RAMBOLL

ENVIRONMENT
& HEALTH

16 September 2024

Botany Road Development Pty Ltd c/- Kurraba Group Pty Ltd
Attn: Kate Evans
Level 15, 124 Walker Street
North Sydney NSW 2060

By email: kevans@kurrabagroup.com

Dear Kate,

RE: INTERIM AUDIT ADVICE LETTER NO. 1 - REMEDIATION ACTION PLAN, 100 BOTANY ROAD, ALEXANDRIA

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Ref: 318002089

Audit Number: TO-134

1. INTRODUCTION

1.1. Background and Objective

As a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor, I am conducting an Audit (TO-134) under the NSW *Contaminated Land Management Act 1997* (CLM Act) in relation to 74-108 Botany Road and 86-100 Wyndham Street, Alexandria (herein referred to as 100 Botany Road or 'the site') (**Attachment 1**). The site is proposed to be developed as a new health research facility. The objective of this initial review (IAA #1) is to review the remediation action plan (RAP) associated with the proposed development.

In accordance with section 4.39 of the *Environmental Planning & Assessment Act 1979* (EP&A Act), the Planning Secretary's Environmental Assessment Requirements (SEARs) for SSD-63067458 were issued on 16 January 2024. This IAA #1 has been prepared to respond to the relevant issued SEARs as well as correspondence from the Department of Planning, Housing and Infrastructure (DPHI) as set out in **Table 1.1**.

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Table 1.1: Secretary's Environmental Assessment Requirements and Correspondence from the DPHI

SEAR	Documentation	Status
17. Contamination and Remediation In accordance with Chapter 4 of SEPP (Resilience and Hazards) 2021, assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable (or will be suitable, after remediation) for the development.	• Preliminary Site Investigation If required: • Detailed Site Investigation • Remedial Action Plan • Preliminary Long-term Environmental Management Plan	Addressed by Preliminary Site Investigation (PSI), Detailed Site Investigation (DSI) report and the RAP. A Long-term Environmental Management Plan is not currently anticipated to be required.
Correspondence from the Department of Planning and Environment (letter from Karen Harragon dated 16 January 2024) identified additional assessment requirements, including *"In relation to Contamination and Remediation, if required, provide a Remediation Action Plan (RAP) including Interim Audit Advice from an EPA-accredited Site Auditor certifying the RAP as appropriate"*.	Interim Audit Advice (IAA) letter	This Interim Audit Advice letter (IAA #1) has been prepared to review the RAP and other existing site investigation reports to satisfy the request from the Department of Planning and Environment.

Following approval of the State Significant Development Application (SSDA), subsequent audit phases are expected to include review of a report documenting the remediation and validation of the site during development. It is anticipated that this will culminate in a Section A Site Audit Statement (SAS) and supporting Site Audit Report (SAR). The Audit is not currently a condition of consent and so is not currently a Statutory Audit. However, the Audit is expected to become a Statutory Audit upon approval of the SSDA.

1.2. Scope of Interim Audit Review

IAA #1 is based on a review of the documents listed below, as well as discussions with Kurraba Group Pty Ltd (Kurraba Group), representing Botany Road Development Pty Ltd as trustee for the Botany Road Development Trust Fund, and Douglas Partners Pty Ltd (DP) who prepared the DSI and the RAP.

The documents reviewed were:

- 'Waste Classification Assessment, 74 – 88 Botany Road, Alexandria, NSW', 11 April 2017, Alliance Geotechnical Pty Ltd (Alliance) (**the Alliance Waste Classification**).
- 'Remediation Action Plan For 74-88 Botany Road, Alexandria, NSW', 27 April 2017, Alliance (**the Alliance RAP**, superseded by the RAP).
- 'Preliminary Contamination Assessment, Due Diligence Assessment, 100 Botany Road, Alexandria', 27 April 2023, DP (**the PSI**).
- 'Report on Geotechnical Investigation, Proposed Research and Life Science Development, 100 Botany Road, Waterloo NSW', 28 June 2024, DP (**the Geotech Investigation**).
- 'Report on Detailed Site (Contamination) Investigation, Proposed Research and Life Science Development, 100 Botany Road, Alexandria NSW', 16 September 2024, DP (**the DSI**).
- 'Remediation Action Plan, Proposed Research and Life Science Development, 100 Botany Road, Alexandria NSW', 16 September 2024, DP (**the RAP**).

The Alliance RAP refers to a Phase 1 and Phase 2 investigation in 2015 and a data gap investigation report in 2017 by Alliance that were not available for review. However, relevant informant including summaries of results/outcomes, logs and data summary tables were included in the DSI (and taken into consideration by DP). This is considered by the Auditor to be an adequate basis for inferring that the

conditions encountered by Alliance were comparable to those documented in the DSI which informed the RAP.

The Auditor has reviewed the key documents against the requirements of guidelines made or approved under Section 105 of the CLM Act, including the following:

- National Health and Medical Research Council (NHMRC) (2008) *'Guidelines for Managing Risks in Recreational Water'.*
- NHMRC and Natural Resource Management Ministerial Council of Australia and New Zealand (2011) *'Australian Drinking Water Guidelines'* (**ADWG**).
- National Environment Protection Council (NEPC) *'National Environment Protection (Assessment of Site Contamination) Measure 1999'*, as Amended 2013 (**NEPM 2013**).
- NSW EPA (2014) *'Waste Classification Guidelines'*.
- NSW EPA (2015) *'Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997'.*
- NSW EPA (2017) *'Guidelines for the NSW Site Auditor Scheme (3rd Edition)'.*
- Australian and New Zealand Guidelines (ANZG) (2018) *'Guidelines for Fresh and Marine Water Quality'.*
- Australia and New Zealand Heads of EPAs (HEPA 2020) *'PFAS National Environmental Management Plan, Version 2.0'.*
- NSW EPA (2020a) *'Contaminated Land Guidelines, Consultants Reporting on Contaminated Land'.*
- NSW EPA (2020b) *'Guidelines for the Implementation of the Protection of the Environmental Operations (UPSS) Regulations 2019'.*
- Chapter 4 Remediation of Land in the Resilience and Hazards State Environment Planning Policy (SEPP) (2021) (SEPP R&H, formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (1998) *'Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land'.*
- Western Australia Department of Health (WA DoH) (2021) *'Guidelines for the assessment, remediation and management of asbestos contaminated sites'.*
- NSW EPA (2022) *'Contaminated Land Guidelines, Sampling design part 1 – application'* and *'Contaminated Land Guidelines, Sampling design part 2 – interpretation'.*
- NSW EPA (2023) *'Contamination assessment of service station sites, Minimum sampling requirements'*.

1.3. Summary of Proposed Remediation

The goal of the remediation works is to demonstrate that contamination identified during previous site investigations (or additional contamination identified through a data gap assessment) has been appropriately managed through the proposed remediation strategy. Namely this includes:

- Appropriate removal and decommissioning of suspected underground storage tanks (USTs).
- Management of asbestos in soil risks through off-site disposal of soils and managing risks to direct receptors (workers, nearby public).
- Management of other known soil contaminants, namely lead, through offsite disposal.
- Potentially reducing classification of lead impacted soils through development of a treatment strategy and site-specific immobilisation order, and demonstration of successful treatment.

- Assessment following removal of fill to validate removal of known contamination (or additional contamination).

Furthermore, fill is to be removed from the site for a multilevel basement (2 levels in the north and 4 levels in the south comprising the Proton Therapy Centre) which will expose natural sand in some areas and the underlying residual clay in others (**Attachments 4a and 4b**). Minor landscaped areas outside of the basement appear to be proposed in the southeast and northwest (**Attachment 2a**).

The development includes a basement over the majority of the site. Therefore, fill and natural materials require excavation and offsite disposal as part of bulk earthworks. Therefore, the proposed data gap assessment and any remediation/treatment of soil is to predominantly manage and determine waste classifications.

2. SITE DETAILS

2.1. Location

The site details are as follows:

Street address:	74-108 Botany Road and 86-100 Wyndham Street, Alexandria (referred to as 100 Botany Road) (**Attachment 1**)
Identifier:	Lot 2 DP136012, Lot 11 DP219505, Lot 11 DP135914, Lot 2 DP659166 Lot 1 DP510091, Lot 3 DP1146614
Local Government:	City of Sydney Council (Council)
Site Area:	5,350.6 m^2
Zoning:	MU1: Mixed Use Sydney Local Environmental Plan 2012, State Environmental Planning Policy Amendment (Land Use Zones) 2023

The site has a frontage to Botany Road to the east and Wyndham Street to the west. Part of Wyndham Lane runs through the middle of the site.

2.2. Adjacent Uses

The site is located within an area of mixed use. The surrounding site use includes:

- North – Commercial
- East – Botany Road, then Sydney Metro Waterloo Station development site
- South – Residential and commercial
- West – Wyndham Street and commercial premises, then residential properties

The RAP states that offsite (and onsite) former potential sources of contamination included a dry cleaner to the east, and a motor garage/service station to the west and northwest. The motor garage/service stations (and the onsite dry cleaner) are shown on **Figure 2.1** extracted from the RAP. The offsite dry cleaner is understood to be to the east of Botany Road within the now current Waterloo Station development site.

The closest surface water receptor to the site was identified by the RAP to be Alexandra Canal, located approximately 1.5 km to the southwest. The Auditor notes that Sheas Creek, which flows into Alexandra Canal, is located approximately 600 m to the south of the site.

Figure 2.1: Onsite and Nearby Former Dry Cleaners/Service Stations

2.3. Site Condition

The site comprises one to two storey buildings used for commercial purposes, a concreted loading zone and Wyndham Lane. The Auditor has not inspected the site.

2.4. Proposed Development

The proposed development includes:

- Demolition of all existing buildings, site preparation and remediation works.
- Bulk excavation to create two levels of basement with access from Wyndham Street, including allowance for a below ground Proton Therapy Cancer Treatment Centre, car parking, loading and services.
- Construction and use of two new health research buildings. One building is proposed along Botany Road which has a stepped built form and is between seven and eleven storeys in height. One building is proposed along Wyndham Street which is five storeys in height. The two buildings will include the following:
    - Ground floor lobby and retail uses fronting Botany Road and Wyndham Street.
    - Proton Therapy patient lobby from Wyndham Street.
    - Various laboratories, write up areas and office spaces.
    - A series of outdoor landscaped terraces within the Botany Road building.
    - One rooftop plant level on each building.
- Landscaping and public domain works including:
    - Construction and extension of Wyndham Lane as a shared laneway.

  - Construction of a pedestrian network including two pathways from Botany Road and an east-west through-site link.
- Extension and augmentation of services and utilities to the development, as required.

Refer to the Environmental Impact Statement for a detailed description of the proposed development.

The proposed site plan is shown on **Attachment 2a**. The multilevel basement structure is proposed covering the site footprint as shown on **Attachment 2b**.

The proposed development is considered to fall within a 'commercial/industrial use' exposure scenario for the purpose of the Audit.

3. SITE HISTORY

The Alliance RAP was prepared for 74–88 Botany Road (Lot 2 DP136012 and Lot 11 DP219505), which is the northern portion of the site. The Alliance RAP included a summary of the site history based on historical aerial photographs, land title deed information, NSW EPA registers, SafeWork NSW databases regarding the Storage of Hazardous Chemicals (search date 24 August 2016) and Council Development Application (DA) records.

The Alliance RAP stated that the site and surrounding areas has changed land use multiple times. The site appeared to have been used for residential purposes until it changed to industrial land uses between 1955 and 1970 (including Shell Company and a steel pipe bending business). Between 1955 and 1970, the residential buildings were demolished and the construction of the current buildings was completed.

The Alliance RAP stated the search of SafeWork NSW databases returned no records.

