# Attachment A16

## Site remedial concept plan

# 84-94 Parramatta Road, Camperdown, NSW

## Wentworth Capital

## Site Remedial Concept Plan

**69242 | 167,581 (Rev B)**

**29 September 2025**

**We acknowledge the Traditional Custodians of Country throughout Australia and their connection to land, sea and community.**

We pay our respect to Elders past, present and emerging and in the spirit of reconciliation we commit to working together for our shared future where every person is respected, valued and has strong sense of belonging.

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# Abbreviations

| Term | Definition |
|---|---|
| ACM | Asbestos Containing Materials |
| AEC | Areas of Environmental Concern |
| AHD | Australian Height Datum |
| ASS | Acid Sulfate Soils |
| AST | Aboveground Storage Tank |
| BGS | Below Ground Surface |
| BTEX | Benzene, Toluene, Ethylbenzene, and Xylenes |
| CLM Act | Contaminated Land Management Act |
| COC | Chain of Custody |
| COPC | Contaminants of Potential Concern |
| CSM | Conceptual Site Model |
| DA | Development Application |
| DP | Deposited Plan |
| DSI | Detailed Site Investigation |
| EPA | NSW Environmental Protection Authority |
| Ha | Hectare |
| JBS&G | JBS&G Australia Pty Ltd |
| MNA | Monitored Natural Attenuation |
| OCP | Organochlorine Pesticides |
| OPP | Organophosphate Pesticides |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PCB | Polychlorinated Biphenyls |
| PID | Photoionisation Detector |
| POEO Act | Protection of Environment Operations Act |
| PSI | Preliminary Site Investigation |
| QA/QC | Quality Assurance/Quality Control |
| SAQP | Sampling Analytical and Quality Plan |
| STC | SMEC Testing Services |
| SWMS | Safe Work Method Statement |
| TRH | Total Recoverable Hydrocarbons |
| UST | Underground storage tank |
| VOC | Volatile Organic Compounds |
| WHSP | Work Health and Safety Management Plan |

# 1. Introduction

## 1.1 Background

JBS&G Australia Pty Ltd (JBS&G) has prepared this site remedial concept plan (SRCP) to be submitted to the City of Sydney on behalf of University of Sydney / Wentworth Capital (the client) in support of a Planning Proposal for an amendment to the *Sydney Local Environmental Plan 2012* for the introduction a new site specific Floor Space Ratio (FSR) and Height of Buildings development standard for the purpose of a built life sciences research facility and ancillary uses at 88-94 Parramatta Road, Camperdown (the site). The site location is shown on **Figure 1**.

This Planning Proposal seeks approval for the amendment of Floor Space Ratio (FSR) and Height of Buildings in the Sydney Local Environmental Plan 2012. Specifically, approval is sought for the following:

### 88-94 Parramatta Road

- A new maximum building height of part 80 metres, part 30 metres.
- A new site specific provision for 88-94 Parramatta Road that enables 6.5:1 of additional uplift for non-residential uses.
- A site-specific clause limiting the maximum amount of residential floor space that can be provided on the site.
- Retention of the existing warehouse at 88-90 Parramatta Road.
- Amendments to the Sydney Development Control Plan 2012 (Sydney DCP 2012) to address site specific outcomes.

### 84 Parramatta Road

- A new mapped maximum height of 30 metres.
- A new mapped maximum floor space ratio for the Veriu site (84 Parramatta Road) of 4.8:1, retaining the mixed use zone on the site.
- Amendments to the Sydney Development Control Plan 2012 (Sydney DCP 2012) to address site specific outcomes.

Full details of the proposed amendments are outlined in the Planning Proposal Report prepared by Ethos Urban.

This SRCP report was prepared to address State Environmental Planning Policy (SEPP) (Resilience and Hazards) 2021, in order to establish a suitable framework for management of potentially contaminated media at the site and facilitate the future redevelopment of the site. This assessment has been developed in general accordance with the requirements of the NSW Environment Protection Authority (EPA) published and endorsed guidelines.

## 1.2 Objective

The objectives of this SRCP are to provide a summary of suspected potential site contamination conditions and potential exposure pathways via documentation of a Conceptual Site Model (CSM), and to identify available remedial strategies as may be adopted for the site by an assessment of remedial options, including evaluation of options in accordance with the principles of ecologically sustainable development (ESD) and the overall anticipated development objectives for the site.

# 2. Site Condition & Environmental Setting

## 2.1 Site Identification

The location and current layout of the site is shown in **Figures 1** and **2** respectively. The site details are summarised in **Table 2.1**.

**Table 2.1: Summary of Site Details**

| | |
|---|---|
| **Lot/Deposited Plan (DP)** | Lot A deposited plan (DP) 402925, Lot 1 DP 965792, Lot 1 DP 178634, and Lot 1 DP 1216911 |
| **Site Address** | 84-94 Parramatta Road, Camperdown, NSW 2050 |
| **Site Area** | 6195 $m^2$ |
| **Local Government Authority (LGA)** | Council of the City of Sydney |
| **Approximate Coordinates (GDA 94 Map Grid of Australia (MGA) 55)** | Eastings: 331690.78<br>Northings: 6249059.84 |
| **Site Zoning** | MU1, mixed use commercial and residential. |
| **Current Land Uses** | 84 Parramatta Road – hotel and fitness centre<br>88-90 Parramatta Road – vacant<br>92-94 Parramatta Road – a medical research centre including commercial office space and laboratories |
| **Proposed Land Uses** | Educational facility, including laboratories, educational spaces and amenities. |

## 2.2 Site Description

The site is located at 84-94 Parramatta Road, Camperdown within the City of Sydney Local Government Area (LGA). The site is situated on the traditional land of the Gadigal people.

The land is owned by the University of Sydney and is located on the opposite side of Parramatta Road from the main University of Sydney Camperdown/Darlington campus. The site fronts Parramatta Road along its southern boundary and is bounded by a mixture of residential and commercial uses to the north, east, and west of the site. The site is located just 4km south-west of the Sydney CBD, and 2.5km west of Central Station, and is currently largely used by the University of Sydney for university purposes.

The site's locational context is shown in **Figure 1**.

A limited site inspection of publicly accessible land surrounding the site, was completed on 16 June 2025 by a suitably qualified and experienced JBS&G Environmental Consultant to assess the site condition and identify indicators of potential contamination and/or contaminating activities. The observed conditions surrounding each parcel of land within the site is summarised in the Sections below.

### 84 Parramatta Road, Camperdown

This portion of the site is currently used as a hotel and fitness centre. The property was not accessible to JBS&G at the time of inspection, hence only a limited inspection from the perimeter of the property was conducted.

The property was observed to be a recent build, with a brick façade. The property comprised one main building of around 5 levels with a central courtyard area, comprising some small garden beds. Access to undercover parking was observed off Sparkes Street, but it was unclear if the carpark comprised any basement levels.

### 88-90 Parramatta Road, Camperdown

This portion of the site was observed to be vacant. The property was not accessible to JBS&G at the time of inspection, hence only a limited inspection from the perimeter of the property was conducted.

The property was observed to comprise a multi-level building with a brick façade with signage for 'Glebe Antique Centre'. The building appeared to have been unoccupied for some time, with boarded up windows and appearing in somewhat derelict condition.

### 92-94 Parramatta Road, Camperdown

The portion of the site was observed to be currently used as a medical research facility. The property was not accessible to JBS&G at the time of inspection, hence only a limited inspection from the perimeter of the property was conducted.

Entrance to the site was through a covered gated archway off Parramatta Road, which appeared to lead to a paved open courtyard area. The property was observed to comprise of painted brick and comprised multiple levels plus a basement carpark. The building is known to comprise of a medical research centre, containing laboratories, offices and meeting rooms.

Driveway access to basement parking was observed off Sparkes Street. A potential diesel refuelling point was observed on the wall next to the driveway, which is expected to connect with a potential AST / UST within the site, potentially servicing a backup generator.

## 2.3 Surrounding Land Use

The current land uses of adjacent properties or properties across adjacent roadways are summarised below:

- North – Various commercial and medium-density residential apartment buildings are located north of the site;
- East – Larkin Street, followed by commercial and residential land use is present to the east of the site;
- South – Parramatta Road, followed by BP petrol station, childcare centre, catholic church, college and St Johns Oval and other Sydney University facilities further southeast; and
- West – High-density residential properties, motorcycle dealer, and café, followed by Lyons Street and various commercial and residential properties, including a gym, hotel, mechanic and Lyons Road Park further west.

## 2.4 Topography

A review of regional topographic data provided on Spatial Information Exchange (SIX Maps[1]) indicates that the site elevation ranges from 19-26 m Australian Height Datum (AHD) and slopes to the north-east.

## 2.5 Geology and Soil

A review of the site geology provided on the NSW Department of Primary Industries and Regional Development (NSW DPIRD 2025[3]) as included in JBS&G 2025, indicated that the site is underlain Ashfield Shale of the Wianamatta group. This material is characterised by laminate, dark grey siltstone and Bringelly Shale which consists of shale, with occasional calcareous claystone, laminite and coal.

[1] Six Maps, https://maps.six.nsw.gov.au/ accessed 7 May 2025
[3] NSW Department of Primary Industries and Regional Development, *NSW Seamless Geology project*, https://www.resources.nsw.gov.au/geological-survey/projects/nsw-seamless-geology-project, accessed 17 May 2025

Review of the Soil Landscapes of Central and Eastern NSW provided by the NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW 2024[4]) as included in JBS&G 2025[5], indicated that the site is present within the Blacktown soil landscape. Blacktown Soil Landscape is characterized by shallow to moderately deep (less than 100 cm) Red and Brown Podzolic Soils on crest, upper slopes and well-drained areas. Yellow Podzolic Soils is presented on lower slopes and in areas of poor drainage on the depth of 150-300 cm. These soils are noted to have moderately reactive highly plastic subsoil, with low soil fertility and poor soil drainage.

