental Consultant will provide advice on implementing the RAP. The Environmental Consultant will be responsible for:

- Undertake any required assessments where applicable (e.g. waste classification, validation);
- Provide advice and recommendations arising from monitoring and/or inspections, including unexpected finds; and
- Notify the Client with any results of assessments, and any observed non-conformances.

2.6 Site workers

All workers on the site are responsible for observing the requirements of this RAP and other management plans. These responsibilities include the following:

- Being inducted on the site and advised of the general nature of the remediation / environmental issues at the site;
- Being aware of the requirements of this plan;
- Wearing appropriate personal protective equipment (PPE) as required by this plan;
- Only entering restricted areas when permitted; and
- Requesting clarification when unclear of requirements of this or any other plans (e.g. safe work method statements (SWMS)).

3. Water management

Stormwater must be managed during the remediation works such that potential adverse impacts from surface runoff (e.g. cross contamination, mobilisation of contaminants in soil particles, etc.) are appropriately mitigated. Accordingly, the Remediation Contractor will take appropriate measures which may include:

- Construction, where necessary, of stormwater diversion channels, bunding and linear drainage sumps with catch pits in and around the remediation areas to divert stormwater from the contaminated areas;
- Provision of appropriately located sediment traps including geotextiles; and
- Discharge of excess water in excavations / low points on a regular basis to limit the potential for flooding.

4. Soil management plan

The Remediation Contractor will develop a plan to mitigate cross contamination as part of the CEMP to be implemented throughout the works.

4.1 Stockpiling of contaminated material

Contaminated material shall be excavated and stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- An impermeable membrane such as plastic sheeting should be provided at the surface by the Remediation Contractor prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- All stockpiles of contaminated material shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation (if remaining overnight);
- Stockpiles impacted, or potentially impacted, with asbestos must be covered by geotextile or similar cover to prevent dust generation;
- Measures should be taken by the Remediation Contractor to prevent the migration of stockpile materials (i.e. perimeter bunds, hay bales, silt fences, etc.); and
- A record of stockpile locations (stockpile register), dimensions, descriptions, environmental controls, etc. should be maintained by the Remediation Contractor.

All movement of soil within the site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

4.2 Stockpiling imported material

Imported material shall be stockpiled at a suitably segregated location(s) away from sensitive areas (e.g. water bodies, drainage lines, stormwater pits, etc.) and ongoing excavations, and in a manner that will not cause nuisance to the neighbouring properties. Soil stockpiles are to be managed as follows:

- Imported material should not be stockpiled within un-remediated areas of the site. If this is unavoidable an impermeable membrane such as plastic sheeting should be provided at the surface by the Remediation Contractor prior to stockpiling. Plastic sheeting should be taped at joins, as necessary;
- All stockpiles shall be surrounded by star pickets and marking tape or other suitable material to clearly delineate their boundaries;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation (if remaining overnight); and
- A record of stockpile locations (stockpile register), dimensions, descriptions, environmental controls, etc. should be maintained by the Remediation Contractor.

All movement of soil within the site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

4.3 Transport of material off-site and on to site

Transport of contaminated material from the site and imported material to the site shall be via a clearly delineated haul route(s) and this route shall be used exclusively for entry and egress of vehicles used to transport contaminated materials within and away from the site, and onto and within the site. The proposed transport route(s) (to be determined by the Remediation Contractor) will be notified to Council and truck dispatch shall be logged and recorded by the Remediation Contractor for each load leaving or arriving the site. A record of the truck dispatch will be provided to the Environmental Consultant.

All haulage routes for trucks transporting soil, materials, equipment or machinery to and from the site should be selected to meet the following objectives:

- Comply with all road traffic rules;
- Minimise noise, vibration and dust to adjacent premises; and
- Use State roads and minimise use of local roads as far as practicable.

The remediation work will be conducted such that all vehicles:

- Conduct deliveries of soil, materials, equipment or machinery only during the specified hours of remediation;
- Have securely covered loads to prevent any dust or odour emissions during transportation; and
- Exit the site in a forward direction.

In addition, measures will be implemented to ensure no contaminated material is spilled onto public roadways or tracked off-site on vehicle wheels. Roadways will be kept clean throughout the remediation works and will be broomed, if necessary, to achieve a clean environment.

All loads will be securely covered and may be lightly wetted, if required, to ensure that no materials or dust are dropped or deposited outside or within the site. Prior to exiting the site each truck should be inspected by Remediation Contractor personnel and either noted as clean (wheels and chassis) or broomed prior to leaving the site. Any soil spilled onto surrounding streets will be cleaned by mechanical or hand methods, on a daily basis.

Removal of waste materials from the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to dispose the waste materials according to the waste classification and with the appropriate approvals obtained from the EPA, where required.