Subsequently, DP prepared the PSI for 100-108 Botany Road and 86-100 Wyndham Street (Lot 11 DP135914, Lot 2 DP659166, Lot 1 DP510091, Lot 3 DP1146614), which is the southern portion of the site. This was supplemented by the DSI, which considered the site history of the entire site based on a review of previous reports, historical aerial photographs and review of business directory records which indicated the following activities present within the site (refer also **Figure 2.1**):

- Manufacturing and wholesale/retail: (including *inter alia*) tools, pumps, furniture, boat/ship accessories, motor exhaust/mufflers, metals, and welding.
- Motor body repairs/painting.
- Motor garage (circa 1950-60).
- Service station (circa 1960), including potential USTs.
- Dry cleaners (circa 1950).

DP also commenced a search of historical records and SafeWork NSW for the site, however, these were not available at the time the DSI was published. The DSI therefore recommended additional desktop searches, including SafeWork NSW search for dangerous goods, historical title deeds and review of Section 10.7 planning certificates.

3.1. Auditor's Opinion

The site history is broadly understood. However, searches typically completed to inform a thorough site history review have not been completed. Uncertainties relate to the absence of SafeWork NSW and historical records for the southern portion of the site (and recent searches for the northern portion). Uncertainties include the potential for USTs; other underground structures such a spits/sumps/drains; details of specific activities; and filling history.

However, these uncertainties have been considered by the investigations that have been completed (including a broad suite of laboratory analytes) and by the proposed remediation framework.

4. CONTAMINANTS OF CONCERN

The DSI identified the following contamination sources and contaminants of potential concern (CoPC):

- Source 1 (S1): Fill: Associated with levelling, demolition of former buildings on the site, including potential uncontrolled imported fill. CoPC include metals, per- and polyfluoroalkyl substances (PFAS), total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphate pesticides (OPP), phenols and asbestos.
- Source 2 (S2): Former service station (onsite), including potentially disused/abandoned USTs and associated infrastructure that may have caused leaks / spills of fuels (e.g., petrol / diesel), fuel additives or oils / greases. CoPC include lead, TRH, BTEX, PAH, phenols and volatile organic compounds (VOC).
- Source 3 (S3): Former dry cleaner (onsite), including historical leaks / spills from chlorinated solvent usage / storage. CoPC include chlorinated VOC.
- Source 4 (S4): Previous on-site commercial / industrial land-uses, including motor garage / repairs, manufacturing, storage, etc. CoPC include metals, TRH, BTEX, PAH, phenols, OCP, PFAS and VOC.
- Source 5 (S5): Existing buildings (i.e., risk of cross-contamination of soils after demolition). CoPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.
- Source 6 (S6) (offsite): Historical motor garages/service stations. CoPC include lead, TRH, BTEX, PAH, and VOC.

4.1. Auditor's Opinion

The identified CoPC adequately reflect the site history and condition and have been incorporated into the analyte list used by DP during investigation of the site and proposed during validation of remediation. A former dry cleaner is also located offsite to the east. Relevant CoPC are the same as for the onsite dry cleaner.

5. STRATIGRAPHY AND HYDROGEOLOGY

5.1. Stratigraphy

The Geotech Investigation reviewed the NSW Seamless Geology dataset and indicate that the site is underlain by Quaternary aeolian sand deposits of transgressive dune sands (this is known as Botany Sands). These sands typically comprise medium to fine grained marine sands with podsols. The boundary with Triassic-aged Ashfield Shale occurs approximately 400 m to the northwest of the site. Ashfield Shale typically comprises black to dark grey shale and laminite and weathers to residual clay.

Stratigraphy encountered at the site was reported as follows (borehole locations shown on **Attachment 1**):

- Hardstand – asphalt or concrete slabs generally to depths of 0.1 m below ground level (mbgl).
- Fill – generally comprising sand with various inclusions such as brick, tile, terracotta, metal, wood, glass, charcoal, and suspected asbestos containing materials (ACM) (BH103) generally to depths of ~0.8-1.0 mbgl, and up to a maximum of 1.6 mbgl (BH103).

- Sand – natural aeolian sands, to depth of the contamination boreholes. Aeolian sands were identified extending to depths of up to 7.6-9.5 mbgl in the geotechnical boreholes.
- Silty Sand – isolated bands of silty sand (with organic / peaty inclusions) at BH3 between ~5.5 to 9.5 mbgl.
- Silty Clay / Gravelly Clay - residual clays / extremely weathered soils between 7.6 to 17.4 mbgl.
- Bedrock – comprising shallow shale, laminite and deeper sandstone.

The Geotech Investigation referenced the regional Acid Sulphate Soils (ASS) Risk map and indicated that the site is located within an area with no known occurrence of ASS. As a result, an Acid Sulfate Soil Management Plan was not considered to be required. The site does not occur within an area mapped for known salinity issues. Based on investigation and analytical results, the DSI concluded that no further ASS investigation or management was required.

5.2. Hydrogeology

The Geotech Investigation states a search of the available WaterNSW Groundwater well data indicates three registered groundwater wells lie within 300 m of the proposed development site (GW106192, GW115632, and GW114895). The well records indicate that they were installed for monitoring and domestic purposes and had a standing water level (SWL) between approximately 4.0 m and 5.2 mbgl (RL 10.5 m and 9.3 m Australian Height Datum (AHD)).

The nearest surface water receptor is Sheas Creek (600 m south), which flows into Alexandra Canal located approximately 1.5 km to the southwest. The DSI states groundwater is expected to follow the regional topography and flow generally to the south and southwest.

The Geotech Investigation referenced the Bureau of Meteorology Groundwater Dependent Ecosystem Atlas which indicated that the site does not lie within 2 km of a Groundwater Dependant Ecosystem, and that the proposed development is not likely to impact these ecosystems.

The Geotech Investigation states groundwater was encountered at depths of between 2.3 m and 3.0 mbgl during the augering of boreholes. The use of water as a drilling fluid during diamond coring precluded further measurement of the groundwater level during the deeper drilling of the boreholes. The results of the groundwater level monitoring reported in the DSI are reproduced as **Figure 5.1**.

Figure 5.1: Summary of Groundwater Level Measurements

Well ID	Ground level * m (AHD)	17 June 2024		20 June 2024		24 June 2024		26 June 2024	
		SWL m (bgl)	SWL m (AHD)	SWL m (bgl)	SWL m (AHD)	SWL m (bgl)	SWL m (AHD)	SWL m (bgl)	SWL m (AHD)
BH1	15.3	3.1	12.2	3.2	12.1	3.2	12.1	-	-
BH2	14.6	2.0	12.6	2.9	11.7	2.3	12.3	-	-
BH3	15.5	2.8	12.7	2.9	12.6	2.9	12.6	-	-
MW2	15.5**	-	-	-	-	-	-	2.7	12.8
MW4	15.4**	-	-	-	-	-	-	2.8	12.6

Notes:
*Surveyed by dGPS
**Elevation from AG (2017b)
AHD – Australian Height Datum
SWL – standing water level

The DSI states, based on the groundwater level measurements, groundwater is interpreted to flow to the south/southwest as interpreted from the local and regional topography.

5.3. Auditor's Opinion

The depth of fill and underlying stratigraphy have been adequately characterised.

The hydrogeology has been adequately characterised for the purpose of informing potential data gaps and a remediation framework. The site is located in Area 2 of the groundwater management zone within The Botany Sands Aquifer. Domestic groundwater use is banned, and all industrial users must test their bore water annually and provide results to the NSW Office of Water. There is also an embargo on new applications for licences to extract groundwater from the Botany Sands Aquifer.

The surface water receptor for any potential offsite migration of groundwater contamination is considered by the Auditor to be Sheas Creek, a concrete stormwater drainage channel that flows into Alexandra Canal (an estuarine environment).

The Auditor has assumed that the proposed basement will intersect groundwater and minor ingress/seepage may occur providing an exposure route to site users.

6. EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL

The Auditor has assessed the overall quality of the data by review of the information presented in the referenced reports, supplemented by field observations. The data sources are summarised in **Table 6.1**.

Table 6.1: Summary of Investigations

Investigations	Field Investigations	Analytical Data Obtained
Alliance Waste Classification *Fieldwork: 2015*	Prepared based on data from a Phase 2 report (not available) which included 10x boreholes (BH1 to BH8, MW1, MW2) and 9x additional borehole locations (BH9 to BH15), MW3 and MW4). **Attachment 3**	Soil: metals, TRH, BTEX, PAH, pH, electrical conductivity, asbestos (presence/absence).
Geotech Investigation *Fieldwork: June 2024*	4x boreholes (BH1 to BH4). BH1 to BH3 converted to groundwater monitoring wells. **Attachment 1**	Not analysed for chemical contaminants.
DSI *Fieldwork: June 2024*	<u>Soil</u> Opportunistic testing from concurrent geotechnical test locations, generally providing systematic site coverage (BH1 to BH3). Additional 13x boreholes (BH101 to BH113). Based on a targeted minimum of nine additional systematic test locations and up to four additional test locations used to provide further coverage within separate building footprints (16 total locations). This is equivalent to/exceeds the NSW EPA (2022a) recommended minimum of 13 to 15 locations for a 5000 m^2 to 6000 m^2 site. Soil samples were collected from each borehole (16 total) at depths of approximately 0.15 m, 0.5 m, 1.0 m and every 0.5 m. **Attachment 1**	Soil: metals, TRH, BTEX, PAH, VOC, phenols, OCP, OPP, PCB, PFAS, asbestos (500 mL). Soil Vapour: IPA, VOC, BTEX and naphthalene, TRH F1 (TRH C_6-C_{10} fraction minus BTEX), TRH F2 (TRH >C_{10}-C_{16} fraction minus naphthalene). Groundwater: metals, TRH, BTEX, VOC, PAH, OCP, OPP, PCB, PFAS.

Investigations	Field Investigations	Analytical Data Obtained
	Soil Vapour 6x sub-slab soil vapour sampling pins: • SV201 and SV202 – within the building occupying the area of the identified former service station. • SV203 – downgradient of the identified former dry cleaner. • SV204 and SV205 – within the former dry cleaner. • SV206 – to provide additional spatial coverage to the west. • Leak testing using a shroud and isopropyl alcohol (IPA) **Attachment 1** Groundwater: 3x groundwater monitoring wells installed to provide general coverage and as described in **Table 6.2** - BH1, BH2 and BH3. Two additional existing wells (MW2 and MW4) were tested to provide further assessment of potential contamination in shallow groundwater (e.g., light non aqueous phase liquid (LNAPL)) towards the northern parts of the site (i.e., former service station). **Attachment 1** Groundwater monitoring event (GME) (26 June 2024). MW2, MW4, BH1, BH2, BH3	

A summary of the location of the groundwater monitoring wells, depth of the screened intervals and the various screened geologies and SWLs is provided in **Table 6.2**. Groundwater monitoring well locations are shown on **Attachment 1**.

Table 6.2: Summary of Well Locations and Screened Intervals

ID	Location	Screened Interval (mbgl)	Screened geology	SWL (mbgl) (June 2024)	SWL (mAHD) (June 2024)
BH1	Possibly upgradient – at the western edge of the site – screened interval providing assessment of shallow groundwater in sands.	12-15	Residual clay then the top of shale	3.2	12.1
BH2	Downgradient – southern boundary - screened interval providing assessment of groundwater in deeper silty sands and residual soils.	1-7.5	Sand	2.3	12.3
BH3	Upgradient - northern end of the site - screened interval providing assessment of groundwater in the residual soil/top of the rock profile.	6.75-12.75	Sand then clay and weathered shale	2.9	12.6
MW2	Alliance well, upgradient at northern end of site - screening shallow soil.	3.2-5.5	Sand	2.7	12.8
MW4	Alliance well, downgradient/ eastern site boundary to Botany Road - screening shallow soil	3-5.5	Sand	2.8	12.6

The Auditor has reviewed the following aspects of data quality:

- Data Quality Objectives (DQO)
- Sampling pattern and locations
- Sampling density
- Sample depths
- Groundwater well and soil vapour pin construction
- Sample collection methods
- Leak testing for soil vapour sampling
- Decontamination procedures
- Sample handling and containers
- Chain of Custody (COC) forms
- Detailed description of field screening protocols
- Calibration of field equipment
- Sampling logs
- Field quality control samples
- Field quality control results
- NATA registered laboratory and NATA endorsed methods
- Analytical methods
- Holding times
- Laboratory limits of reporting (LORs)
- Laboratory quality control samples
- Laboratory quality control results
- Data Quality Indicators (DQI) and Data Evaluation (completeness, comparability, representativeness, precision, accuracy)

6.1. Auditor's Opinion

The data is of adequate completeness, comparability, representativeness, precision and accuracy to assess potential risks to relevant receptors, identify potential data gaps and inform a remediation framework. The groundwater wells screened different positions in the geology and included shallow groundwater in sand (to assess for LNAPL associated with former fuel storage and USTs) (BH1, MW2 and MW4) as well as deeper groundwater in residual soil (BH2) and in the top of the weathered shale (BH3). There are no deep wells in the vicinity of the dry cleaner shown on **Figure 2.1**. The deeper well (BH3) is located up and cross gradient from the dry cleaner. However, soil vapour pins were installed to assess impacts from the dry cleaner.