Review of the Atlas of Australian Soil compiled by the Commonwealth Scientific and Industrial Research Organisation (CSIRO[6]) as included in JBS&G 2025, indicate the site is underlain by the soil order of Kurosol, in which chief soils are hard acidic red soils with hard neutral and acidic yellow mottled soils on lower slopes and in valleys as similarly described in the Blacktown soil landscape. Associated are small areas of various soils including on some ridges and on some slopes, in saddles and some mid-slope positions and some low-lying swampy areas of soils and soil with peaty surfaces

## 2.6 Hydrology

The nearest surface water receptor is Orphan School Creek approximately 300 m to the northwest of the site which flows into the Johnstone Creek, located approximately 600 m to the west and northwest of the site. The Johnstone Creek flows into Rozelle Bay, located approximately 1.6 km to the north of the site.

The site is covered by buildings and concrete hardstand with the exception of Lot A in DP 402925 and Lot 1 in DP 1216911 which both have small internal courtyards with garden spaces. Infiltration of precipitation at the site is expected to be low, given the site is primarily sealed and has existing buildings. Most of surface water generated during periods of rainfall will be captured by the site's stormwater infrastructure and discharged to the municipality stormwater network.

## 2.7 Hydrogeology

Based on the natural topography of the site, as summarised in **Section 2.4**, groundwater is inferred to flow in a north-east direction.

A search for registered groundwater bore information was undertaken of the National Groundwater Information System from the Bureau of Meteorology, Water NSW (NGIS, BOM 2024[7]) and is included in JBS&G 2025. There were no registered groundwater bores onsite.

There are six groundwater bores identified within a 0.5 km radius of the site, and a further 23 groundwater bores within a 1.5 km radius of the site. There are no known beneficial uses of groundwater within or in proximity of the site. The relevant information is summarised in **Table 2.2** below.

**Table 2.2: Registered Groundwater Bore Search Summary**

| Bore ID | Use | Standing Water Level (m bgs) | Depth (m) | Distance from site (m) / Direction | Lithology |
|---|---|---|---|---|---|
| GW109231 (2008) | Monitoring | N/A | 3.20 | 38 m / East | N/A |
| GW109230 (2008) | Monitoring | N/A | 1.80 | 50 m / East | N/A |

[4] Department of Climate Change, Energy, the Environment and Water, 2024, *Soil Landscapes of Central and Eastern NSW - v3.0.1*, Department of Climate Change, Energy, the Environment and Water, Sydney.
[5] *Preliminary Site Investigation, 84-94 Parramatta Road, Camperdown NSW*, prepared by JBS&G Pty. Ltd, May 2025
[6] CSIRO; & National Resource Information Centre, BRS (1991): Atlas of Australian Soils (digital). v3. CSIRO. Data Collection. https://doi.org/10.25919/5f1632a855c17
[7] *National Groundwater Information System*, Bureau of Meteorology (BOM 2024) Water NSW

| | | | | | |
|---|---|---|---|---|---|
| GW111408 (2011) | Monitoring | 2.07 | 4.40 | 328 m / East | 0.00m-0.22m: Concrete slab<br>0.22m-0.50m: Gravel roadbase<br>0.5m-1.1m: Fill, Silty clay<br>1.1m-4.4m: Silty clay |
| GW116424 | Monitoring | N/A | 5.00 | 426 m / East | N/A |
| GW116421 | Monitoring | N/A | 5.80 | 428 m / East | N/A |
| GW116422 | Monitoring | N/A | 5.30 | 429 m / East | N/A |

## 2.8 Acid Sulfate Soils

A review of the Atlas of Australian Acid Sulfate Soils (CSIRO 2011[8]) as included in JBS&G 2025, identified the site to have an extremely low probability of occurrence of Acis Sulphate Soil (ASS). The Environmental Planning Instrument - Acid Sulphate Soils from the NSW Department of Planning, Housing and Infrastructure (NSW DPHI 2025[9]) indicates the site is classified Class 5. ASS are not typically found in Class 5 areas, but the site is located 129 m from adjacent Class 3 land, where works more than 1 metre below natural ground surface present an environmental risk and works by which the watertable is likely to be lowered more than 1 metre below natural ground surface, present an environmental risk.

Review of geology maps, soil maps, and topography indicate that it is unlikely that acid sulfate soils would be present on the site. Based on the elevation of the site and the reported geology, no further consideration of requirements for the assessment or management of ASS is warranted.

## 2.9 Naturally Occurring Asbestos

A review of NSW DPIRD map Naturally Occurring Asbestos (DPIRD 2015[10]) as included in JBS&G 2025, indicated that the site and the immediate surrounds are not situated in an area of naturally occurring asbestos.

## 2.10 Salinity

A review of the Australian Dryland Salinity Assessment by the Australian Bureau of Agricultural and Resource Economics and Science (ABARES[11]) as included in JBS&G 2025, identified there were no record of dryland salinity potential at the site.

## 2.11 Meteorology

A review of average climatic data for the nearest Bureau of Meteorology monitoring location (Sydney (Observatory Hill)), located approximately 3.7 km to the northeast of the site, indicates the site is located within the following meteorological setting:

- Mean minimum temperatures vary from 8.1°C in July to 18.9°C in February;
- Mean maximum temperatures vary from 16.4°C in July to 26.0°C in January;

[8] Fitzpatrick, Rob; Powell, Bernie; & Marvanek, Steve (2011): Atlas of Australian Acid Sulfate Soils. v3. CSIRO. Data Collection. https://doi.org/10.4225/08/512E79A0BC589

[9] State Government of NSW and NSW Department of Planning, Housing and Infrastructure 2025, *Environmental Planning Instrument - Acid Sulfate Soils*, accessed 16 April 2025

[10] State Government of NSW and Department of Primary Industries and Regional Development (DPIRD) 2015, Naturally Occurring Asbestos, supplied 26 April 2024

[11] Australian Bureau of Agricultural and Resource Economics and Science (2013) Australian Dryland Salinity Assessment Spatial Data (1:2,500,000) – NLWRA 2001, supplied 3 June 2024

- The mean annual rainfall is approximately 1211.1 mm, with rainfall greater than 1 mm occurring on an average of 99.5 days per year; and
- Monthly average rainfall varies from 68.1 mm in September to 133.1 mm in June with the wettest periods occurring on average in January to June.

# 3. Site History and Previous Assessments

The preliminary site investigation (PSI) completed by JBS&G (JBS&G 2025[12]) provides a detailed history of the properties within the site as based on a review of various historical records including historical land title records, business directories, council development application (DA) records, and historical aerial imagery. As part of the desktop assessment and review, a previous detailed site investigation (DSI) report was found to have been completed as part of a DA for 84-86 Parramatta Road, Camperdown by SMEC Testing Services (STS, 2013[13]).

A summary of both reports, including key aspects of the site history are provided below.

## 3.1 Preliminary Site Investigation – 84-94 Parramatta Road (JBS&G 2025)

JBS&G completed an PSI for the properties located at 84, 88-90 and 92-94 Parramatta Road, Camperdown NSW in 2025. The stated objective of the PSI was to draw preliminary conclusions regarding potential contamination status of the site. The following summarises the key findings of the assessment:

- Based on the desktop findings, the site appears to have been historically used for various commercial / industrial enterprises from as early as the 1920s, with businesses primarily consisting of car dealerships, motor body repair shops, and wholesale manufacturers of various goods and equipment such as fluorescent lighting, scientific instruments, and machinery. A portion of the site acquired by the University of Sydney in 2001 and 2006, currently operates as a medical research centre, with a small portion of the site also currently operating as a hotel and gym.
- Based on an assessment of the history, environmental setting and site inspection, potentially contaminating activities include fill used for site levelling prior to and during construction of the current commercial buildings at the site, former industrial land-uses (motor garages etc), potential above ground storage tanks (ASTs) and the former service station and dry cleaner located upgradient and in close proximity to the site;
- The assessment did not identify the potential for gross or widespread contamination;
- It is considered unlikely that activities at the site will have contaminated the land to a degree that would prevent the redevelopment of the site for the proposed land-use; and
- In the event that contamination is identified at the site, it is anticipated that the site can be made suitable for the proposed land-use.
- Based on these conclusions, it was recommended that a limited and targeted intrusive investigation of the site in accordance with a Sampling, Analysis and Quality Plan (SAQP) to provide a quantitative assessment of contaminant levels as associated with the areas of environmental concern identified above.
- It was further concluded, that in the event that contamination is identified at the site, it is anticipated that the site can be made suitable for the proposed land uses through standard industry approaches as guided through the preparation of a Remediation Action Plan (RAP).

[12] *Preliminary Site Investigation, 84-94 Parramatta Road, Camperdown NSW*, prepared by JBS&G Pty. Ltd, May 2025
[13] *Detailed Site Investigation, 84-86 Parramatta Road, Camperdown NSW*, prepared by SMEC Testing Services Pty. Ltd December 2013

## 3.2 Detailed Site Investigation, 84-86 Parramatta Road (STC 2013)

STC completed an DSI for the property 84-86 Parramatta Road, Camperdown NSW in 2013. The DSI was prepared to support the DA and redevelopment of the site for a mixed commercial and residential use.

The DSI investigation included a review of historical land title information, historical aerial photographs, local council records, review of local geology and hydrogeology, as well as a site inspection and a limited soil sampling program comprising six borehole sample locations.

The site history review found that the site appears to have been used for commercial / industrial purposed since at least the 1930s, including that of a motor vehicle workshop which operated at the site from 1992 to 2010. The review was unable to identify the specific historical uses at the site beyond that of commercial / industrial uses. A Dangerous goods search was conducted and found no records of the storage of dangerous goods at the site. A search of EPA contaminated land public register did not find any notices pertaining to the site. The site was also found to not be listed on EPAs list of notified sites. Potential contamination sources were noted to include any contaminants associated with historical industrial land use, and any contaminants associated with fill material of unknown origin.