Materials imported onto the site shall only be carried out by contractors holding the appropriate license(s), consent or approvals to transport the materials with the appropriate approvals obtained from the EPA, where required.

All movement of soil within the site is to be tracked by the Remediation Contractor, from cradle to grave. Copies of tracking records must be provided to the Environmental Consultant.

5. Noise and vibration control plan

All equipment and machinery should be operated in an efficient manner to minimise the emission of noise. The use of any plant and/or machinery should not cause unacceptable vibrations to nearby properties and should meet Council requirements.

6. Dust control plan

Dust emissions must be confined within the site boundary as far as is practicable. The following example dust control procedures could be employed to comply with this requirement, as necessary:

- Erection of dust screens around the perimeter of the site (as applicable);
- Securely covering all loads entering or exiting the site;
- Use of water sprays across the site to suppress dust;
- Stockpiles shall be lightly conditioned by sprinkler or covered by geotextile or similar cover to prevent dust generation (if remaining overnight);
- Stockpiles impacted, or potentially impacted, with asbestos must be covered by geotextile or similar cover to prevent dust generation;
- Include wheel wash (if applicable); and
- Keeping excavation and stockpile surfaces moist.

Regular checking of the fugitive dust issues is to be undertaken. Remedial measures are to be undertaken to rectify any cases of excessive dust.

7. Odour control plan

No odours should be detected at any boundary of the site during remediation works by an authorised Council Officer relying solely on sense of smell. The following example procedures could be employed to comply with this requirement as necessary:

- Use of appropriate covering techniques such as plastic sheeting, polythene or geotextile membranes to cover excavation faces or stockpiles;
- Fine spray of water and/or hydrocarbon mitigating agent on impacted areas / stockpiles or loads to lightly condition the material;
- If required, restrict uncovered stockpiles to appropriate sizes to minimise odour generation;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues to ensure compliance. Undertake immediate remediation measures to rectify any cases of excessive dust or odour (e.g. use of misting sprays or odour masking agent); and
- Adequate maintenance of equipment and machinery to minimise exhaust emissions.

8. Work health and safety plan

8.1 General

It is the Remediation Contractor's responsibility to devise a SWMS¹ (or series thereof, for various respective tasks) and to implement proper controls that enable the personnel undertaking the remediation to work in a safe environment. This RAP and SMP does not relieve the Remediation Contractor or other contractors of their ultimate responsibility for occupational health and safety of their workforce and to prevent contamination of areas outside the 'remediation' workspace. This RAP and SMP sets out general procedures and the minimum standards and guidelines for remediation that will need to be used in preparing the safe work method statement.

This work health safety plan (WHSP) has been prepared with reference to CRC CARE *Remediation Action Plan: Implementation - Guideline on Health and Safety* (CRC CARE, 2019). The requirements of this WHSP must be incorporated into the Remediation Contractor's SWMS.

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. To attain this the SWMS developed by the Remediation Contractor must comply with policies specified in the Work Health and Safety Regulation 2011.

All appropriate permits, licences and notifications required for the remediation activities must be obtained prior to the commencement of remediation works.

¹ Either a SWMS or construction environmental management plan (CEMP), or other equivalent document incorporating health and safety aspects of the proposed remedial works.

8.2 Site access

Appropriate fencing and signage must be installed around and within the site to prevent unauthorised access and restrict access to remediation areas and/or deep excavations. Access restrictions and administrative arrangements for management of entry of workers or related personnel on site is the responsibility of the Remediation Contractor.

Any existing pits or unstable areas on site that may generate potential safety, or operational risk should be demarcated and taped off, with appropriate rectification action undertaken (e.g. backfilling of pits).

8.3 Personnel and responsibilities

Before undertaking works on site, all personnel will be made aware of the officer responsible for implementing WHS procedures. All personnel must read and understand this WHSP and over-arching SWMS prior to commencing site works and sign a statement to that effect. Contractors employed at the site will be responsible for ensuring that their employees are aware of, and comply with, the requirements of this WHSP and Remediation Contractor's SWMS.

8.4 Chemical contamination hazards

Chemical compounds or substances that may be present in the soils at the site include the key CoPC TRH, BTEX, TCE and, given the presence of fill, asbestos. There is also a lower probability of other contaminants being present.

The risks associated with the identified contaminants to site personnel and workers involved in the remediation are considered to be low due to the concentrations within groundwater and soil vapour and limited exposure durations. These risks are associated with:

- Ingestion of contaminated soil and/or water;
- Dermal contact with contaminated soil and/or water; and
- Inhalation of dusts or vapours of the CoPC.

If asbestos is encountered in fill, this risk evaluation should be revised.

Personnel will endeavour, wherever possible, to avoid direct contact with potentially contaminated material. Workers must avoid the potential exposures listed above as far as is practicable. Appropriate personal protective equipment (PPE) must be used to mitigate potential risks.