Given the low concentrations of VOC detected in soil, groundwater and soil vapour across the site, the weight of evidence suggests a low potential for the presence of unidentified deeper groundwater impacts in the vicinity of the dry cleaner.

The adoption of borehole investigation methods has not allowed for thorough visual assessment or quantification of asbestos in fill. The potential for unidentified asbestos in fill has been considered by the Auditor in review of the investigations and proposed remediation.

7. ENVIRONMENTAL QUALITY CRITERIA

7.1. Soil and Soil Vapour

The Auditor compared the soil and soil vapour data to health-based criteria for commercial/industrial land use on the basis that the basement covers the majority of the site. Minor deep landscaping areas may be proposed in the southeast and northwest of the site (**Attachment 2a**). The criteria adopted were as follows:

- NEPM (2013) Health Investigation Levels (HILs) for soil for commercial/industrial D land use setting.
- NEPM (2013) Health Screening Levels (HSLs) for a commercial/industrial D land use setting for vapour intrusion for soil and soil vapour for TRH, BTEX and naphthalene. Criteria for a sand geology were adopted and a depth interval of 0-1 m was applied as an initial screen.
- NEPM (2013) Management Limits (MLs) for petroleum hydrocarbons for 'Commercial/Industrial' land use and assuming coarse soil texture. Criteria are relevant for operating sites where significant sub-surface leakage of petroleum hydrocarbons has occurred and when decommissioning industrial and commercial sites. These criteria are used qualitatively by the auditor to provide context regarding the magnitude of impacts where appropriate.
- NEPM (2013) interim soil vapour HILs for chlorinated VOCs for a commercial/industrial D land use setting. The interim HILs are applied to shallow (up to 1 m depth) soil vapour or sub-slab soil vapour. They are based on the potential for vapour intrusion using an indoor air-to-soil vapour attenuation factor of 0.1 and an outdoor air-to-soil vapour attenuation factor of 0.05.
- USEPA Regional Screening Levels (RSLs) in air (for composite workers) as adjusted by attenuation factor of 0.1 for sub-slab soil vapour when Australian criteria were not available. Where these were for non-threshold risks (carcinogenic risks) they were multiplied by factor of 10 to adjust for an acceptable cancer risk level of 1 x 10^{-5} and a hazard quotient of 1 was adopted for threshold risks consistent with NEPM (2013).
- HEPA (2020) Perfluorooctanesulfonic acid (PFOS)/perfluorohexane sulfonate (PFHxS) and perfluorooctanoic acid (PFOA) soil criteria developed for 'commercial/industrial' D land use. The PFOS + PFHxS criteria is compared to the sum of the PFOS and PFHxS concentrations.
- NEPM (2013) HSLs for Asbestos Contamination in Soil for commercial/industrial D land use. Asbestos was also assessed on a presence/absence basis within a weight of evidence framework.
- The LOR was also applied as a screen for soil and soil vapour results in the absence of other criteria.
- Aesthetic impacts were assessed by on-site observations of soil staining and/or asbestos.

Ecological soil assessment criteria were generally not considered to be applicable given the proposed basement across the majority of the site, with only minor landscaping areas. However, criteria have been included to provide context in relation to the magnitude of impacts. These were applied as follows:

- NEPM (2013) Ecological Screening Levels (ESLs) for 'Commercial/Industrial' land use, assuming coarse soil.
- NEPM (2013) Ecological Investigation Levels (EILs) for 'Commercial/Industrial' land use. In the absence of site-specific soil data on pH, clay content, cation exchange capacity and background concentrations, the published range of the added contaminant limits (ACL) have been applied as an initial screen.
- Canadian Council of Ministers of the Environment (CCME) (2010) *Canadian soil quality guidelines: carcinogenic and other polycyclic aromatic hydrocarbons (PAHs)* soil quality guideline (SQG) for benzo(a)pyrene for 'Commercial/Industrial' land use. The SQG has been adopted in place of the

NEPM (2013) ESL as it is based on a larger and more up-to-date toxicity database than the low reliability NEPM (2013) ESL.

- HEPA (2020) PFOS and PFOA interim ecological soil guidelines for direct exposure and indirect exposure developed for all land use.

7.2. Groundwater

Groundwater is expected to be intersected by the proposed basement. Therefore, recreational and drinking water criteria were considered as these assess all exposure pathways including inhalation, ingestion and direct contact that may occur from vapour intrusion and seepage into the basement.

Sheas Creek is expected to be freshwater, and Alexandra Canal is considered estuarine. Marine criteria have been adopted as Alexandra Canal and downgradient receptors are estuarine. It is also noted that Sheas Creek comprises a concrete stormwater drain with limited ecological receptors.

The Auditor compared the groundwater data against the following criteria:

- LOR was applied as an initial screen for all exposure pathways including inhalation of VOC.
- NEPM (2013) HSLs were not directly applicable for assessing vapour intrusion as a basement intersecting groundwater is proposed.
- ADWG adjusted by a factor of 10 for recreational exposure as a screen for all exposure pathways including direct contact, incidental ingestion and inhalation for VOC via groundwater basement seepage and vapour intrusion pathways onsite and for recreational exposure to assess potential off-site risk to human receptors. Consistent with NHMRC (2008).
- USEPA RSLs for tap water for VOC via vapour intrusion pathway when Australian criteria were not available. Where these were for non-threshold risks (carcinogenic risks) they were multiplied by factor of 10 to adjust for an acceptable cancer risk level of 1×10^{-5} and a hazard quotient of 1 was adopted for threshold risks consistent with NEPM (2013).
- WHO (2017) Guidelines for Drinking-water Quality, Fourth Edition, incorporating the 1st addendum.
- WHO (2008) *Petroleum Products in Drinking-water. Background document of WHO Guidelines for Drinking-water Quality* (adopted in absence of health-based criteria in WHO (2017) because the taste and odour of petroleum products will in most cases be detectable at concentrations below those of health concern).
- HEPA (2020) PFOS + PFHxS and PFOA 'interim marine water' criteria developed for the 95% level of species protection (LOP) for slightly to moderately disturbed systems; 99% LOP was also considered to address potential for bioaccumulation.
- ANZG (2018) default guideline values (DGV) for marine water ecosystems protective of 95% of species to assess potential offsite risk to ecological receptors.

7.3. Auditor's Opinion

The criteria adopted by DP were largely the same as those adopted by the Auditor. No significant differences resulting in a material impact on conclusions were identified during the review.

8. EVALUATION OF SOIL RESULTS

Soil samples were analysed for a variety of contaminants as described in **Table 6.1**. The DSI included a summary of the results (including Alliance (AG) DSI data) exceeding the site assessment criteria (SAC) which has been reproduced as **Table 8.1**. Locations are shown on **Attachments 1 and 3**.

Table 8.1: Summary of Alliance and DP DSI Soil Exceedances

Analyte (SAC)	Location	Depth (m)	Result (mg/kg)
Lead (HIL D – 1500 mg/kg)	BH101	0.2-0.3	1800
	BH101	0.5-0.6	8,100
	BH113	1-1.1	2,900
	BH2	0.2-0.3	21,000
	BH1(AG)	0.1-0.3	6,200
	BH1(AG)	0.7-0.8	5,000
	BH3(AG)	0.7-0.9	24,000
	BH4(AG)	0.2-0.3	4,900
	BH5(AG)	0.2-0.2	71,000
	MW3(AG)	0.5-0.7	2,700
	MW4(AG)	0.2-0.3	1,700
	BH9 (AG)	0.2-0.4	2,100
	BH9 (AG)	1-1.3	5,200
	BH13 (AG)	0.2-0.4	4,200
	BH15(AG)	0.7-0.9	1,600
Total Chromium (HIL D – 3600 mg/kg)	BH4(AG)	0.2-0.3	5,800
Benzo(a)pyrene Toxic Equivalency Quotient (HIL-D 40 mg/kg)	BH2	0.1-0.2	200
Total PCB (7 mg/kg)	BH2	0.9-1.0	15.8
TRH (F3) (>C_{16} - C_{34}) Management Limits (3500 mg/kg)	BH3	0.1-0.2	9000
	BH101	0.5-0.6	4300
Asbestos (0.001% w/w [AF/FA] or detection)	BH101	0.2	Detected
		0.5-0.6	Detected, 0.0158 % w/w (AF/FA)
	BH102	0.5-0.6	Detected
	BH103	0.2-0.3	Detected
		0.5-0.6	Detected, 0.0283 % w/w (AF/FA)
	BH106	0.2-0.3	Detected
	BH107	0.2-0.3	Detected
	BH108	0.5-0.6	Detected
	BH1(AG)	0.1-0.3	Detected (including respirable fibres)
		0.7-0.8	Detected (including respirable fibres)

Analyte (SAC)	Location	Depth (m)	Result (mg/kg)
	BH3(AG)	0.2-0.4	Detected
	BH4(AG)	0.2-0.3	Detected (including respirable fibres)
	BH7(AG)	0.2-0.4	Detected
	BH8(AG)	0.2-0.4	Detected
	MW4(AG)	0.2-0.3	Detected

Notes: AG – Alliance Geotechnical Investigation Location (**Attachment 3**); AF/FA – asbestos fines/fibrous asbestos.

No BTEX, VOC, OPP or phenols were detected above the LOR. Low concentrations of TRH, OCP, PFAS below the adopted criteria were detected in a small number of samples. The maximum concentration of OCP (aldrin + dieldrin) detected was 13.8 mg/kg in BH103 which is below the assessment criterion of 45 mg/kg but exceeds 2 mg/kg which indicates materials in this area will need to be managed as per the NSW EPA Scheduled Chemical Wastes Chemical Control Order (CCO) 2004. The same applies for the PCB detection at BH2. A maximum 0.0004 mg/kg of PFOS was detected, well below the HEPA (2020) HIL D criterion of 20 mg/kg for PFOS and the most conservative Ecological indirect exposure criterion of 0.01 mg/kg.

The DSI stated that identified potentially significant contaminants included:

- Elevated metals, notably lead with concentrations ranging up to 71,000 mg/kg. Leachability testing indicated leachable concentrations of up 620 mg/L (Alliance data), i.e., potentially constituting hazardous waste and a potential risk to groundwater.
- PAH – predominately as benzo(a)pyrene, with a benzo(a)pyrene Toxic Equivalency Quotient (TEQ) concentration up to 200 mg/kg.
- TRH limited to exceedances above management limits.
- Asbestos – including both non-friable (ACM) and friable materials (AF/FA).

The DSI stated that the high concentrations of lead detected in soils were also found to correspond to potentially leachable concentrations ranging up to 170 mg/L (under acidic conditions). With the highest leachable rate observed at BH113/1-1.1 (2900 mg/kg primary sample, 170 mg/L leachable), compared to a lower leachability at the peak lead in soil concentration at BH2/0.2-0.3 (21,000 mg/kg primary sample, 44 mg/L leachable), which suggests inherent heterogeneity of the lead contamination.