The site was noted to be located on the boundary of two geological units, these being the Middle Triassic Age 'Ashfield Shale' and 'Hawkesbury Sandstone'. The Ashfield Shale comprises black to dark-grey shale and laminate, whilst the Hawkesbury Sandstone comprises medium to coarse-grained quartz sandstone with minor shake and laminite lenses. The natural soils encountered during the investigation were observed to comprise grey and brown silty clays. Sandstone and shale bedrock was observed at depths of at least 2.3 m below the ground surface.

Observations from the limited intrusive soil investigation noted fill depths ranged from 0.4 m bgs to 1.5 m bgs, with fill material generally comprising silty clay fill with some trace inclusions of gravels, brick and glass. Ten samples, as well as one intra-laboratory and one inter-laboratory field duplicate sample for quality control assessment, were analysed for a limited range of COPC including heavy metals, monocyclic aromatic compounds (MAH), total petroleum hydrocarbons (TPH), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos. All reported concentrations were below the adopted site criteria. Hence it was concluded that based on the results of the DSI investigation, the site was considered to be suitable for high-density residential and commercial land use.

# 4. Preliminary Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of the site and how contaminants move from the source through the environment to potential human or environmental receptors. A preliminary CSM has been developed based on the desktop assessment and site inspection. It presents a preliminary understanding of potential contamination sources, pathways, and receptors, consistent with NEPC (2013) ASC NEPM.

## 4.1 Potential Areas of Environmental Concern

Based on the historical review and observations made during the JBS&G inspection of the site, potential contamination sources or areas of environmental concern (AECs) and associated key contaminants of potential concern (COPC) are presented in **Error! Reference source not found.** below.

**Table 4.1: Areas of Environmental Concern and Contaminants of Potential Concern**

| Area of Environmental Concern (AEC) | Contaminants of Potential Concern (COPC) |
|---|---|
| Fill materials used to create current site levels | Heavy metals, total recoverable hydrocarbons (TRH), volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), polychlorinated biphenyls (PCBs) and asbestos |
| Historical demolition of previous structures | Lead, asbestos |
| Historical use of the site for industrial purposes that has potentially included manufacturing of scientific instruments, fluorescent lighting, textiles, and shoes, as well as motor vehicle maintenance and repairs | Heavy metals, TRH, BTEX, PAHs, VOCs |
| Above ground storage tanks (ASTs) within the site. | Heavy metals, TRH, BTEX, PAHs, VOCs |
| Offsite sources (e.g. current and former industry surrounding the site including an active service station 26m south of the site and former dry cleaners 29m north east of the site) | Heavy metals, TRH, BTEX, PAH, per- and polyfluoroalkyl substances (PFAS) and VOCs |

## 4.2 Potentially Contaminated Media

Each of the AECs and corresponding COPCs identified in **Section 4.1** have the potential to impact soil, groundwater and/or soil gas (where volatile constituents are identified) underlying the site.

Where fill materials are present to depth, or in areas surrounding potential USTs, there is a likelihood that environmental impact may be present at depth. Anthropogenic materials are commonly present in impacted fill materials and can be used as an indication of the depth of disturbance. Where soils impacted with chemical-based contaminants are identified, there is a likelihood the impact may have migrated laterally and vertically to underlying natural soils.

With the exception of asbestos, each of the COPCs identified for the site, in **Table 4.1,** have the potential to migrate from shallow soils into groundwater.

## 4.3 Potential for Migration from Site

Contaminants generally migrate from site via a combination of windblown dusts, rainwater infiltration, groundwater migration and surface water runoff. The potential for contaminants to migrate is a combination of:

- The nature of the contaminants (solid/liquid and mobility characteristics);
- The extent of the contaminants (isolated or widespread);

- The location of the contaminants (surface soils or at depth); and
- The site topography, geology, hydrology and hydrogeology.

The COPCs identified as part of the site history review and site inspection are generally in solid (e.g. asbestos, PAHs and metals), liquid (e.g. TRH, BTEX, VOCs, PFAS, OCPs and PCBs) or gaseous (e.g. VOCs, BTEX, Volatile TRH and semi-volatile PAHs) form. It is noted that the COPCs identified to primarily occur in liquid form can also presumably exist in solid form as adsorbed to the soil matrix.

The ground surfaces overlying the site are primarily comprised of sealed pavements and building footprints with limited unsealed or vegetated ground thereby limiting the total extent of surface water infiltration into the subsurface. The migration of in-situ impacted soil via windblown dust is considered to be unlikely provided the hardstands are maintained across the majority of the site.

The potential solubility of chemical contaminants in soil, in addition to rate of surface water intrusion, perched water seepage and groundwater movement across the site, will influence the potential for migration of soil and groundwater contamination within and from the site. Should groundwater be identified to be impacted with on-site sources of contamination in proximity to the inferred downgradient boundary of the site, then potential off-site migration of contaminants in groundwater will require consideration.

The potential for off-site migration of vapours will only be relevant where these constituents are identified at concentrations greater than relevant health-based screening and investigation levels. These constituents can migrate laterally from the site through volatilisation and diffusive/advective processes as well as through preferential pathways (refer to **Section 4.5**). Should elevated levels of vapours be identified, then the potential off-site migration of these constituents will require further consideration.

The potential migration of contaminants from off-site sources to the site is possible via groundwater and/or soil vapour.

## 4.4 Potential Human and Ecological Receptors and Exposure Pathways

**Table 4.2** summarises potential on-site human receptors and associated exposure pathways for the site, based on the range of exposure scenarios that may occur under the different potential land-uses of the site.

**Table 4.2: Summary of Potential On-site Human Exposures**

| Receptor | Location | Media | Potential Exposure Pathways |
|---|---|---|---|
| General Site User | Indoor and outdoor areas | Soils | Inhalation (vapours) |
| | Indoor and outdoor areas | Groundwater | Inhalation (vapours)<br>Oral (infiltrating seepage water within basement if present)<br>Dermal (infiltrating seepage water within basement if present) |
| Construction worker or intrusive maintenance worker (short duration) | Construction areas/ Excavations | Soil | Inhalation (vapours and particulates)<br>Oral<br>Dermal |
| | | Groundwater | Inhalation (vapours)<br>Oral (infiltrating seepage water within basement if present)<br>Dermal (infiltrating seepage water within basement if present) |

Currently the site is primarily covered by hardstand pavements and building footprints. On this basis, there are limited on-site ecological receptors that could be exposed to environmental impacts underlying the site which is proposed to be maintained as part of the site redevelopment. Possible off-site ecological receptors are limited to potential impacts associated with groundwater and surface runoff water (if present) migrating through the local stormwater network towards Johnstons Creek and Orphan School Creek and eventually discharge into Rozelle Bay. Off-site ecological receptors are therefore limited to the organisms living within the estuarine system of Rozelle Bay and can be identified from the water quality objectives (WQO) from the Sydney Harbour catchment and include 'aquatic ecosystems'. In addition, recreational users of Rozelle Bay comprise an off-site human receptor.

## 4.5 Preferential Pathways

For the purpose of this assessment, preferential pathways have been identified as natural and/or man-made pathways that result in the preferential migration of COPC as either liquids or gases.

Man-made preferential pathways are present throughout the site, generally associated with service easements and areas of previously disturbed fill material which may have a higher permeability than underlying natural soils. Natural preferential pathways include fractures within bedrock. Where environmental impact (particularly in liquid or gaseous form) is observed within proximity to these identified preferential pathways, further consideration to the potential migration of these impacts will be required.

# 5. Conceptual Remedial Strategy

The overall goal for any potential remediation and/or ongoing management of environmental impact at the site will be to:

- Prevent exposure of human populations including future site occupants, workers and users to contaminated media;
- Prevent potential phyto-toxicity effects to land, water and sediment-based flora and/or fauna that may come into contact with contaminated media;
- Remove potential ongoing sources of environmental contamination from the site; and
- Prevent human exposure to impacted groundwater and vapour where present.

In achieving the above goals, it is noted that consideration would also need to be given to the requirements of other urban redevelopment concerns including ecologically sustainable development (ESD) principles, ecological concerns etc. It would be required that there is flexibility to adopt alternative measures, including the in-situ management of contamination, to address these other urban redevelopment concerns.

## 5.1 Guidance Framework

The *Contaminated Land Management (CLM) Act 1997* is the primary legislation associated with management of contaminated land in NSW. Section 105 of the Act allows the EPA to make or endorse guidelines connected with the objectives of the Act. These guidelines form the basis for making decisions in relation to the investigation, remediation, validation and documentation of contaminated land management within NSW.

As such, this remedial strategy document and future activities associated with assessment, remediation and validation will address the requirements of those guidelines. The current list of relevant NSW EPA endorsed guidelines comprises:

- National Environment Protection (Assessment of Site Contamination Measure) Measure 1999 (as amended 2013), National Environment Protection Council (NEPC 2013);
- Remediation of Land requirements under State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP 2021) and associated Planning Guidelines;
- Sampling design part 1 – application and Sampling design part 2 - interpretation, NSW EPA 2022 (EPA 2022);
- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Land. NSW EPA 2020 (EPA 2020);
- Contaminated Land Management: Guidelines for NSW Site Auditor Scheme (3rd Edition), NSW Environment Protection Authority 2017 (EPA 2017);
- Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards, Dept. of Health and Ageing and EnHealth Council (CoA 2012);
- Guidelines for the Assessment and Management of Groundwater Contamination, Department of Environment and Conservation (DECC 2007); and
- Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act, 1997, NSW (EPA 2015).