8.5 Physical hazards

The following physical hazards are associated with conditions that may be created during remediation works:

- Heat exposure;
- Excavations;
- Buried services;
- Noise;

- Dust;
- Electrical equipment;
- Heavy equipment and truck operation; and
- Asbestos.

Safe work practices must be employed to manage the physical risks identified above. For the most part these risks can be managed through appropriate demarcation, access controls and the use of appropriate PPE.

8.6 Safe work practices

The appropriate safe work practices should be clearly defined by the Remediation Contractor in their SWMS. As a minimum, all personnel on site will be required to wear the following PPE:

- Steel-capped boots (mandatory);
- High visibility clothing / vest (mandatory);
- Safety glasses or safety goggles with side shields requirements (as necessary);
- Hard hat (as necessary);
- Appropriate respiratory and protective equipment for any works involving asbestos (as necessary); and
- Hearing protection when working in the vicinity of machinery or plant equipment if noise levels exceed exposure standards (as necessary).

Each item of PPE should meet the corresponding relevant Australian Standard(s).

Specific safe work practices will be adopted when working with asbestos, in accordance with (but not limited to) the following codes of practice:

- *SafeWork NSW Code of Practice, How to Manage and Control Asbestos in the Workplace* (SafeWork NSW, 2019a);
- *SafeWork NSW Code of Practice, How to Safely Remove Asbestos* (SafeWork NSW, 2019b);
- *WorkCover NSW Managing Asbestos in or on Soil* (WorkCover NSW, 2014); and
- *NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed* (NOHSC, 2005).

9. Remediation schedule and hours of operation

The remediation works will be conducted within the days and hours specified in the development consent.

10. Response to incidents

The key to effective management of incidents is the timely action taken before any situation reaches a reportable or critical level. Therefore, surveillance activities are extremely important and should be conducted for the measures prescribed herein and any other measures prescribed in any additional environmental management plan developed subsequently. During construction activities on the site, the following inspection or preventative actions should be performed by the Remediation Contractor:

- Regular inspection of works;
- Completion of routine environmental checklists and follow-up of non-compliance situations;
- Maintenance and supervision on-site; and
- An induction process for site personnel involved in the remediation works that includes relevant information on the contamination status of the site, the remediation works being undertaken, worker health and environmental protection requirements and ensures that all site personnel are familiar with the site emergency procedures.

An emergency response plan will be in place for all aspects of site works. Any emergency will be reported immediately to the site office and/or the Site Manager (and Safety Officer), and the appropriate emergency assistance should be sought. The Site Manager should be responsible for initiating an immediate emergency response using the resources available on the site. Where external assistance is required, the relevant emergency services should be contacted. A table such as that below, containing contact details for key personnel who may be involved in an environmental emergency response should be completed and be readily available to personnel at all times. The table should be completed, and thereafter amended, as required.

The Remediation Contractor will be responsible for ensuring that site personnel are aware of the emergency services available and the appropriate contact details. A site Safety Officer should be contactable, or available, on-site during remediation and development works.

Contact details for key utilities are included in the event of needing to respond to incidents. Blank cells are 'to be confirmed' and should be completed prior to works commencing when all entities are confirmed.

Table 1: Summary of roles and contact details

Role	Personnel / contact	Phone contact details
Principal		
Principal's Representative		
Site Manager		
Remediation Contractor and Builder		
Site Office		
Environmental Consultant		
Consent Authority		

Role	Personnel / contact	Phone contact details
Regulator	NSW EPA (pollution line and general enquiries)	131 555
Utility Provider	Water (Sydney Water Corporation)	13 20 92
Utility Provider	Power (Ausgrid)	13 13 88
Utility Provider	Gas (Jemena Limited)	131 909
Utility Provider	Telecommunications (Telstra Corporation Limited)	13 22 03
Utility Provider	Telecommunications (Optus)	1800 505 777
Utility Provider	Telecommunications (NBN Co Limited)	1800 687 626

11. References

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Canberra, ACT: Australian and New Zealand Governments and Australian state and territory governments.

CRC CARE. (2019). *Remediation Action Plan: Implementation - Guideline on Health and Safety*. National Remediation Framework: CRC for Contamination Assessment and Remediation of the Environment.

NOHSC. (2005). *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Ed*. Canberra, April 2005, NOHSC:3003: National Occupational Health and Safety Commission, Commonwealth of Australia.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land*. Contaminated Land Guidelines: NSW Environment Protection Authority.

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

SafeWork NSW. (2019b). *Code of Practice, How to Safely Remove Asbestos*. August 2019: SafeWork NSW, NSW Government.

WorkCover NSW. (2014). *Managing Asbestos in or on Soil*. March 2014: WorkCover NSW, NSW Government.