Further delineation and remediation (excavation and offsite disposal) of identified impact is proposed in the RAP.

8.1. Auditor's Opinion

High concentrations of lead (and to a lesser extent PAHs and TRH) have been identified. The lead appears to be associated with fill which includes anthropogenic inclusions described as *"sandstone gravel, brick fragments, trace wood, igneous (blue metal) gravel, metal, glass"* and appears widespread. The high concentrations may be associated with the occurrence of metal in the fill. Asbestos has also been detected in fill.

Remediation is required to address the identified impacts (**Section 12**).

9. EVALUATION OF SOIL VAPOUR RESULTS

Soil vapour samples were analysed for the contaminants as described in **Table 6.1**. The data summary table from the DSI for primary and duplicate samples (and the shroud) has been reproduced as **Table 9.1**. Locations are shown on **Attachment 1**.

Table 9.1: DSI Soil Vapour Results

		Isopropyl Alcohol	Vinyl chloride	Trichloroethene	trans-1,2-dichloroethene	cis-1,2-Dichloroethene	Tetrachloroethene	Benzene	Toluene	Ethylbenzene	m-& p-Xylene	o-Xylene	Naphthalene	TRH F1	TRH F2
	PQL	12	0.8	1.6	2	2	3.4	1.6	1.9	2.2	4.3	2.2	2.6	200	40
Interim HIL-D Commercial/Industrial		-	100	80	-	300	8000	-	-	-	-	-	-	-	-
NEPC (2013) HSL D - Sand 0-1m		-	-	-	-	-	-	4000	4 800 000	1 300 000	840 000		3000	680 000	500 000
Sample ID	Sample Date	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
SV202	20/06/2024	**330**	<0.8	**6**	<2	<2	**4**	**4**	**62**	**5**	**20**	**5**	**<2.6**	<200	**80**
SV203	20/06/2024	**410**	<0.8	**9**	<2	<2	**570**	**3**	**53**	**5**	**10**	**5**	**<2.6**	**470**	**60**
SV204	20/06/2024	**190**	<0.8	<1.6	<2	<2	**710**	**2**	**38**	**4**	**10**	**4**	**<2.6**	**320**	<40
BD1	20/06/2024	**200**	<0.8	<1.6	<2	<2	**730**	**2**	**40**	**4**	**10**	**4**	**<2.6**	**370**	<40
SV205	20/06/2024	**290**	<0.8	<1.6	<2	<2	**5**	**3**	**58**	**5**	**10**	**4**	**<2.6**	<200	**50**
Shroud	20/06/2024	**1300000**	-	-	-	-	-	-		-	-	-	-	-	-

Notes: **Bold** – detection above LOR.

Tetrachloroethene (PCE) was detected in all soil vapour pins sampled. The highest concentrations were detected at SV203 and SV204. The DSI stated:

> *"No further degradation products of PCE, e.g., dichloroethenes, or vinyl chloride were detected above the limit of detection to suggest the presence of a degrading chlorinated solvent plume. Higher chlorinated VOC were detected at SV203 (downgradient of the former dry cleaner) and SV204 (within the former dry cleaner). It is however noted that low level detection (5 µg/m³) was measured at SV205 which is within the former dry cleaner, near the eastern site boundary. This may either suggest more localised impacts, or more generally that given the groundwater flow direction (or influence of nearby services) that no historical contamination migration was occurring towards Botany Road.*
>
> *Concentrations of air-phase TRH do not currently indicate a significant risk from potential volatile hydrocarbon contamination. The results generally may indicate low level historical impacts from the noted land-uses, otherwise and may in part be attributed to the chlorinated VOC and / or BTEX concentrations present.*
>
> *Based on the maximum magnitude of groundwater concentrations (10 µg/L of tetrachloroethene), and considering the current soil vapour concentrations it is considered unlikely that an exposure scenario for the final landform of direct contact and seepage through basement walls would result in unacceptable vapour risks as relating to chlorinated VOC. Furthermore, the proposed development would necessarily entail removal of potential sources of chlorinated VOC in soils, and to a lesser extent in groundwater during construction dewatering, such that any potential remnant sources would be considered minimal. If a drained basement design is adopted (currently considered unlikely) then further risk assessment may be required to assess the residual risk of vapour intrusion from direct seepage into the basement.*
>
> *The low concentrations of BTEX are generally suggestive of the historical commercial usages (e.g., motor garages) and potentially minor residual impacts from the historical service station."*

9.1. Auditor's Opinion

The Auditor agrees with the above discussion by DP. Based on soil vapour results there may be some impact from the former onsite or offsite dry cleaner. However, DP has advised in email correspondence dated 11 July 2023 that:

Based on the DSI results the risk of a significant historical [chlorinated] VOC impacts was considered low.

BH1 [and BH2] were currently the accessible potential downgradient locations of the historical dry cleaner, (noting BH1 more likely cross gradient). BH1 included a screened interval of 12-15m bgl (terminating at the start of shale rock, a potential aquitard). BH2 included a screen to 7.6m bgl (sitting above a silty clay layer) which is another potential aquitard for the more permeable sands/silty sands above...

The screening intervals are also noted to cover the expected basement excavation depths (~up to 7 m, for the majority of the site, and limited deeper excavation to 15m bgl.

Whilst it is noted there is a residual risk of deeper [chlorinated] VOC impacts the risk for the proposed development is currently considered low as discussed in the groundwater results section (and DSI) I.e., that current magnitude of results do not suggest a significant direct seepage-volatilisation risk. The proposed works would also necessarily require removal of soils and therefore potential source in the soils/shallow groundwater from excavation and dewatering."

The Auditor agrees with the above discussions and is of the opinion that overall, the potential risk from soil vapour to human health are low and acceptable.

10. EVALUATION OF GROUNDWATER RESULTS

10.1. Metals

A summary of the groundwater results for metals for primary and duplicate samples presented in the DSI is reproduced as **Table 10.1** with the addition of recreational criteria by the Auditor to assess risk from potential seepage into a basement structure. Well locations are shown on **Attachment 1**.

Table 10.1: DSI Groundwater Results - Metals

			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
PQL			1	0.1	1	1	1	0.05	1	1
ANZG (2018) Marine DGV 95% LOP			24 /13	0.7	4.4	1.3	4.4	0.1	7	8
ADWG x 10 (recreational)			100	20	500	20000	100	10	200	-
Sample ID	Sampling depth (m)	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW2	4.5-5	26/06/2024	-	-	-	-	-	-	-	-
MW4	5.5-6	26/06/2024	-	-	-	-	-	-	-	-
BH1	12-12.5	20/06/2024	<1	<0.1	4	**2**	<1	<0.05	2	3
BH2	5.5-6	20/06/2024	<1	0.6	<1	**84**	1	<0.05	**14**	**280**
BH3	8-8.5	20/06/2024	<1	0.2	<1	<1	<1	<0.05	1	**21**
BD1	8-8.5	20/06/2024	<1	0.2	<1	<1	<1	<0.05	<1	**19**

10.1.1. Auditor's Opinion

With the potential exception of copper and zinc in BH2 (elevated above ecological criteria), concentrations of metals in groundwater did not appear elevated above typical background levels (including lead which was detected at or below the LOR despite being significantly elevated in soil fill samples). Furthermore, concentrations were well below the recreational criteria for human health adopted by the Auditor to assess risk from potential seepage into a basement. BH2 is on the inferred downgradient boundary and may be indicative of impacts migrating offsite. The DSI states *"The detected heavy metals in groundwater are considered typical of urban groundwater quality, particularly in built-up environments with historical/ongoing commercial / industrial activity. Accordingly, the*

detected concentrations are not considered likely to be related to a specific onsite source, and therefore may only require management as part of any dewatering process."

The Auditor agrees that specific remediation for metals in groundwater is not required and the risks to human health and the environment are low and acceptable.

Furthermore, fill (containing elevated metals) will be removed during the proposed remediation and development which will further reduce risks should onsite fill be contributing to groundwater impacts.

10.2. PFAS

A summary of the groundwater results for PFAS presented in the DSI is reproduced as **Table 10.2** with the addition of recreational criteria by the Auditor to assess risk from potential seepage into a basement structure. Well locations are shown on **Attachment 1**.

Table 10.2: DSI Groundwater Results - PFAS

			Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	Total Positive PFAS
PQL			0.0002	0.0002	0.0002
HEPA (2020) Interim Marine DGV 99% LOP			0.00023	19	-
HEPA (2020) Interim Marine DGV 95% LOP			0.13	220	-
HEPA (2020) Recreational			2	10	-
Sample ID	Sampling depth (m)	Sample Date	µg/L	µg/L	µg/L
MW2	4.5-5	26/06/2024	-	-	-
MW4	5.5-6	26/06/2024	-	-	-
BH1	12-12.5	20/06/2024	**0.0032**	0.002	0.039
BH2	5.5-6	20/06/2024	**0.11**	0.015	0.013
BH3	8-8.5	20/06/2024	**0.29**	0.026	0.38

10.2.1. Auditor's Opinion

The DSI states "*It is noted that the PFOS DGV (0.00023 µg/L, for 99% protection of species) has been adopted based on a more conservative assumption of a slightly to moderately disturbed receiving water body (95% level of protection), with one level higher protection (99%) adopted based on guidance for PFAS given the potential for bioaccumulation. It is noted however the [Alliance] RAP considered adoption of a base 90% level of protection for a highly disturbed system. Comparison to the equivalent 95% DGV for PFOS (accounting for bioaccumulation) equates to a DGV of 0.13 µg/L.*

Generally, Douglas notes that no significant PFAS was identified in soils, and no current distinct source of PFAS has been identified from the site history review. It is therefore possible that the PFAS detections are in part attributed to regional groundwater quality (given the sites urban, and nearby historical commercial / industrial land uses). Notwithstanding, slightly higher levels have currently been detected in downgradient wells."

The Auditor agrees with the above discussion. Furthermore, all concentrations were below the recreational criteria for human health adopted by the Auditor to assess risk from potential seepage into a basement. The Auditor agrees that specific remediation for PFAS in groundwater is not required. The risks to human health and the environment appear likely to be low and acceptable.

Furthermore, historical commercial activities have ceased, and fill and soil will be removed during the proposed remediation and development which will further reduce risks should unidentified sources of PFAS (in soil) be present and contributing to groundwater impacts.

10.3. TRH and BTEXN

A summary of the groundwater results for TRH and BTEXN for primary and duplicate samples is presented in the DSI and is reproduced as **Table 10.3** with the addition of human health-based criteria (refer table footnotes for sources) by the Auditor to assess risk from potential seepage into a basement structure. Well locations are shown on **Attachment 1**.

Table 10.3: DSI Groundwater Results - TRH and BTEXN

			TPH C6 - C10 less BTEX (F1)	TRH >C10 - C16 less Naphthalene (F2)	TRH >C16-C34 (F3)	TRH >C34-C40 (F4)	Benzene	Toluene	Ethylbenzene	m+p-xylene	o-xylene	Naphthalene
PQL			10	50	100	100	1	1	1	-	3	1
ANZG (2018) Marine DGV 95% LOP			-	-	-	-	500	180	80	75/ 200	350	50
NPEC (2013) HSL - D for vapour intrusion			NL	NL	-	-	30 000	NL	NL	NL	NL	NL
Human Health Based Criteria			15000[a]	300[a]	3000[a]	3000[a]	10[b]	8000[b]	3000[b]	6000[b]	6000[b]	12[c]
Sample ID	Sampling depth (m)	Sample Date	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MW2	4.5-5	26/06/2024	<10	<50	<100	<100	<1	<1	<1	<2	<1	<1
MW4	5.5-6	26/06/2024	<10	<50	<100	<100	<1	<1	<1	<2	<1	<1
BH1	12-12.5	20/06/2024	<10	**150**	<100	<100	<1	<1	<1	<2	<1	<1
BH2	5.5-6	20/06/2024	**13**	<50	<100	<100	<1	<1	<1	<2	<1	<1
BH3	8-8.5	20/06/2024	**14**	<50	<100	<100	<1	<1	<1	<2	<1	<1
BD1	8-8.5	20/06/2024	**11**	<50	<100	<100	<1	<1	<1	<2	<1	<1

Notes: a) WHO (2017); b) 10 x ADWG (recreational); USEPA tap water x 10 to convert 1 x 10-5 risk x 10 to convert to recreational exposure; vTPH – volatile total petroleum hydrocarbons.