In addition, consideration is also required to guidelines made or endorsed by the EPA under the Protection of the Environment Operations (POEO) Act 1997 and associated regulations, including:

- Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019. (UPSS 2019);
- Waste Classification Guidelines, Part 1 - Classifying Waste (NSW EPA 2014);
- Waste Classification Guidelines, Part 2 – Immobilising Waste (NSW EPA 2014);
- Waste Classification Guidelines, Part 3 - Waste Containing Radioactive Material (NSW EPA 2014); and
- Waste Classification Guidelines, Part 4 – Acid Sulfate Soils (NSW EPA 2014).

Other guidance that should also be considered in relation to site conditions includes:

- Acid Sulfate Soil Manual, Acid Sulfate Soil Management Advisory Committee (ASSMAC 1998);
- National Acid Sulfate Soil Guidance. Australian Government Department of Agriculture and Water Resources (DAWR) (AGDAW, 2018);
- Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017;
- SEPP (Resilience and Hazards) 2021; and
- Code of Practice for the Safe Removal of Asbestos, SafeWork NSW, September 2019 (SafeWork 2019).

## 5.2 Regulatory and Planning Requirements

Where a proponent seeks approval for a change of permitted use of the land in the form of a rezoning, it is required that the proponent satisfies the consent authority, and relevant regulator (including the NSW EPA), that contamination conditions as may be present at the site will be appropriately managed such that the site may be considered suitable for the proposed use.

In some instances, the proposed development and/or remedial works may also trigger requirements under the POEO Act for issue of a specific Environmental Protection License (EPL). Relevant categories and associated triggers are outlined in Schedule 1 of the POEO Act and relate to categories including the treatment of contaminated soil and/or groundwater, quarrying activities, etc (not suspected on this site given the current understanding of the proposed development).

### 5.2.1 Requirements in Relation to Future Project Applications/Approvals

It is understood that the client is seeking approval of a rezoning of the site that will facilitate a new development of a new Life Sciences Building as part of the University of Sydney. Subsequent to the approval, it is anticipated that the site will each be subject of one or more specific Development Applications to the appropriate consent authority. Such applications would define specific land uses and built form layouts. Under SEPP (Resilience and Hazards) 2021 it is noted that the consent authority must not consent to the carrying out of development on the subject land unless:

a) It has been considered whether the land is contaminated; and

b) If the land is contaminated that the planning authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all purposes for which the development is proposed to be carried out; and

c) If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, the planning authority is satisfied that the land will be remediated prior to use for that purpose.

Further, it is required that the planning authority obtains from the proponent a report specifying the findings of a preliminary investigation of the land prepared in accordance with the contaminated land planning guidelines. The consent authority may also require the applicant to provide a report on the detailed

investigation of the site if it is considered that the findings of the preliminary investigation warrant such additional assessment.

For future development within the site, it is anticipated that a Detailed Site Investigation (DSI) will be implemented in accordance with the recommendation of the PSI (JBS&G 2025) to quantify any potential impacts associated with the identified AECs. Should the DSI identify contamination that requires to be addressed in order to make the site suitable for the proposed used, then a detailed site-specific Remedial Action Plan (RAP) with specific consideration to the proposed development details (site levels, land use scenarios, etc) will be required. The DSI and subsequent RAP (if required) would be submitted to the consent authority prior to, or during the Project Application/Approvals process to satisfy the consent authority's obligations in relation to SEPP (Resilience and Hazards) 2021.

It is further anticipated that as part of the resulting project approval/development consent, the planning authority may issue consent conditions in relation to:

- Compliance with the requirements of the SRCP and RAP in completing site remediation works; and
- Documentation of remediation works as a validation assessment report and where appropriate, an environmental management plan (EMP), to be submitted to the consent authority stating that the site contamination concerns have been appropriately addressed, and the site is considered suitable for the approved use.

Detailed and/or data gap investigation(s) and further evaluation of data in relation to specific site development proposals may identify that the site, or a portion of the site, is considered suitable for the specific proposed use without requirement for ongoing management and/or remediation. In this event, the detailed assessment report would then be submitted at the project approval/application stage in lieu of a RAP. In this instance, the Development Consent conditions would not be required to address compliance with this SRCP, unless contamination/inground conditions are identified during site development works that are inconsistent with the conclusions of the site assessment.

### 5.2.2 Other Requirements

In addition to the requirements of SEPP (Resilience and Hazards) 2021, consideration of the regulatory requirements under NSW legislation is also necessary as part of development of the RAP, as briefly outlined following:

- Protection of the Environment Operations (POEO) Act 1997 - Evaluation of the proposed remediation/validation activities in relation to the categories and/or thresholds presented in Schedule 1 of this Act. Where works trigger one or more categories presented in Schedule 1, the works will require to be licensed by the EPA in addition to the requirements of the consent authority.
- Water Management Act 2000 – Where remediation works require the extraction (and treatment, reinjection or otherwise) of groundwater, consent for these works may be required under a temporary dewatering licence even if the triggers for an EPL are not met. Such requirements may potentially be stipulated as a condition of the development consent via the integrated development approvals process.
- POEO (Waste) Regulation 2014 – In addition to triggers for an EPL, consideration will be needed with respect to the POEO Waste Regulation in relation to non-licensed waste activities and waste transporting. This includes requirements for management of asbestos waste during transport/disposal and the approval of methods associated with the immobilisation of specific waste streams etc. as may be required under an area specific RAP.
- Work Health and Safety Act 2011 and associated Regulations including those related to Asbestos – Where asbestos contamination in soil is identified during site investigation works or during/following the demolition of existing structures, the site must be considered as having asbestos-contaminated soil. Appropriate protective measures must be implemented to prevent exposure to site workers and nearby

sensitive receptors. In such cases, management requirements are outlined in the *How to Manage and Control Asbestos in the Workplace* Code of Practice, WorkSafe NSW, 2019.

## 5.3 Extent of Remediation and/or Management Required

To date, intrusive investigations have not been completed at the site (with the exception of some limited sampling as part of STC 2013 (**Section 3.2**), and as such, no specific impacts that require remediation have been identified. Notwithstanding, should environmental impact be identified at the site, it is considered that the primary source of impact will likely be limited to soils as a consequence of the surface / near surface application of contamination associated with the historical land-uses. Therefore, the sections below (within this preliminary RCP) focus on the potential remedial requirements as related to soil. Notwithstanding, appropriate contingencies are provided in the event that groundwater and / or soil vapour impacts are identified that require remediation.

### 5.3.1 Soil Impact

Potential historical filling activities undertaken within the site and current/former industrial land uses may have resulted in site soils to be potentially impacted with a variety of inorganic and organic constituents that, dependent upon final land use scenarios may be present at unacceptable levels. **Table 4.1** presents the areas of environmental concern and associated contaminants of concern as listed following:

- Heavy metals;
- TRH/BTEX
- OCPs/PCBs;
- PFAS; and
- Asbestos

An intrusive assessment of site soils will be required for each of these contaminants to identify the extent of potentially impacted soils that may require remediation.

## 5.4 Hierarchy of Remedial Options

The preferred hierarchy of options for remediation (clean up) and/or management adopted by NSW EPA has been established within the NEPC (2013) Assessment of Site Contamination Policy Framework as follows:

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

If the above options are not practicable:

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material; or
- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

In addition, when deciding which option to choose, consideration is also required to be given to the sustainability (environmental, economic and social) aspects of each option to ensure an appropriate balance between the benefits and effects of undertaking remedial/management options.

In cases where no readily available or economically feasible method is available for remediation, it may be possibly to adopt appropriate regulatory controls or develop other forms of remediation.

## 5.5 Options Assessment

In accordance with the above hierarchy, the opportunities and constraints of each remedial option required for any potential site impacts are further discussed below.

### 5.5.1 On-site Treatment

On-site treatment of contaminants/contaminated material requires that the contaminants are either destroyed or otherwise the risk associated with the material is appropriately reduced to an acceptable level whereby no on-going management of the hazard is necessary. These opportunities are discussed following for the main contaminants of potential concern at the site.

- Heavy metals cannot be destroyed by treatment methods. However, there are a number of commercially available microencapsulation measures available, including cement stabilisation that effectively reduce hazards associated with soil heavy metal contaminant migration in leachable material. Whilst there are costs associated with site specific approvals, space and time requirements, etc, should treatment be successful, the stabilised material could potentially be reused on site saving the cost of off-site (landfill) disposal. As such, where soils are identified as impacted with leachable metals such that they require treatment to address contaminant migration risks, application of on-site treatment via micro-encapsulation and subsequent reuse of stabilised material may be a viable option, provided the material can be temporarily excavated and there is sufficient capacity for retention of an increased volume of material on-site.
- Organic contaminants can be remediated through thermal processes such as indirect or direct thermal desorption (I/DTD). However, as with heavy metal contamination, the material must be excavated for ex-situ treatment. The practicability of this method will be dependent on the extent and nature of organic contaminant impacts identified at the site, as well as the costs associated with plant establishment, site sensitivity, on-site approvals, operational (energy) costs, and space and time constraints. Additionally, if the material is co-contaminated with contaminants such as heavy metals and asbestos, they will remain following thermal treatment. For soils impacted by organic compounds, several commercially available microencapsulation technologies may be used to reduce the mobility of organic contaminants. However, where unacceptable contaminant migration risks and/or vapour risks are not identified, microencapsulation of the impacted soil is not considered necessary.
- For asbestos impacts in soil, where the material consists of intact infrastructure or bonded asbestos-containing material (ACM) in shallow soils (less than 10 cm), typically resulting from incomplete or poor demolition of asbestos structures (i.e. not necessarily from asbestos historically present within imported fill materials), on-site treatment options may include the physical separation of ACM from surrounding soil using screening and/or manual picking methods. The presence of broken ACM or co-occurrence with demolition rubble within fill material may reduce the viability of manual picking or removal programs, which require sufficient space and time for effective implementation. These programs also require the off-site disposal of ACM fragments; however, they allow for the on-site retention of treated soil without the need for further management.
- If chemical or petroleum storage infrastructure is identified, it may need to be removed. Where impacted soil is identified in association with such infrastructure, or as a separate occurrence, there is potential for on-site remediation using bio-remediation methodologies, provided that adequate time and space are available to support the process. Bio-remediation involves the breakdown of petroleum hydrocarbons and, in certain cases, chlorinated compounds through the metabolic activity of soil micro-organisms, either naturally present or introduced to the impacted soil. However, the application of bio-remediation methodologies must ensure that the process is not simply the result of volatilisation of

contaminants into the atmosphere, which the NSW EPA classifies as air pollution. To prevent this, bio-remediation should involve the use of covered bio-pile systems, allowing vapour emissions to be captured and treated through carbon filters before environmental discharge. Additionally, the presence of free product may limit the suitability of this remediation method. Given these factors, the effectiveness of bio-remediation may be constrained where significant volumes of impacted soil are present in areas with limited space for treatment. The viability of this option should be further evaluated in the site RAP, should areas of petroleum hydrocarbon or chlorinated hydrocarbon impact requiring remediation be observed.

### 5.5.2 Off-site Treatment

Off-site treatment of contaminants or contaminated material requires that the impacted material be excavated and transported to an alternative, lawful location for treatment. The contaminants must then be either destroyed or otherwise rendered such that the associated hazards are appropriately reduced to an acceptable level, eliminating the need for ongoing hazard management. Following the completion of these treatment activities, the material may either be returned to the site or lawfully disposed of at the treatment location. The available treatment options for contaminants are consistent with those identified for on-site soil treatment, as discussed above.

The advantage of off-site treatment options, when compared to on-site treatment for suitable heavy metal-, PAH, and/or hydrocarbon impacted soils, include the absence of potential regulatory requirements for on-site treatment, no costs of establishing on-site treatment plants, and no requirements manage emissions associated with potential treatment methodologies. However, the material would still require excavation and potentially need to be returned to the site. As such, factors such as the cost and impact of soil movement, the time required to complete treatment for the necessary volumes (particularly in the case of hydrocarbon-impacted material), and social constraints (e.g., increased truck movements) must be considered in a feasibility assessment.

Regarding the off-site treatment of asbestos-contaminated material instead of on-site treatment, additional regulations concerning the transport, treatment, and management of asbestos-containing materials would need to be considered. On this basis, off-site treatment of asbestos-impacted soil is unlikely to be feasible.

### 5.5.3 Consolidation and Isolation by Containment

Consolidation and isolation by containment involves retaining the contaminated material on-site beneath a physical barrier, ensuring that no complete exposure pathways exist between the contaminated material and sensitive human or ecological receptors. The material would be covered with a demarcation indicator (such as a visual marker layer), followed by a permanent physical barrier—such as pavements and/or a layer of clean, non-impacted soil. An Environmental Management Plan (EMP) would then be prepared to provide a framework for the ongoing management of potential risks associated with the retained material.

- For heavy metals and organic compounds with low volatility, this option is considered appropriate, subject to confirmation the contaminated material does not result in adverse impacts to groundwater quality and there are no vapour generation risks associated with such contaminants. Where material is identified as leachable and as such may impact groundwater quality, physical containment is unlikely to be an economically viable option. In such instances, impacted material should be the subject of one or more of the above options.
- For asbestos-impacted material, this option is considered to pose the least risk to remediation and construction personnel during site works. The implementation of a physical barrier to prevent the liberation and airborne dispersion of asbestos fibres is generally appropriate. However, potential risks associated with site development activities, particularly where building foundations may need to be installed within or through the encapsulated material, must be considered. In such cases, asbestos management controls may still be required during these construction activities

- For volatile hydrocarbon impacted material, which may potentially generate unacceptable soil vapour concentrations or migrate via groundwater, containment measures would need to address these potentially unacceptable risks to establish the appropriateness of this option.

### 5.5.4 Off Site Removal

Excavation and off-site disposal of contaminated material to a lawfully facility effectively removes the contaminants from the site such that no on-going management is required. Impacted materials are transported to a facility lawfully able to accept the type of waste, where associated fees including government waste levies apply. There are facilities within the Sydney region able to accept material classified as General Solid Waste (GSW), Special (asbestos) Waste and Restricted Solid Waste (RSW).

Social impacts, including high volume truck movements and potential environmental emissions associated with on-site activities and vehicle movements would require consideration on evaluation of this strategy.

Subsequent to off-site disposal of the contaminated material, in some instances replacement material may be required to be sourced to establish proposed development levels. Opportunities may exist for the beneficial reuse of excess suitable material from other areas of the site during development. Alternatively, suitable material could be sourced from off-site locations. Consideration of the viability of this option would be required for large quantities of material and where material is required to be sourced from off-site to reinstate site levels.

Further, where material is identified to be impacted such that contaminant concentrations exceed the thresholds for characterisation as GSW, GSW mixed with Special waste or RSW, material may require to be treated prior to off-site disposal to a lawful facility as discussed above. In such instances, on-site or off-site treatment of the contaminated soil as per the methodologies outlined above would require application prior to either beneficial reuse, or disposal as a lower category waste to landfill.

### 5.5.5 Implementation of an Appropriate Management Strategy

Where assessment of site conditions and potential remediation opportunities has identified the absence of a strategy that would deliver net environmental gains and/or would result in greater environmental impact, then none of the above opportunities should be preferred. Instead, alternative approaches, including for example, monitored natural attenuation (MNA), or management of contamination at depth by maintenance of existing site uses/features may be considered. Evaluation of such opportunities would require appropriate lines of evidence to be documented, as well as the potential adoption of an EMP to guide the ongoing management of the site.

As technologies, exposure scenarios, and contamination conditions may evolve over time, these changes could influence the initial outcomes of the remediation and management options assessment. Therefore, such a strategy should be viewed as an interim rather than permanent solution, and its potential limitations must be carefully considered by stakeholders prior to adoption.

Should potential hazardous ground gas impacts be identified at the site, the management strategy will be required to address the impacts to future buildings and site users. This strategy would involve the incorporation of additional building elements designed to prevent the accumulation of gases within buildings. These elements may include venting systems and/or impermeable liners installed beneath the building structures.

## 5.6 Strategy for Selection of Proposed Options

Based upon the assessment of potential remedial options as presented above, it is likely that a range of potential strategies may be adopted during future development of the site, dependent upon specific factors including the contaminant(s) of concern in various areas and the final site development details (ie. basement excavations, site surface treatments, exposure scenarios).

In general, subject to the specific considerations above, it is anticipated that the preferred option for remediation of non-volatile impacted fill material is, where appropriate, the on-site containment of the contaminated material. Where retention of impacted material on-site is not feasible due to development requirements (material excess to development requirements), it is anticipated that such materials will be the subject of off-site disposal to a lawful facility.

In the preparation of the site RAP, proposals to adopt on-site containment will be required to demonstrate:

- Exclusion of potential direct human contact to materials by consideration of potential exposure times and pathways that will pose an unacceptable level of risk / hazard;
- Exclusion of new site flora contact to materials that may pose a potential phyto-toxicity risk; and
- Confirmation that the material present is consistent with the extent of fill materials historically observed and reported on the site, and that these materials are not expected to generate vapours or gases (posing a potential inhalation risk), as assessed through site soil, groundwater, and/or direct vapour data. Additionally, confirmation that the materials do not contain significant levels of potentially leachable constituents that could impact groundwater quality, as assessed by comparing soil leachate and groundwater data against site-specific contaminant threshold values, taking into consideration the Sydney Harbour water quality objectives.

The preferred option for remediating any potential hydrocarbon-impacted materials is source removal, followed by on-site bioremediation using a method that reduces hydrocarbon concentrations in the affected soil and/or groundwater, while preventing uncontrolled atmospheric release of hydrocarbon constituents. Where bioremediation cannot be implemented due to spatial, temporal, or environmental constraints, the contingency option is off-site disposal of the impacted materials. It is noted that should heavily impacted materials be encountered, limited bioremediation may be conducted to reduce gross contamination levels, thereby facilitating more manageable off-site disposal to a licensed facility.

Where source material presenting a vapour or leaching risk is identified, removal will be undertaken as necessary. In such cases, the most suitable remediation option will be selected on a case-by-case basis from the following preferred approaches:

- On-site treatment, including chemical encapsulation, bioremediation, or other appropriate methods tailored to the specific contaminant characteristics; or

## 5.7 Anticipated Scope of Remediation Works

### 5.7.1 Areas Subject to Further Investigation

While there is an established history of potentially contaminating industries operating at the site, there is very limited analytical data available, hence contaminant conditions have not yet been confirmed at the site. As identified in previous sections, additional site characterisation activities would be required to identify the extent of remediation/ management required for a future land use proposal.

It is anticipated that a DSI will need to be conducted to provide information of the contaminant conditions at the site and inform potential remediation requirements. The proposed scope of the DSI investigation should be documented as a SAQP prior to the commencement of works such that the proposed approach can be endorsed by the appointed site auditor (if required) prior to the investigation. If following the DSI, there are no identified data gaps or evidence of gross or widespread contamination, then there may not be a requirement to have a RAP for the site.

Investigations that have not yet been completed at the site which will require further assessment include the following:

- Site wide soil characterisation assessment, especially in relation to the assessment of the potential for asbestos in soil contamination and other COPC as identified in S**ection 4.1**;

- The assessment of the potential leaching of contaminants to groundwater/sensitive nearby receptors;
- Assessment of site soil vapour conditions, and collection of a defensible of soil vapour data set using endorsed methodologies;
- Assessment of groundwater contaminant conditions on the site, especially focused on the evaluation of potential contaminant sources and down-gradient site conditions;
- Evaluation of site and laboratory soil, soil vapour, and groundwater data against appropriate initial Tier 1 screening levels presented in NEPC (2013); and
- If required, implementation of a site-specific health risk assessment with appropriate consideration to exposure pathways specific to the proposed development details.