10.3.1. Auditor's Opinion

Reported concentrations were below or close to the LOR and well below the ecological and human health assessment criteria.

Furthermore, USTs and unexpected finds (if any) will be removed during the proposed remediation and development which will further reduce risks.

10.4. VOC

A summary of the groundwater results for VOC presented in the DSI is reproduced as **Table 10.4** with the addition of human health-based criteria (refer table footnotes for sources) by the Auditor to assess risk from potential seepage into a basement structure. Well locations are shown on **Attachment 1**.

Table 10.4: DSI Groundwater Results - VOC Detections

			Chloroform	Tetrachloroethene	All Analysed VOCs
PQL			1	1	-
ANZG (2018) Marine DGV 95% LOP			370	330	-
Human Health Based Criteria			22[a]	50[b]	-
Sample ID	Sampling depth (m)	Sample Date	µg/L	µg/L	µg/L
MW2	4.5-5	26/06/2024	**1**	<1	**1**
MW4	5.5-6	26/06/2024	<1	<1	<1
BH1	12-12.5	20/06/2024	**8**	<1	**8**
BH2	5.5-6	20/06/2024	<1	**10**	**10**
BH3	8-8.5	20/06/2024	<1	<1	<1

Notes: a) USEPA tap water x 10 to convert 1 x 10^{-5} risk x 10 to recreational exposure; b) ADWG.

10.4.1. Auditor's Opinion

Results for VOC were below or close to the LOR. However, the wells were generally not screened in the deeper groundwater where chlorinated hydrocarbons would be more likely to be present. A low but detectable concentration of PCE was detected in BH2 which appears likely to be downgradient from the dry cleaner. This may be indicative of deeper impact associated with the dry cleaner (and other sources). However, as per the discussion in **Section 9.1**, overall when considering the various lines of evidence the data does *"… not suggest a significant direct seepage-volatilisation risk. The proposed works would also necessarily require removal of soils and therefore potential source in the soils/shallow groundwater from excavation and dewatering."*

The Auditor agrees with the above discussions and is of the opinion that overall, the potential risk from VOC in groundwater to human health are low and acceptable.

10.5. Overall Auditor's Opinion

Similar results were obtained by Alliance from sampling of MW1, MW2, MW3 and MW4, including lead results below or close to the LOR. TRH, BTEX and VOC were below the LOR.

The DSI states *"The current groundwater quality therefore doesn't indicate the requirement for additional groundwater investigation or management for site contamination purposes, with any management limited to treatment as part of site dewatering."*

The Auditor agrees the risks to human health and the environment are low and acceptable and specific remediation for groundwater is not required. The proposed remediation and removal of fill and soil during bulk earthwork will further reduce risks.

11. CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of the contaminant source, pathway, and receptor linkages at a site. DP developed a CSM and used it iteratively throughout the site assessment to inform decisions around investigation and remediation/management requirements. The CSM was initially developed following the preliminary investigations and has been updated as new information became available.

A summary of the CSM and potentially complete exposure pathways identified by DP in the RAP are presented as **Tables 11.1 to 11.3**.

Table 11.1: Summary of Potential Sources

Potential sources
S1: Fill: Associated with levelling, demolition of former buildings on the site, including potential uncontrolled fill. **S4:** Previous on-site commercial / industrial land-uses, including motor garage / repairs, manufacturing / wholesales etc. CoPC: metals, PAH, asbestos Secondary CoPC: OCP, PCB, TRH, BTEX, PFAS
S2: Former service station (on-site), including potentially disused / abandoned UST and appurtenances which may have caused leaks / spills of fuels (e.g., petrol / diesel), fuel additives or oils / greases. CoPC: lead, TRH, BTEX, PAH, phenols and VOC
S3: Former dry cleaner (on-site), including historical leaks / spills from chlorinated solvent usage / storage CoPC include chlorinated VOC
S5: Existing buildings (i.e., risk of cross contamination of soils after demolition) CoPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB

Table 11.2: Summary of Potential Receptors

Potential human receptors
HR1: Current users [commercial] **HR2:** Construction and maintenance workers **HR3:** End users [commercial (workers and visitors)] **HR4:** Adjacent site users [residential, commercial]
Potential environmental receptors
ER1: Surface water [Alexandria Canal] **ER2:** Groundwater Based on the current and future proposed land-form it is considered that there would be no significant on-site terrestrial ecosystem receptors (i.e. hardstand cover or new basements).
Potential pathways to human receptors
HP1: Ingestion and dermal contact **HP2:** Inhalation of dust and / or vapours
Potential pathways to environmental receptors
EP1: Surface water run-off (considered limited to risks during construction works given existing hardstand cover) **EP2:** Leaching of contaminants and vertical migration into groundwater **EP3:** Lateral migration of groundwater providing base flow to water bodies

Table 11.3: Summary of Potentially Complete Exposure Pathways

Source and CoPC	Exposure pathway	Receptor	Risk management action
S1/S4: Fill CoPC include metals, PAH, asbestos Secondary CoPC: TRH, BTEX, PFAS	**HP1:** Ingestion and dermal contact **HP2:** Inhalation of dust and / or vapours	**HR1:** Current users [commercial] **HR2:** Construction and maintenance workers **HR3:** End users [commercial]	Data gap investigation following demolition to provide data principally for waste classification purposes to facilitate off- site disposal (all fill) during basement formation.
	EP3: Lateral migration of groundwater providing base flow to water bodies	**ER1:** Surface water	
	EP2: Leaching of contaminants and vertical migration into groundwater	**ER2:** Groundwater	
S2: Former service station (on-site), CoPC include lead, TRH, BTEX, PAH, phenols and VOC **S3:** Former dry cleaner(on-site) CoPC include chlorinated VOC	**HP1:** Ingestion and dermal contact **HP2:** Inhalation of vapours	**HR2:** Construction and maintenance workers	Decommissioning of suspected UST during site excavation works. Localised soil / water impacts may be present (e.g. tank pits) Residual vapour intrusion risks considered to be not significant dependent on a tanked basement design. Manage residual risk to groundwater as part of dewatering planning
	HP2: Inhalation of vapours (direct seepage through groundwater contact with basement)	**HR2:** Construction and maintenance workers **HR3:** End users [commercial]	
	EP2: Leaching of contaminants and vertical migration into groundwater	**ER2:** Groundwater	
	EP3: Lateral migration of groundwater providing base flow to water bodies	**ER1:** Surface water	
S5: Existing buildings (i.e. risk of cross contamination of soils after demolition) CoPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB	**HP1:** Ingestion and dermal contact **HP2:** Inhalation of dust and / or vapours	**HR1:** Current users [commercial] **HR2:** Construction and maintenance workers **HR3:** End users [commercial]	Conduct hazardous building material survey prior to demolition.
	HP2: Inhalation of dust and / or vapours	**HR4:** Adjacent site users [commercial / residential]	

11.1. Auditor's Opinion

The CSM was a reasonable representation of the contamination at the site including consideration of potential data gaps and uncertainties. The Auditor considers the primary data gaps to be:

- Quantification of ACM concentrations in fill material has not been undertaken due to the limitations of the site investigations undertaken (boreholes).
- The extent of contamination present in fill material for waste classification purposes. The data gap assessment may include a trial for the treatment of fill material to immobilise lead for waste classification and offsite disposal.

- The presence and condition of UST(s) (including potential for unidentified USTs).

The data gap investigations, remediation and validation works proposed in the RAP are considered adequate to address the identified risks under the proposed land use based on the CSM.

12. EVALUATION OF PROPOSED REMEDIATION

12.1. Proposed Extent of Remediation

The RAP identifies the proposed extent of remediation as follows:

- Asbestos (all fill) – fill material is suspected or known to be contaminated with asbestos (friable and non-friable), however, results are currently limited to identification of ACM in soil (presence/absence) and AF/FA analysis. However, based on current results it is considered likely that ACM concentrations in 10 L bulk samples of fill material would exceed the NEPM (2013) criteria.
- Lead in soil – currently identified above the adopted criteria for 74-88 Botany Road, with additional exceedances identified at BH113 and BH2 (laneway) between other structures. Generally, it is considered there is a risk of additional elevated lead in soils which would require management. The source of lead may represent the same source as asbestos in soil (i.e., previous demolition and impacted fill), therefore these impacts are to be managed concurrently.
- Total chromium in soil – BH4(AG) exceeding criteria, identified with elevated lead concentrations in fill material.
- TRH in soil – BH101 (0.5-0.6 m) and BH3 (0.1-0.2) exceeding management limits (TRH fractions F3). Noted to be comingled with elevated metals concentrations in fill material. Current groundwater results do not indicate significant impacts to groundwater associated with the residual soil impact.
- PCB in soil – BH2 (deeper fill, ~1 m) exceeding criteria.
- PAH in soil – BH2 (shallow fill, 0.1-0.2 m) exceeding criteria for benzo(a)pyrene TEQ. Further delineation/assessment is recommended to determine whether the impact relates to asphalt/bitumen fragments from hardstand at this location.
- Suspected UST (if present) – may include localised heavy metal, TRH/BTEX and PAH impacts in soils/groundwater. If present, remediation would require decommissioning and removal/destruction of tank(s).

The RAP proposes a data gap investigation following demolition of structures and removal of hardstand. The RAP also proposes potentially reducing the waste classification of lead impacted soils through development of a treatment strategy and site-specific immobilisation order.

The development includes a basement over the majority of the site. Therefore, fill and natural materials require excavation and offsite disposal as part of bulk earthworks. The proposed data gap assessment and any remediation/treatment of soil is therefore predominantly to manage and determine waste classifications.

12.1.1. Auditor's Opinion

The Auditor agrees with the approach discussed above to determine the final extents of remediation and waste management requirements (including potential for treatment of fill for waste disposal). The approach is consistent with the development, project objectives and the information reviewed. The details will be informed by the data gap investigation after demolition and removal of hardstand have improved access. This is a reasonable approach.

The proposed development (**Attachment 2a**) appears to include some minor landscaping areas outside of the basement footprint (**Attachment 2b**). It is recommended that fill material is entirely removed from any areas outside of the basement.

12.2. Proposed Sequence of Remediation

The RAP proposes a sequence of remediation as summarised in **Table 12.1**.

Table 12.1: Proposed Sequence of Remediation

Task	Description
Task 1	Data gap investigation following demolition to provide further assessment of asbestos in soil risks, to provide further data inputs for management of lead in soil contamination, i.e., if on- or off-site treatment is considered, assessment of the presence of USTs, and to further inform the waste classifications.
Task 2	Excavation of all fill for off-site disposal based on the following options: • Option 1 – on-site treatment of soils, and off-site waste disposal. • Option 2 – off-site treatment of soils and off-site waste disposal. • Option 3 (default fallback approach if no treatment is considered) – off-site waste disposal under waste classifications assigned without treatment.
Task 3, concurrent with Task 2	Removal and decommissioning of UST (currently suspected, to be further investigated in Task 1).
Task 4	Validation and classification of natural soils / rock following fill removal.

12.2.1. Auditor's Opinion

The proposed sequence of remediation is reasonable.

12.3. Data Gap Assessment

The RAP proposes a minimum of an additional twelve test pits into natural soil, located systematically across the site to increase sampling density for the purposes of refining the extent of asbestos contaminated soil, and the risk of any further impacts as a result of demolition works. The data gap works will also aim to identify the presence of suspected USTs following removal of existing building slabs which currently limit the effectiveness of ground penetrating radar (GPR).