### 5.7.2 Contaminant Source Removal

Where assessment of soil, groundwater and/or soil vapour contaminant conditions identifies the occurrence of unacceptable contaminant sources on the site, these sources will be required to be removed and/or treated such that they no longer represent an unacceptable risk. It is anticipated that sources may include, but are not necessarily limited to:

- Existing petroleum hydrocarbon infrastructure and associated impacted soils/groundwater;
- Fill/waste material with leachable contaminant concentrations representative of an unacceptable migration risk; and
- Fill/waste material with concentrations of volatile and/or semi-volatile contaminants presenting an unacceptable vapour generation risk in relation to the proposed land use scenario.

Validation of the works will be required during, and potentially following completion of the source removal works to demonstrate that the unacceptable risks have been appropriately addressed prior to issue either of the final validation report or alternatively, implementation of cap and containment strategies to address residual impacts as may be identified within specific areas.

### 5.7.3 Management of Asbestos Impacts

Where asbestos impacts other than those in existing buildings and infrastructure (pits, pipework, etc) are identified within soil during either site investigation works, or during/following demolition of existing improvements, the site will be required to be considered as having asbestos contaminated soils.

Such soils are defined in *How to Manage and Control Asbestos in the Workplace Code of Practice*, December 2022, SafeWork NSW (SafeWork NSW 2022) as:

- Soil that contains visible asbestos as determined by a competent person; or
- Soil that contains asbestos fibres at quantities exceeding trace levels (considered to be the analytical detection limit in lieu of alternate guidance) as reported by analysis undertaken in accordance with AS4964:2004 *Method for the qualitative identification of asbestos in bulk samples*.

Environmental, work health and safety management requirements for the handling of these materials will be based on the requirements provided for asbestos-related works in WorkSafe NSW 2022. This will include preparation of an asbestos register and associated asbestos removal control/management plan.

Assessment of site soils/fill material may be completed via inspection and sampling by a competent person and subsequent laboratory analysis of appropriate characterisation samples. Consideration may also be given to a quantitative assessment of the asbestos in soil impact to evaluate the potential extent of remediation required using asbestos quantitation methods as outlined in NEPC (2013).

Where the assessment results indicate that such material does not fall within the 'asbestos contaminated soil' definition, the requirements for management of 'asbestos contaminated soils' will not be required to be implemented.

For the purposes of the proposed remediation works, a competent person shall be considered to be a person who holds a tertiary degree in an environmental or occupational hygiene discipline, has experience in contaminated site assessment and has completed a Safe Work NSW approved Asbestos Removal Supervisor course and/or a NSW WorkSafe accredited Licensed Asbestos Assessor (LAA).

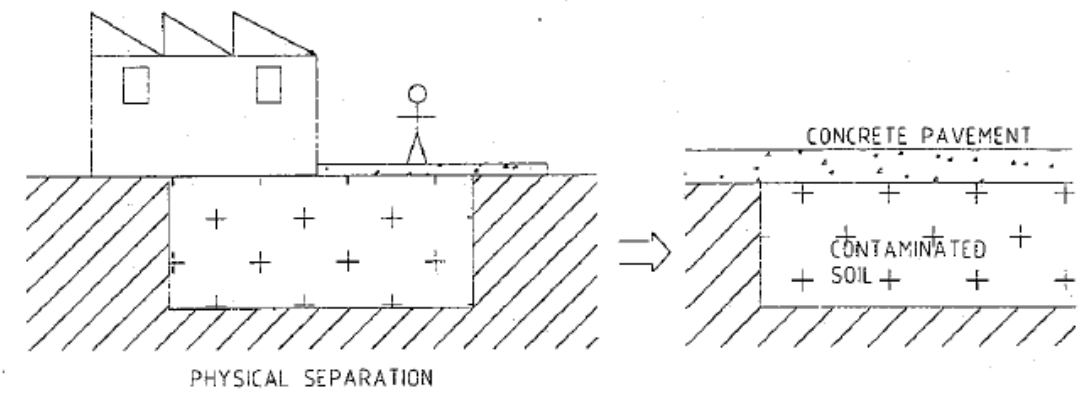
### 5.7.4 On-Site Containment Requirements

Requirements for installation of the physical barrier over impacted fill material are based upon the *Guidelines for the Assessment of On-Site Containment of Contaminated Soil*, September 1999, ANZECC (ANZECC 1999).

The minimum typical requirements for physical separation to ensure that there are no complete exposure pathways include:

- Permanent pavement measures such as a concrete ground slab, asphalt surfaced pavement, mortared stone/concrete pavers or similar. The pavement base course shall be underlain by an easily discernible visual marker layer; or
- A thickness of soil that is unlikely to be penetrated by future users during everyday activities at the site (or relevant parts thereof). A minimum soil cover thickness of 0.5m is nominated in general site areas where exposed soil is proposed, which is to be underlain by a visual marker layer. However, it is noted that to achieve ecological objectives, increased depths of suitable non-contaminated soil may be required.

An example of such measure is shown schematically below:




Source: ANZECC (1999)

Further consideration would be given in the site RAP to relevant scenarios, including requirements to address the installation of underground services, areas of deep planting, etc.

The purpose of the marker layer is to serve as a visual signal to those disturbing the capping system of the presence of potentially contaminated fill material at depth. The marker layer shall consist of a bright-coloured knitted HDPE constructed equivalent to at least Bidum A19 in strength and durability. The marker layer should be of a distinctive bright colour such that future workers and/or site users will be alerted to conditions as documented in a site environmental management plan (EMP) prior to breaching the marker layer.

Where soil/rock based material is proposed to be used as part of the capping media and placed above the marker layer, the material will be required to be validated as meeting the adopted health / ecological criteria for the site such that there are no unacceptable risks to future site users/ occupants and/or workers during day to day site activities.

### 5.7.5 Site Boundaries

It is anticipated that, in some instances, potential remediation activities at the site may require consideration of boundary conditions to protect adjoining structures and/or road infrastructure. In such cases, it may not be feasible to complete remedial excavation works right up to the site boundary. Excavations may either be battered back from the boundary or, alternatively, shoring may be installed within the property boundary. As a result, some impacted material may remain on site at the time of validation.

Where shoring is installed inside the boundary, it is anticipated that (provided the shoring is permanent and will form part of a future structure) the capping beam will effectively cap the remaining impacted material, which satisfies the requirement of the RAP for material containment.

However, where battering is used at the excavation edge, the resulting slope may cause environmentally impacted material to remain at depths shallower than the minimum site capping requirement (i.e. a minimum of 0.5 m of clean material in non-paved areas). Where such conditions occur, the extent of the impacted material must be surveyed, and the non-compliance addressed in the final Validation Report and

Environmental Management Plan (EMP). This ensures that future site workers or occupants undertaking activities in this area are appropriately informed.

Alternatively, license agreements may be arranged to allow the proponent to construct boundary stability works within an adjoining lot, thereby enabling full remediation of the subject site. In such cases, appropriate contamination management protocols must be followed to ensure that contamination conditions on the adjoining site are managed in accordance with the RAP.

## 5.8 Material Movement Management

### 5.8.1 Material Movement Principles

As part of the potential site remediation/redevelopment works it is anticipated that material excavated during works will fall into one of a number of categories, comprising:

- Material required to be removed from the site to achieve site remediation objectives and will require disposal to a lawful waste facility; and
- Material excavated for services installation, to establish site development levels, regrading for installation of landscaping, etc. with contaminant concentrations suitable to be reused and retained on the site with or without ongoing management.

Appropriate sampling protocols including the required density of sampling for differing material types, sampling methodology and documentation requirements would be outlined in the RAP to ensure compliance with NSW EPA Regulations and Guidance.

Based on assessment outcomes, material falling within the first category will automatically require classification and off-site disposal to a lawful facility. Tracking of this material will be required with resulting documentation to be included in the relevant validation report.

For the second category, it is proposed where possible reuse of material across the site be facilitated where possible such that disposal to waste facilities may be minimised. This will assist with management of social impacts including truck movements, waste generation rates, the potential need to source material for importation, in addition to reducing the overall cost of remedial/development works.

Application of this approach will result in management of such material under the Contaminated Land Management Act (CLM) framework, rather than the Waste (POEO Act) framework. The RAP would have to evaluate the potential suitability of material within the site to be the subject of reuse elsewhere on site, where excavation is required as part of development works.

In addition, where off-site disposal of surplus materials is required, preference should be given to materials with a lower waste classification or those with potential for off-site beneficial re-use. These should be selected for removal prior to the off-site disposal of impacted material at a lawful facility, in order to minimize the quantity of waste generated by the works. This may include the excavation of non-contaminated or less impacted material for off-site disposal, with the resulting area being reinstated using environmentally impacted material and which may be capped/contained if required as described in **Section 5.7**. These activities would be subject to development approval for excavation and stockpiling activities. Soils moved between stages or development lots must be transferred in accordance with a Materials Tracking System (MTS), as described below.

Within the RAP, the management of excavated material would need to be addressed through the application of an appropriate MTS. The scope and level of detail included in the MTS will depend on the volume of excavated material anticipated within the area-specific RAP footprint. However, it is expected that each MTS will include the following elements:

Definition of Roles and Responsibilities;

- Material quality information;

- Material movement tracking;
- Material emplacement;
- Documentation required;
- Dealing with non-conformance; and
- Dealing with expected and unexpected finds.

It is noted that the MTS system should also cover material imported to site for use in development works until such time as a final validation report and/or SAS (if required) stating that the site is considered suitable for the proposed land use.

### 5.8.2 Off-Site Disposal of Material

Where material is identified as either unsuitable under the RAP, or engineering specification, or the material is surplus to development objectives for the site, the material will be required to be assessed for off-site removal.

Should sufficient information be available when constructing a potential RAP for the site, a waste classification in accordance with EPA (2014) may be documented in the RAP. Alternatively, the requirements for assessment and documentation of a waste classification assessment will be documented in the RAP. If following additional assessment at the site a RAP is not required for development, a waste classification assessment can still be prepared for the site separately.

It is further noted that a number of exemptions may potentially apply to material considered to be surplus to the requirements of the site (but not to material considered unsuitable under a RAP). A waste (resource recovery) exemption may be applicable for material covered by either a General or Specific Resource Recovery Exemption (RRE) as issued by the EPA under the *POEO (Waste) Regulation 2014* (or as updated), including Excavated Natural Material (ENM[14]), Recovered Aggregate (EPA 2010[15]) or similar. Dependent upon the characteristics and quantities of identified material(s) there may also be opportunities available with regard to the application of a Specific RRE in some instances. Virgin excavated natural material (VENM) as defined in the POEO Act is also exempt from the waste definition for the purposes of resource recovery.

Details of completed additional assessment activities including waste classification reports are included in the final validation report, which is prepared in accordance with the requirements of a RAP. Records associated with material tracking, including trucking receipts, landfill disposal records, etc will also be reviewed to ensure material removed from the site can be accounted for and has been disposed of lawfully.

### 5.8.3 Beneficial Reuse of Material within the Site

Material within the site boundary will initially be evaluated regarding the suitability of the material to remain within the site. Should the material be deemed excess to its requirements, the material may be disposed of to a lawful facility off-site. Alternatively, the material may be the subject of further review to facilitate decisions within respect to the suitability of the material for beneficial reuse and/or containment elsewhere within the site.

The remediation/validation consultant for the site would be responsible for reviewing the available material characterisation data relevant to the excess material. Where necessary, the consultant would develop and implement an additional program of testing to close out any data gaps and confirm the suitability (or otherwise) of the material for beneficial reuse within the site.

[14] *The Excavated Natural Material Exemption 2014*. NSW EPA 24 November 2014 (EPA 2014a)
[15] *The Recovered Aggregate Exemption 2014*. NSW EPA 24 November 2014 (EPA 2014b)

It is noted that such characterisation assessments are included in the final validation report prepared for site. As such, the assessment of the material will require to be sufficiently robust to confirm the material as suitable under the site RAP.

The remediation consultant would be responsible for ensuring Data Quality Objectives and Data Quality Indicator evaluations are completed for the site material characterisation assessment in accordance with the details in site RAP with respect to characterisation and validation of stockpile activities.

In addition to the complete material characterisation report prepared by the remediation consultant, a Material Characterisation Form (MCF) will be developed to provide the site's Principal Contractor and/or remediation consultant with a brief overview of management and/or placement requirements. This document will be required to present the following:

- A unique MCF document name/number;
- Details of the location of the source material, including the source site identification (Lot/DP number and/or Development Lot identifier), and either site-coordinates, GPS co-ordinates, or similar identifying system;
- Summary of the completed characterisation works or identification reference for the applicable characterisation report that complies with the placement site specific RAP requirements;
- Material physical description and volume estimate; and
- Outcome of characterisation assessment stating the potential opportunities for beneficial reuse of material.

Once material has been identified as suitable for reuse within the sites (with or without ongoing management), a unique identifier will be provided for the material. This identifier will assist with the identification and ongoing management of the material from the source project site excavation location to the final project site placement location.

The site's Principal Contractor with the assistance of the site Remediation Consultant will be responsible for reviewing the assessment report and covering MCF and providing written confirmation that the material has been appropriately assessed under the site-specific RAP and whether the material has therefore been accepted for placement.

If the source material (either in-situ or as a stockpile) is subsequently divided for placement at more than one location, a new unique identifier will be generated. The MCF will identify the current location and quantity of material in addition to the previous material identifier such that the initial assessment data may be linked to this new identifier.

It is envisaged that during movement of material within the site, appropriate management of material will be required at the source until the point at which the material is relocated. At this point it is envisaged that the placement site Principal Contractor and remediation consultant will provide the following:

- Placement survey report showing final location and levels of placed material; and
- Written confirmation from the site Remediation Consultant that the material has been placed in accordance with the requirements of the RAP.

Where material movement is to occur within the site, materials should be transported from source to interim stockpile or placement location in a suitable vehicle as outlined in an applicable R/CEMP.

### 5.8.4 Importation of Material

Project remediation and/or redevelopment works may require the importation of material from another site, including:

- Temporary uses – such as trafficability/access measures, piling platforms, etc.; or
- Permanent uses – such as utility/infrastructure trench backfill, reinstatement of excavations, landscaped areas, drainage media, growing media, or pavement subgrade.

Prior to the importation of any material, appropriate assessment must be completed to demonstrate that the material is both fit for purpose and suitable from a contamination perspective. In accordance with EPA requirements, the extent of assessment will depend on the type of material proposed for import.

While it is anticipated that a site-specific RAP will include a tailored assessment strategy, covering sampling methodology, density, and analysis details, the following general principles must be considered:

- Virgin Excavated Natural Material (VENM): Where the material proposed for import is VENM, an assessment must demonstrate compliance with the definition of VENM under the *Protection of the Environment Operations Act 1997* (POEO Act), adopting the minimum characterisation requirements as outlined in EPA (1995), unless the material is sourced from a commercial quarry operating under an Environment Protection Licence (EPL).
- Materials under the Resource Recovery Framework (Order/Exemption): Where material has been classified under a Resource Recovery Order and Exemption, the supplier must demonstrate that it is suitable for use by providing a Statement of Compliance in accordance with the applicable Order. With reference to the current list of approved Orders and Exemptions available on the NSW EPA website, eligible materials may include, but are not limited to, excavated natural material (ENM), recycled aggregate, basalt fines, compost, mixed organic waste, pasteurised garden organics, and recovered fines.

In addition to supplier-provided testing, further compliance assessment is required for any proposed imported material due to the typically low frequency of mandatory testing required under these Exemptions. This additional assessment ensures the material does not pose an unacceptable risk to human health or the environment at the site. It is anticipated that such assessment activities will include visual inspections, representative sampling, and laboratory analysis to confirm that the material meets the site-specific RAP requirements for on-site use. As with VENM assessments, it is considered appropriate for these requirements to be defined on a site-specific basis, given the potential variability in project conditions.

Material tracking records, along with the import assessment report, must be included in the final validation report for the site.

## 5.9 Proposed Validation Strategy

Data would be required to be collected during potential remediation works to assess the effectiveness of any implemented remedial actions and document the final condition of the site at the completion of works such that conclusions may be drawn on the end suitability of the site for the proposed development use.

The following sections present an overview of general principles that would be required to be considered in greater detail within the RAP, if required for the site.

### 5.9.1 Validation Sampling Analysis and Quality Plan

A validation sampling analytical quality plan (SAQP) would be prepared within the RAP prior to the commencement of any on-site remedial works. Validation is required to address the following aspects of any potential remedial works:

- Removal of contamination sources including chemical storage infrastructure;
- Completion of remedial excavation works;
- Installation of capping materials;
- Verification that uncapped / accessible soils (including imported filling and growing media) are suitable for the proposed use;
- Characterisation of identified data gaps including site areas not subject to previous sampling and analysis as a result of access limitations at the time of preparation of the applicable area specific RAP;
- Characterisation and off-site disposal and/or beneficial use of materials excess to development requirements; and
- Assessment and close out of Unexpected Finds assessments.

### 5.9.2 Validation Assessment Criteria

Validation assessment criteria are required to be developed for each potentially contaminated medium (soil, groundwater, vapour, etc.) as part of the RAP, in accordance with the framework established in NEPC (2013). In some instances, it may be appropriate to adopt the NEPC (2013) Tier 1 investigation levels as default validation criteria. However, site-specific validation criteria developed through a process of human health and/or ecological risk assessment may be more appropriate for certain media and/or specific site areas, depending on the identified contaminants of concern and the development details.

Specific consideration would be required for potential exposure scenarios associated with the proposed development at the site. It is also acknowledged that a range of potential validation criteria may be appropriate for one or more media within the RAP, depending on the proposed land use and the final depth of material considered.

### 5.9.3 Contaminant Source and Impacted Material Removal Validation

Validation of excavations resulting from the removal of source material would be undertaken through a combination of physical inspection (visual and olfactory assessments, as appropriate) and sampling analysis of representative samples from the lateral and vertical extents. Validation samples would be analysed for identified COPC associated with the source material removal activities, and the results would be compared to the applicable validation assessment criteria. The density of sampling will be developed in accordance with NSW EPA-endorsed guidance and documented in the RAP.

Appropriate validation assessment activities may also include additional validation of groundwater and/or soil vapor conditions following the removal of source material to verify the success of the remedial works in removing the contaminant source. Depending on the contaminant characteristics and the scale of the impact, an ongoing monitoring program may be required to demonstrate improvements in groundwater, soil, and/or

sediment quality and/or a decline in soil vapor concentrations over time (e.g. via monitored natural attenuation).

### 5.9.4 Accessible Soils Validation

Where material sourced the site area is proposed to be reused in areas of accessible soils either without ongoing management, or above the marker layer in areas subject to management, this material would be required to be validated as suitable with respect to both human health and ecological assessment considerations. In addition, material imported for use in site reinstatement, civil/infrastructure works (aggregates, subgrade material, drainage layers, growing media, etc) would also be required to be demonstrated as fit for purpose from a contamination point of view, including evaluation with respect to human exposure and where appropriate, ecological assessment.