Soil samples are proposed to be collected at regular depth intervals to analyse for the primary CoPC, i.e., metals, TRH/BTEX, PAH, asbestos (500 mL and 10 L), and limited analysis of the secondary CoPC (OCP, PCB and PFAS).

Additional delineation test pits locations will be undertaken around the following previous borehole locations, i.e., four locations within 3-5 m targeting minimum 0.5 m depth below previously identified contamination:

- BH101 – lead.
- BH1 – lead.
- BH2 – PAH, lead and PCB.
- BH103 – OCP (to assess management requirements with respect to CCO).
- BH3[AG] – lead.
- BH5[AG] – lead.

Collected samples will be analysed for the specific CoPC at each of the above locations, targeting depth of previously identified contamination. DP will prepare an in-situ waste classification and relevant inputs if on- or off-site treatment is to be considered. Revision of the RAP will be undertaken, if required.

12.3.1. Auditor's Opinion

The proposed additional 12 locations may not achieve 'double density' for asbestos quantification with reference to WA DoH (2021) given the existing locations are boreholes and are thus of limited value for asbestos quantification. Depending on various factors, some additional test pit locations may be required to confirm waste classification depending on conditions encountered and the assumptions/classifications being considered. It is reasonable for these decisions to be made once works commence and conditions are better observed.

12.4. Evaluation of the Remediation Action Plan

The Auditor has assessed the RAP by comparison with the checklist included in NSW EPA (2020a) *Contaminated Land Guidelines, Consultants Reporting on Contaminated Land*, as detailed in **Table 12.2**.

Table 12.2: Evaluation of Remedial Action Plan

Remedial Action Plan	Auditor Comments
Remedial Goal The RAP states the remediation objectives 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. The goal of the remediation works is to demonstrate that currently known (or additional) contamination has been appropriately managed through the proposed remediation strategy. Namely this includes: • Appropriate removal and decommissioning of suspected UST. • Management of asbestos in soil risks through off-site disposal of soils, and managing risks to direct receptors (workers, nearby public). • Management of other known soil contaminants, namely lead, through off-site disposal. • Potentially reducing classification of lead impacted soils through development of a treatment strategy and site-specific immobilisation order, and demonstration of successful treatment. • Assessment following removal of fill to validate removal of known (or additional) contamination.	The goal is consistent with the project objectives and the information reviewed.
Discussion of the Extent of Remediation Required Remediation required for each area was discussed within the RAP and is summarised in **Section 12.1**.	The proposed extent of remediation is consistent with the project objectives and the information reviewed. The details will be informed by the data gap investigation after demolition and removal of hardstand have improved access. This is a reasonable approach. As noted in **Section 12.1.1**, the Auditor recommends that fill material is entirely removed from any areas outside of the basement.
Remedial Options Remedial options were assessed and included: • No action • Treatment (both on or offsite) • Onsite Management • Offsite disposal.	The Auditor considers that an appropriate range of options were considered.
Selected Preferred Option and Rationale Given the requirement for basement construction, the option of offsite disposal was selected. An option of treating materials for lead	The Auditor considers the preferred option to be reasonable and technically feasible considering the

Remedial Action Plan	Auditor Comments
(immobilisation) to reduce the waste classification is also being considered subject to appropriate trials and approvals.	development includes excavation for a basement across the majority of the site footprint. The feasibility of treating soil for waste purposes will be subject to appropriate trials and approvals for any immobilisation. It is recommended that any fill material outside of the proposed basement is also excavated and disposed offsite.
Description of Remediation to be Undertaken Decommissioning and disposal of USTs. Excavation and validation of areas of impacted soil for offsite disposal as discussed in **Section 12.2**. Treatment of soil for waste disposal may be undertaken if practicable.	Reasonable and technically feasible considering the development includes excavation for a basement.
Proposed Validation Criteria The validation criteria are as per the SAC adopted in the DSI which essentially are the same as the soil environmental quality criteria referenced by the Auditor in **Section 7** (i.e., based primarily on NEPM (2013) Category D health-based criteria). Additionally, NSW EPA (2014) waste classification criteria will be considered for determining extents of the waste classifications. The RAP also states no potentially impacted asbestos soils are to be retained at ground surface. Any retained fill is to meet HSL-D, unless assessment can demonstrate suitability otherwise, noting at present all fill will be removed off-site under the remediation strategy.	The proposed validation criteria are consistent with the remediation goals.
Imported Materials Any soil, aggregate, etc. imported for the remediation works must have contaminant concentrations that meet the validation criteria. 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. • Have no aesthetic issues of concern. • 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 (and Site Auditor if required), material classified under a NSW EPA Resource Recovery Order (RRO) may also be accepted, provided the material can be used on site in accordance with the corresponding Resource Recovery Exemption (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, 2014). The need for check-sampling of 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 imported recycled aggregates and blended materials must be sampled at a frequency of sampling of one sample per 25 m^3, with a minimum of three samples per load. The recycled aggregate will not be permitted to be	The proposed criteria and framework for imported material is appropriate. It will need to be demonstrated that recycled materials and landscaping materials are free of asbestos. Assessment for asbestos should be undertaken in accordance with NEPM (2013).

Remedial Action Plan	Auditor Comments
used on site until the results of the inspection and laboratory analysis have been approved in writing by the Environmental Consultant.	
Proposed Validation Testing The sampling frequency for excavations and unexpected finds 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 consider previous results, where applicable, and findings from the visual inspections: Small to medium excavations (base <500 m^2): • Base of excavation: one sample per 25 m^2 or part thereof, with a minimum of three samples where the base of the excavation is fill rather than natural soils; and • Sides of excavation: one sample per 10 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 (base ≥500 m^2): • 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. • 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 filling. • Where contaminated soils are stored or treated on bare soils (e.g., VENM), the footprint of the stockpile will require validation following removal of the contaminated soils. UST excavations are to be validated as per NSW EPA (2023) and include samples from the walls and base of excavations at a rate of 1 per 5 m and 1 per 25-50 m^2 respectively and at a rate of 1 per 5 m along fuel lines. Validation samples will be analysed for the CoPC relevant to the remediation area.	The proposed validation pattern and frequencies are consistent with NSW EPA (2022) and NSW EPA (2023). The main components of validation from a contaminated land perspective will be: • Validation on the walls and base for excavations associated unexpected finds and USTs. • Confirmation that fill material has been removed from the development footprint exposing natural material at the base.
Contingency Plan if Selected Remedial Strategy Fails The RAP states although the site has been subject to previous investigation(s), there remains a potential for soil contamination to be present between sampled locations. In the event that signs of soil contamination, other than that included in the remediation strategy, are encountered during remediation e.g., evidence of ACM, petroleum, or other chemical odours which weren't previously identified the following protocols will apply: • Site Manager is to be notified and the affected area closed off by the use of barrier tape and warning signs. • 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) and Site Auditor. • The agreed management / remedial strategy, based on the RAP and relevant guidelines (e.g., WA DoH (2021), for asbestos issues), shall be implemented. • All details of the assessment and remedial works are to be included in the site validation report.	The remediation strategy has a low risk of failure as further excavation will be undertaken if validation samples exceed criteria. Furthermore, fill is to be removed from across the majority of the site for a multilevel basement (2 levels in the north and 4 levels in the south) which is anticipated to expose natural sand in some areas and the underlying residual clay in others (**Attachments 4a and 4b**).
Unexpected Finds Protocol The unexpected finds protocol is outlined in the RAP as follows: *"Should signs of concern be observed, the Site Manager, as soon as practical, will:*	The unexpected finds protocol is adequate.

Remedial Action Plan	Auditor Comments
• *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). Where appropriate the Principals Representative will also implement appropriate community consultation in accordance with a Communications Plan.* *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."*	
Interim Site Management Plan (before remediation) No interim site management requirements have been identified.	Based on the data reviewed and the presence of hardstand across the site, the continued operation of the site for commercial land uses appears to represent a low and acceptable risk to human health and the environment.
Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and WH&S The RAP includes a general site management plan (SMP) including stormwater, soil, noise, dust, odour and WH&S to minimise potentially adverse impacts on the environment, and worker and public health as a result of the proposed remediation works. The RAP states that 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. The SMP was prepared to augment the Remediation Contractor's CEMP and contains general details for aspects of the work, as per reporting requirements for a RAP under NSW EPA (2020a).	Adequate.
Remediation Schedule and Hours of Operation The RAP states remediation works will be conducted within the days and hours specified in the development consent.	Remediation is to be undertaken after demolition and removal of hardstand and prior to bulk earthworks and construction.
Contingency Plans to Respond to Site Incidents The RAP states 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.	Adequate.
Licence and Approvals The RAP states the presence of PCB at BH2/0.9-1.0 and OCP at BH103 above 2 mg/kg indicates materials in this area will need to be managed as per the NSW EPA Scheduled Chemical Wastes CCO 2004. As the concentrations are less than a total of 50 mg/kg the materials may be transported off-site in accordance with the Order, to a receiving facility which can receive the material in accordance with their Environmental Protection Licence (EPL). Application to the NSW EPA for a site-specific immobilisation order (for lead). Confirmation should also be sought from receiving facilities (with	Adequate.

Remedial Action Plan	Auditor Comments
respect to limits of their EPL) as to whether they can receive the materials under the site-specific order. All waste must be tracked by the Remediation Contractor from 'cradle to grave'. Copies of all consignment notes / disposal dockets (or similar) and EPL 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. The Asbestos Contractor will be responsible for undertaking all asbestos work involving any asbestos impacted filling and will hold a Class A licence for the removal of asbestos (issued by SafeWork NSW), on the basis that the asbestos identified at the site to date has included both friable and bonded asbestos. A Licenced Asbestos Assessor will be required (based on known friable asbestos contamination) to be engaged independently of the Asbestos Contractor. DP has advised that the SEARs will effectively provide consent for the remediation. An appropriately licensed landfill should be selected, and the material tracked from the Site to the landfill.	
Contacts/Community Relations Contact details for roles/responsible parties are to be completed in the SMP once known. Where appropriate, the Principal's Representative will also implement appropriate community consultation in accordance with the NEPM (2013) guidelines.	Adequate.
Staged Progress Reporting At the completion of the data gap additional investigations, an in-situ waste classification report is proposed to be prepared, including relevant information inputs if on or off-site treatment is to be considered. A data gap investigation report and if required an Addendum RAP will also be prepared. These reports will be provided to the Auditor for review. Preparation of a validation report in accordance with NSW EPA (2020a) will be undertaken to document the completed remediation works.	Adequate.
Long Term Environmental Management Plan The RAP does not propose a long-term management plan.	Ongoing management is not currently anticipated to be required under the proposed remediation strategy. Fill material in the landscaping areas outside of the basement will need to be removed or demonstrated to be suitable to remain.
Waste Management Disposal of waste must be to an appropriately licensed waste facility, as per *Protection of the Environment Operations Act 1997* (POEO Act) and the *Protection of the Environment (Waste) Regulation 2014*. It is envisaged that the data gap investigation will include data sets to be used for formal waste classification. Formal waste classification reports will be prepared for each area / soil type to be removed from site. The waste classification will utilise the data sets plus any additional sampling and testing considered warranted. All waste must be tracked by the Remediation Contractor from 'cradle to grave'. Copies of all consignment notes / disposal dockets (or similar) and EPL 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.	Adequate.

12.5. Auditor's Opinion

The remedial strategy is considered to be adequate although it is recommended that fill material is entirely removed from any areas outside of the basement. Refer to **Section 13** for overall conclusions and recommendations.

13. CONCLUSIONS AND RECOMMENDATIONS

The RAP concludes *"It is considered that the site can be made suitable for the proposed commercial development subject to implementation of this RAP."*

In my opinion, the proposed data gap assessment and remediation and management framework are reasonable and technically feasible. If adequately implemented, the RAP should render the site suitable for the proposed land use through the data gap assessment, remediation and offsite disposal of impacted soil.

This is subject to the Auditor conditions/mitigation measures summarised in **Table 13.1**.

Table 13.1: Auditor Conditions/Mitigation Measures

ID	Mitigation Measure
Contamination and Remediation	
CR001	Preparation of a Data Gap Investigation report documenting the outcomes of the proposed additional investigations including further data inputs for management of lead in soil contamination and finalising the remediation requirements and extents. This must be provided to the Auditor for review and endorsement in an Interim Audit Advice letter.
CR002	Preparation of in-situ waste classification report/s, including relevant information inputs if on- or off-site treatment of fill material is to be undertaken prior to disposal. This must be provided to the Auditor for review and endorsement in an Interim Audit Advice.
CR003	Depending on the significance of the remediation recommendations informed by the Data Gap Investigation, an Addendum to the RAP may be required. This must be provided to the Auditor for review and endorsement in an Interim Audit Advice prior to undertaking the works.
CR004	Implementation of the RAP (and any addendum). It is recommended that fill material is entirely removed from any areas outside of the basement during implementation of the RAP.
CR005	At the completion of remediation in accordance with the RAP (and any addendum), preparation of a Validation Report. This must be reviewed by the Auditor who will prepare a Section A Site Audit Statement (SAS) and Site Audit Report (SAR) assessing the suitability of the site for the proposed use.

14. LIMITATIONS

This interim audit advice was conducted on behalf of Botany Road Development Pty Ltd for the purpose of assessing the suitability and appropriateness of a remedial action plan (RAP). This summary report may not be suitable for other uses.

The Auditor has relied on the documents referenced in Section 1 in preparing the Auditor's opinion. The consultants included limitations in their reports. This interim audit advice must also be subject to those limitations. The Auditor has prepared this document in good faith but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check. If the Auditor is unable to rely on any of those documents, the conclusions of this interim audit advice could change.

It is not possible to present all data which could be of interest to all readers of this interim audit advice. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice in respect to, their situation.

* * *

Consistent with the NSW EPA requirement for staged 'signoff' of sites that are the subject of progressive assessment, remediation and validation, I advise that:

- This advice letter does not constitute a Site Audit Report or Site Audit Statement.
- At the completion of the remediation and validation I will provide a Site Audit Statement and supporting documentation.
- This interim advice will be documented in the Site Audit Report.

Yours faithfully
Ramboll Australia Pty Ltd

Tom Onus
EPA Accredited Site Auditor 1505

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Attachments:

Attachment 1 - Site Location, Layout and Investigation Locations

Attachment 2a – Development Layout

Attachment 2b – Development Layout (Basement 01)

Attachment 3 - Alliance Investigation Locations

Attachment 4a - Basement Cross Section (North-South)

Attachment 4b - Basement Cross Section (East-West)

Attachment 1 - Site Location, Layout and Investigation Locations

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INITIAL ISSUE	28.06.2024	EC / JJH

SCALE: 0 5 10 15 20 25 m

1:499.999999 @ A3

Douglas PARTNERS

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(02)9809 0666

CLIENT: **Kurraba Group Pty Ltd**

NOTE:
1. Basemap from Metromap (Dated 25.03.2024)

COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 56

PROJECT NAME: **Proposed Research and Life Science Development**

PROJECT ADDRESS: **100 Botany Road, Waterloo**

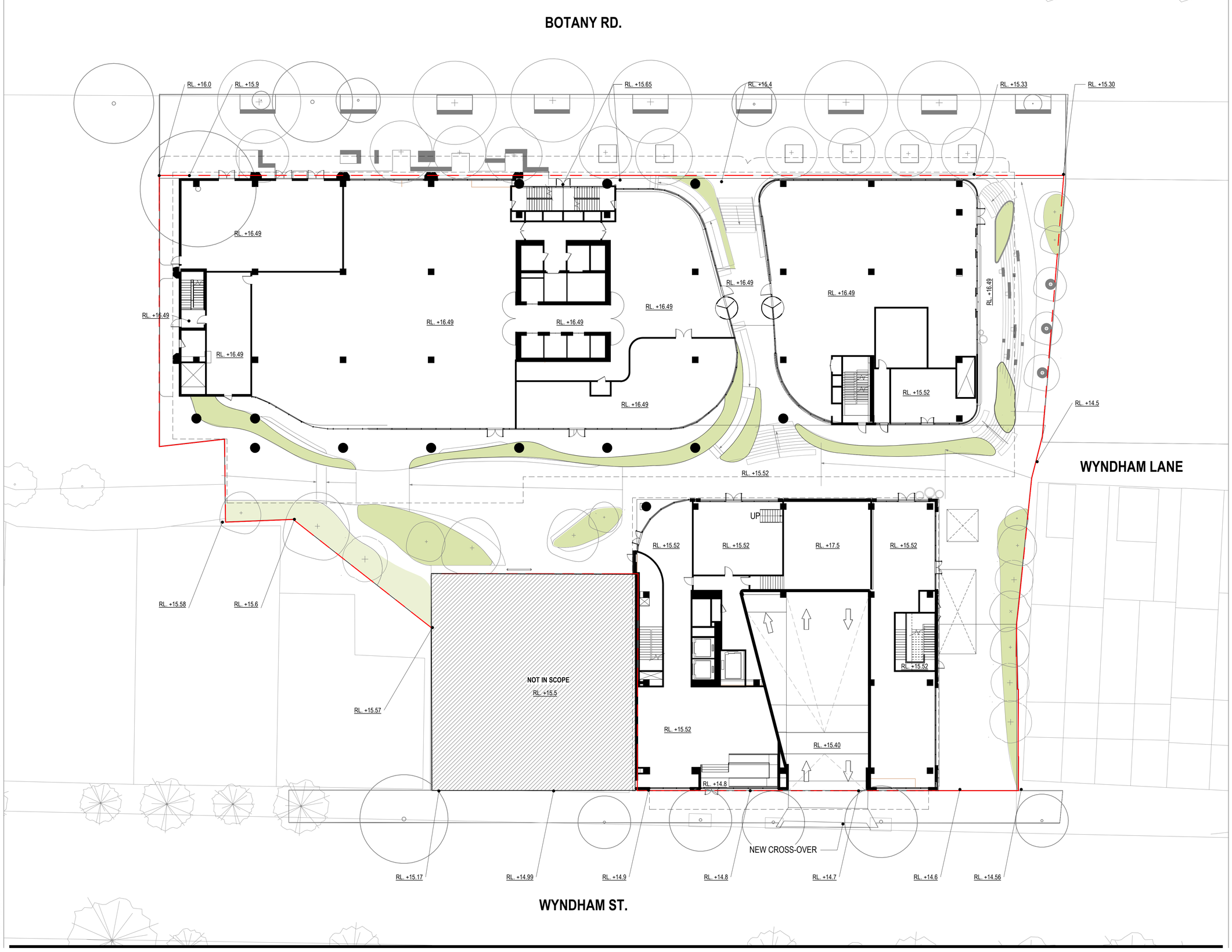
DRAWING TITLE: **TEST LOCATION PLAN**

PROJECT NO: **221233.03**

DRAWING NO: **1**

REVISION: **0**

Attachment 2a - Development Layout



KURRABA

74-108 Botany Road and 86-100 Wyndham Street, Alexandria, NSW 2015

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NOMINATED ARCHITECT - TOM OWENS
NSW REGISTRATION NO. 9877

△	Date	Description
1	19/07/2024	SSDA
2	13/09/2024	SSDA

Seal / Signature

NOT FOR CONSTRUCTION

Project Name

Kurraba

Project Number

05.4858.000

Description

PROPOSED SITE PLAN

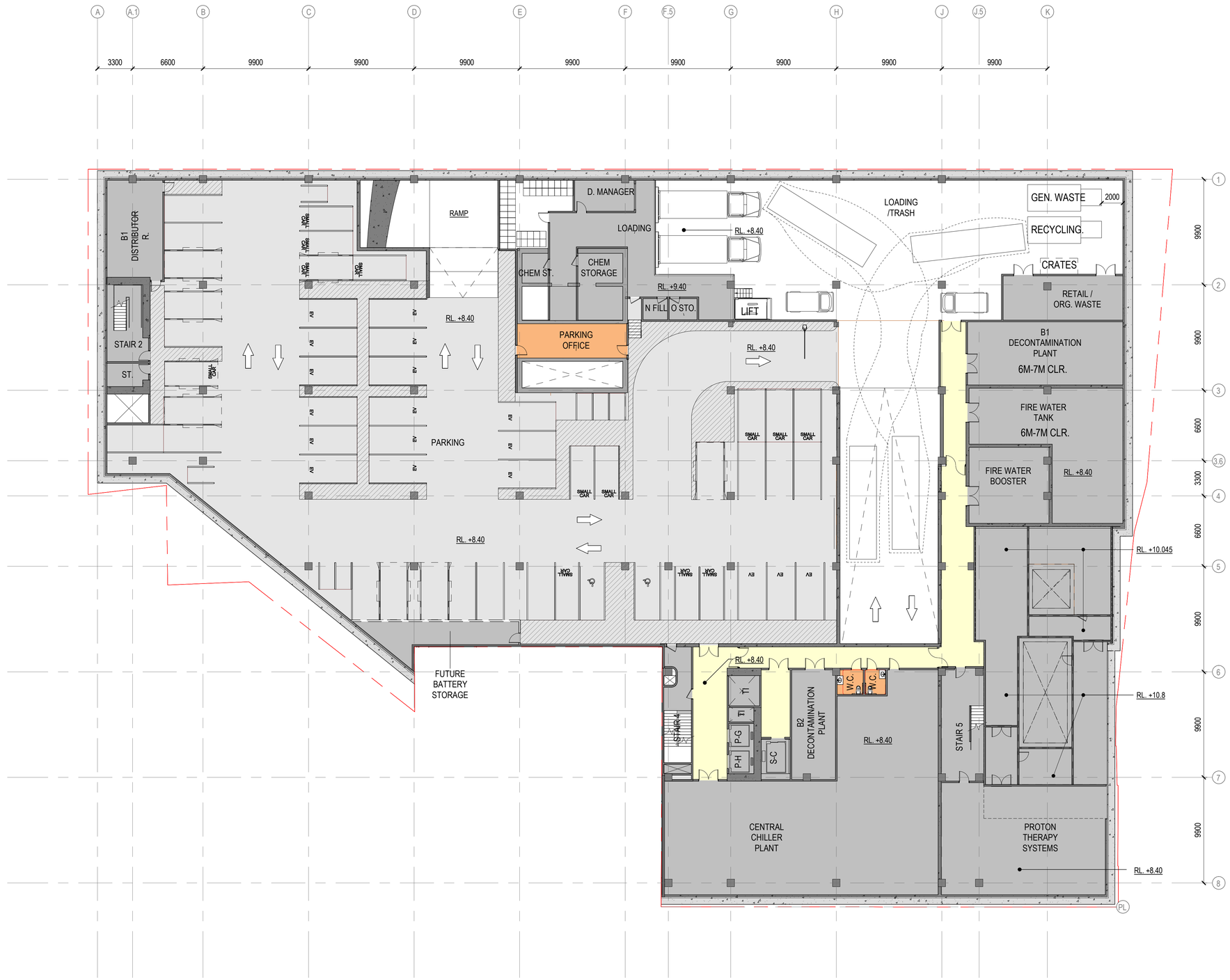
Scale

1 : 200

0m 4m 8m 12m

GEN-BO-XX-D-A-0200

Attachment 2b - Development Layout (Basement 01)



SHEET NOTES

PARKING TYPE	COUNT
BASEMENT 01	
ACCESSIBLE	2
EV	18
MOTORCYCLE	7
SMALL CAR	13
STANDARD	18
	58
BASEMENT 01M	
ACCESSIBLE	3
MOTORCYCLE	7
SMALL CAR	9
STANDARD	32
	51
	109

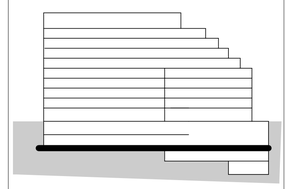
TOTAL PARKING COUNT

LOADING BAYS:	2 SPACES
WASTE COMPACTOR:	2 SPACES
VISITOR / STAFF PARKING:	95 SPACES
EV READY :	5 SPACES
FUTURE EV:	13 SPACES
ACCESSIBLE:	5 SPACES
STANDARD:	50 SPACES
SMALL CAR:	22 SPACES
MOTORCYCLE SPACES:	14 SPACES

LEGENDS

- CORRIDOR
- PROTON THERAPY
- RETAIL
- SHARED SPACES
- PARKING
- SYSTEMS / BUILDING SPACES
- CORE

KEY SECTION



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NOMINATED ARCHITECT - TOM OWENS
NSW REGISTRATION NO. 9877

△	Date	Description
1	19/07/2024	SSDA
2	13/09/2024	SSDA

Seal / Signature

NOT FOR CONSTRUCTION

Project Name

Kurraba

Project Number

05.4858.000

Description

GENERAL ARRANGEMENT PLAN - BASEMENT 01

Scale

As indicated

0m 4m 8m 12m

GEN-BO-B1-D-A-1209

Alliance Geotechnical Pty Ltd
ENGINEERING | ENVIRONMENTAL | TESTING

Figure 3 – Sample Locations

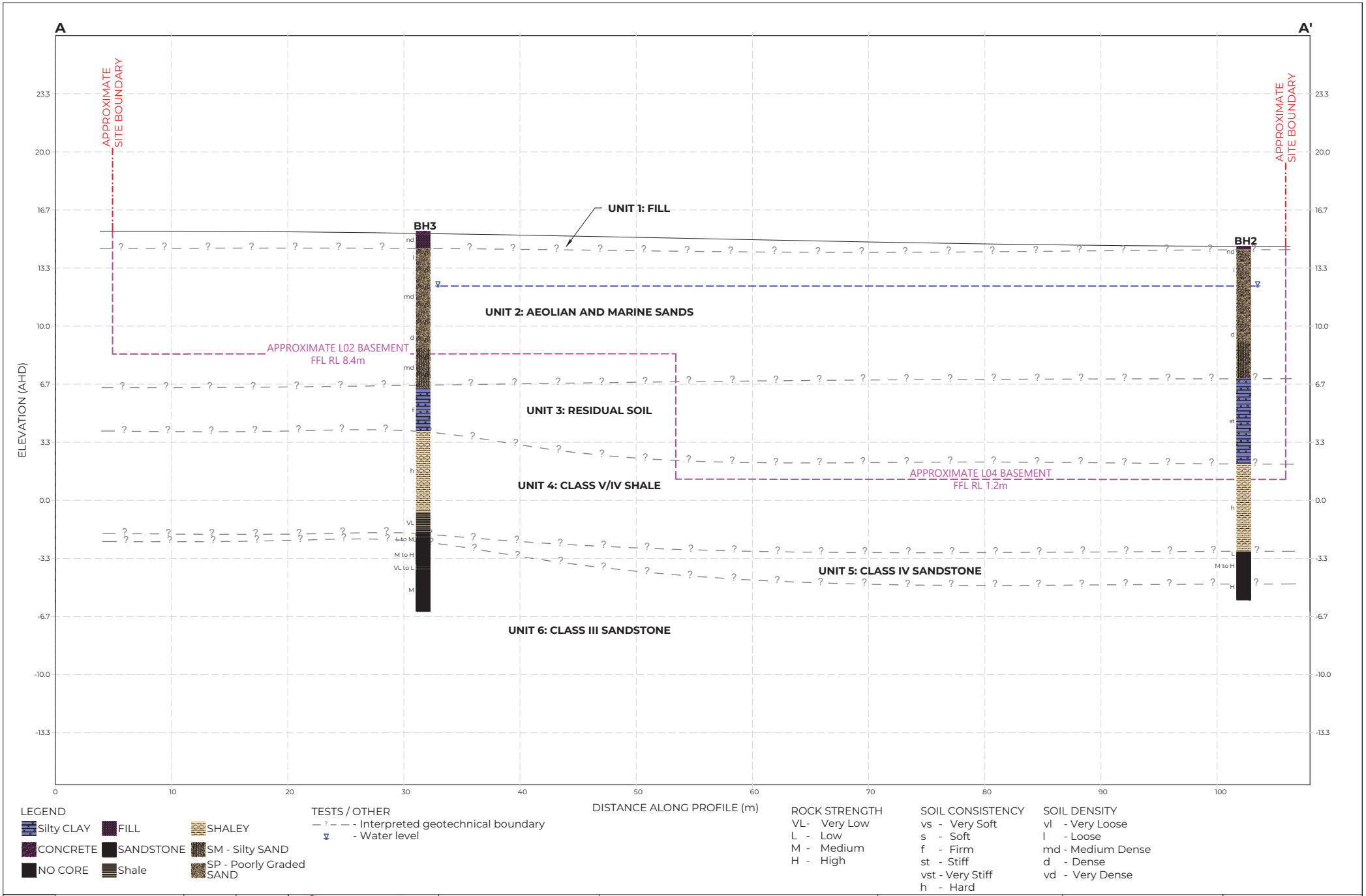
N

KEY

BH1	Borehole Locations – Previous Investigations.
BH9	Borehole Locations – Current Investigations.
MW1	Monitoring Well- Previous Investigations.
MW3	Monitoring Well- Current Investigations.
	Approximate Site Boundary

Source: http://maps.six.nsw.gov.au/

Attachment 4a - Basement Cross Section (North-South)



LEGEND

- Silty CLAY
- CONCRETE
- NO CORE
- FILL
- SANDSTONE
- Shale
- SHALEY
- SM - Silty SAND
- SP - Poorly Graded SAND

TESTS / OTHER

- Interpreted geotechnical boundary
- Water level

ROCK STRENGTH

VL- Very Low
L - Low
M - Medium
H - High

SOIL CONSISTENCY

vs - Very Soft
s - Soft
f - Firm
st - Stiff
vst - Very Stiff
h - Hard

SOIL DENSITY

vl - Very Loose
l - Loose
md - Medium Dense
d - Dense
vd - Very Dense

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INTIAL ISSUE	24.06.2024	EC

SCALE: 0 1 2 4 6 8 10 15
1:300 @ A3
Vertical Exaggeration = 1.5

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CLIENT: **Kurraba Group Pty Ltd**

NOTES
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME: **Proposed Research and Life Science Development**

PROJECT ADDRESS: **100 Botany Road, Waterloo**

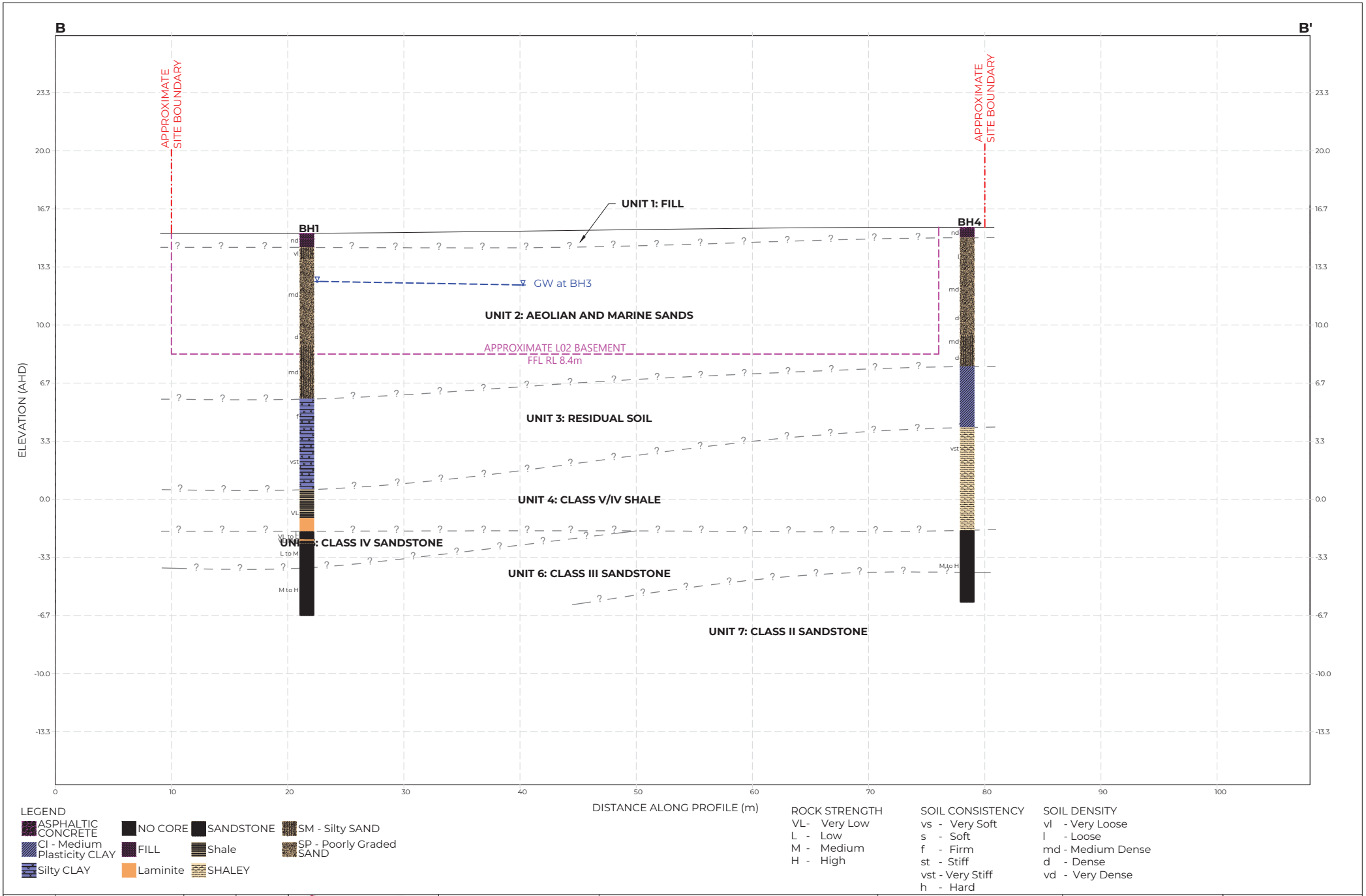
DRAWING TITLE: **INTERPRETED GEOTECHNICAL CROSS SECTION A-A'**

PROJECT No: **221233.02**

DRAWING No: **2**

REVISION: **0**

Attachment 4b - Basement Cross Section (East-West)



LEGEND

- ASPHALTIC CONCRETE
- CI - Medium Plasticity CLAY
- Silty CLAY
- NO CORE
- FILL
- Laminite
- SANDSTONE
- Shale
- SHALEY
- SM - Silty SAND
- SP - Poorly Graded SAND

ROCK STRENGTH
VL- Very Low
L - Low
M - Medium
H - High

SOIL CONSISTENCY
vs - Very Soft
s - Soft
f - Firm
st - Stiff
vst - Very Stiff
h - Hard

SOIL DENSITY
vl - Very Loose
l - Loose
md - Medium Dense
d - Dense
vd - Very Dense

REV	DESCRIPTION/COMMENT	DATE	DRAWN BY
0	INTIAL ISSUE	24.06.2024	EC

SCALE: 0 1 2 4 6 8 10 15
1:300 @ A3
Vertical Exaggeration = 1.5

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NOTES
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

PROJECT NAME: **Proposed Research and Life Science Development**

PROJECT ADDRESS: **100 Botany Road, Waterloo**

DRAWING TITLE: **INTERPRETED GEOTECHNICAL CROSS SECTION B-B'**

PROJECT No: **221233.02**

DRAWING No: **3**

REVISION: **0**