In areas of proposed landscaping, sampling and analysis of existing on-site fill/natural soil materials would be required to demonstrate the suitability of the material for both:

- Human contact under the relevant land use scenario; and
- Growing media, in accordance with thresholds for ecological assessment in urban public open space scenarios.

Alternatively, the existing fill materials may be subject to capping as relevant for the proposed land use and/or landscaping objectives as detailed in the RAP.

In assessing the potential for future human exposure it shall be assumed that direct exposure by site users may occur to soils to a depth of 2 m below the finished ground surface. This depth is considered suitable also for assessment of fill material in deep planting areas. Consideration of potential disturbances that may extend to depths greater than 2 m, such as infrastructure installation (underground services, etc) and ongoing maintenance activities, would also be required. In these localised areas, consideration may be required for assessment (and where required remediation/management) to greater depths. As such, it is anticipated that should remediation be required in such areas, that the site RAP would define specific depth of validation and/or containment requirements relevant to proposed development details for the site.

In general, where site soil and soil vapour conditions are able to be successfully validated with respect to the final validation criteria to a depth of 2 metres below the finish ground surface in unpaved areas of the site, no physical 'marker layer' is required to be installed, and these areas would not be subject to on-going management under a long-term Environmental Management Plan (LTEMP). However, consideration may also be required for the potential for future soil disturbance, including installation of deeper infrastructure (underground services, etc), and/or the presence of other subsurface features.

### 5.9.5 Installation of Containment Measures Validation

Where impacted material is considered suitable to be retained on-site subject to implementation of a physical separation layer and ongoing management, a program of inspections will be required to confirm the requirements in relation to the physical barrier are met during construction. Inspection points would include the installation of the marker layer, pavement subgrade and pavements, or alternatively application of suitable soil capping media. Photographic records would need to be retained from the inspection activities for inclusion in the validation documentation.

In addition, the remediation contractor would be required to provide survey drawings documenting the upper extent of the impacted material/marker layer and the lateral extent of the placed layer material in addition to a final 'as built' survey of the completed works ground level within the remediation area, to demonstrate that the requirements of the physical barrier (cap and containment) have been achieved. These documents would also be required to be included in the final validation report.

Where the capping material includes final ground surface treatments such as pavers, tiles, boardwalks, landscaped areas surrounding buildings, there may be consideration of a staged application of capping arrangements, where an interim cap is placed to achieve remediation sign-off requirements to allow for construction of adjoining buildings/infrastructure, following which the final capping measures will be installed. Such measures would be required to be documented in the RAP.

### 5.9.6 Validation and Ongoing Management Requirement Reporting

Should remediation be required at the site, a validation report shall be prepared at the completion of the remediation works. It is anticipated that the validation report would include:

- An update of the site description and CSM as presented in the RAP relevant to the validation assessment footprint;
- All sampling field notes and laboratory data including calibration certificates for field monitoring equipment, environmental monitoring etc.;
- An assessment of quality assurance and quality control (QA/QC) of analytical data generated by the works to identify if the data is reliable for use in characterising the site;
- An assessment of whether sufficient data has been obtained to meet required limits on decision error;
- An assessment to the decision rules and identify any environmental data which causes decision rules to be failed;
- A summary of waste classification and/or beneficial reuse assessment and material tracking documentation including, but not limited to details of all material removed from site either as waste or under a resource recovery exemption, material volumes, receipts from receiving facilities, RRE order condition compliance statements;
- The requirements for the EMP (where appropriate) including presentation of a survey clearly identifying the extent of the retained impacted material and associated capping; and
- A comment on the suitability of the site for the proposed use and requirements for any ongoing monitoring/management (where applicable).

Where the remedial works for the site result in requirements for ongoing management, an Environmental Management Plan (EMP) would be prepared to detail site conditions and any ongoing management/monitoring requirements for the site. The precise nature and extent of the management requirements would not be known until remediation/ management works are conducted and the validation data obtained.

If an EMP is required, it will include documentation the following elements:

- A statement of the objectives of the EMP;
- Identification of residual environmental contamination issues at the site that require ongoing management/monitoring to meet the EMP objectives, including the type of contamination and location within the site (including a survey plan prepared by a registered surveyor);
- Documentation of environmental management measures which have been implemented to address the identified environmental issues at the site;
- Description of management controls to limit the exposure of site users to known areas of contamination to acceptable levels;
- Description of responsibilities for implementing various elements of the provisions contained in the EMP;
- Environmental monitoring and reporting requirements (if required) for the future management of environmental impact underlying the site including:
    - Appropriate monitoring locations and depth within and down-gradient of any residual contamination;
    - Relevant assessment criteria to be used in evaluating monitoring results;
    - Frequency of monitoring and reporting;
    - Process for reviewing monitoring data and how decisions will be made regarding the ongoing management strategy;
    - The length of time for which monitoring is expected to continue;
    - The regulatory authorities involved (if any) and the management inputs required from each;
    - The integration of environmental management and monitoring measures for soil and groundwater;
    - Health and safety requirements for particular activities;
    - A program of review and audits;
    - Feasibility of the provisions in the EMP and able to be legally enforceable; and
    - The relevant consent authority is satisfied that the inclusion of a development consent condition relating to the implementation of the EMP is acceptable.
- Timeframes for implementing the various control/monitoring elements outlined in the EMP; and
- Corrective action procedures to be implemented where EMP assessment criteria are breached.

## 5.10 Contingency Plans

The RAP, if required, will need to address contingency plans specific to conditions and proposed works that could feasibly occur during remediation works within the area specific footprint. Issues that may require to be addressed in the RAPs could include:

- Encountering additional and/or unknown contaminated media and/or contamination sources;
- Increased volume of contaminated material at one or more locations;
- Failure of source removal works and/or on-site treatment of materials; and
- Identification of material requiring removal that cannot be classified for off-site disposal under EPA (2014) or subsequent endorsed guidance.

Broad discussion of contingency procedures that may be employed to address the above issues are outlined in the following sections.

### 5.10.1 Unexpected Material Finds

Even following any additional investigations that may be conducted at the site, there remains the possibility that additional unexpected hazards may be identified during demolition works and/or remediation works. The nature of hazards which may be present and which may be discovered at the site are largely anticipated to be detectable through visual or olfactory means, for example:

- Large scale occurrences of buried friable asbestos waste (e.g. lagging);
- Construction / Demolition Waste potentially including ACM (visible);
- Hydrocarbon/solvent or similar impacted materials (visible / odorous);
- Drums or underground storage tanks (USTs) (visible);
- Tar impacted material and/or buried tar pits (visible/odorous);
- Buried putrescible waste (visible/odorous);
- Excessive Ash, slag and / or oily contaminated soils / fill materials not considered to be consistent with the appearance of the majority of fill materials (visible).

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances (or any other unexpected potentially hazardous substance) be identified during demolition/remediation/earthworks, the unexpected finds protocol (UFP) as provided in the RAP shall be required to be followed.

The sampling strategy for each 'unexpected find' would be designed by a suitably qualified environmental consultant. The strategy would be aimed at determining the nature of the substance, and if it is at concentrations which pose an unacceptable risk to human health or the environment. Sampling and analysis would also be consistent with the overall requirements for validation sampling and analysis as outlined in the RAP.

### 5.10.2 Emission Complaints

It is not expected, based on the current understanding of the site contamination conditions, that significant widespread odorous/malodorous soils will be encountered. However, other emissions issues that may require consideration during works may include:

- Noise and vibration arising from demolition, excavation, piling/shoring and other works;
- Dust emissions arising from excavation, material handling and placement;
- Visibly impacted water quality in surface water discharged from the site; and
- Small scale odour emissions arising from handling of malodorous soil excavated from backfill areas and/or associated with fuel infrastructure.

Monitoring of all environmental emissions shall be undertaken during the works as detailed in a Site Management Plan, included in the RAP, and appropriate actions would be taken to further control emissions following receipt of a complaint. The management plan shall contain provision for contingency actions where excessive emissions occur.

# 6. Conclusions and Recommendations

## 6.1 Conclusions

Subject to the limitations stated in **Section 7**, it is considered that the proposed actions outlined in this plan conform to the requirements of the Contaminated Sites Guidelines for the NSW Site Auditor Scheme (3rd Edition) (EPA 2017) because they are technically feasible, environmentally justifiable, and consistent with relevant laws policies and guidelines endorsed by NSW EPA.

Should further assessment of contamination conditions at the site identify the need for a RAP, the successful implementation of the measures described in this plan, along with the recommendations below, will ensure that the site can be made suitable for the proposed range of intended uses, and that the risks posed by contamination can be managed in a way that is adequately protective of human health and the environment.

## 6.2 Recommendations

It is recommended that if the need for a RAP is identified for the site following future intrusive assessment of contamination conditions at the site (for example as part of a DSI), that the processes outlined in this plan be implemented as required. It is also recommended that a site management plan be included in the RAP, as well development of a WHSP, to be implemented and ensure the risks and impacts during any potential remediation works are controlled in an appropriate manner.

The site management plan and WHSP would need to address the potential for a range of chemical contaminant conditions in soil, groundwater and vapour in affected areas of the site, in addition to the potential occurrence and storage / handling of asbestos contaminated soils on the site.

If remediation works are undertaken at the site, a validation report and on-going EMP (if required) for residual impacted materials as may be retained on site will be required to be submitted to the consent authority upon completion of the remediation works, documenting that the site is considered suitable for the proposed use, subject to implementation of the relevant ongoing EMP (if required).

# 7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties. The report has been prepared specifically for the client for the purposes of the commission, and no warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be amended in any way without prior approval by JBS&G, or reproduced other than in full including all attachments as originally provided to the client by JBS&G.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements or agreed scope of work.

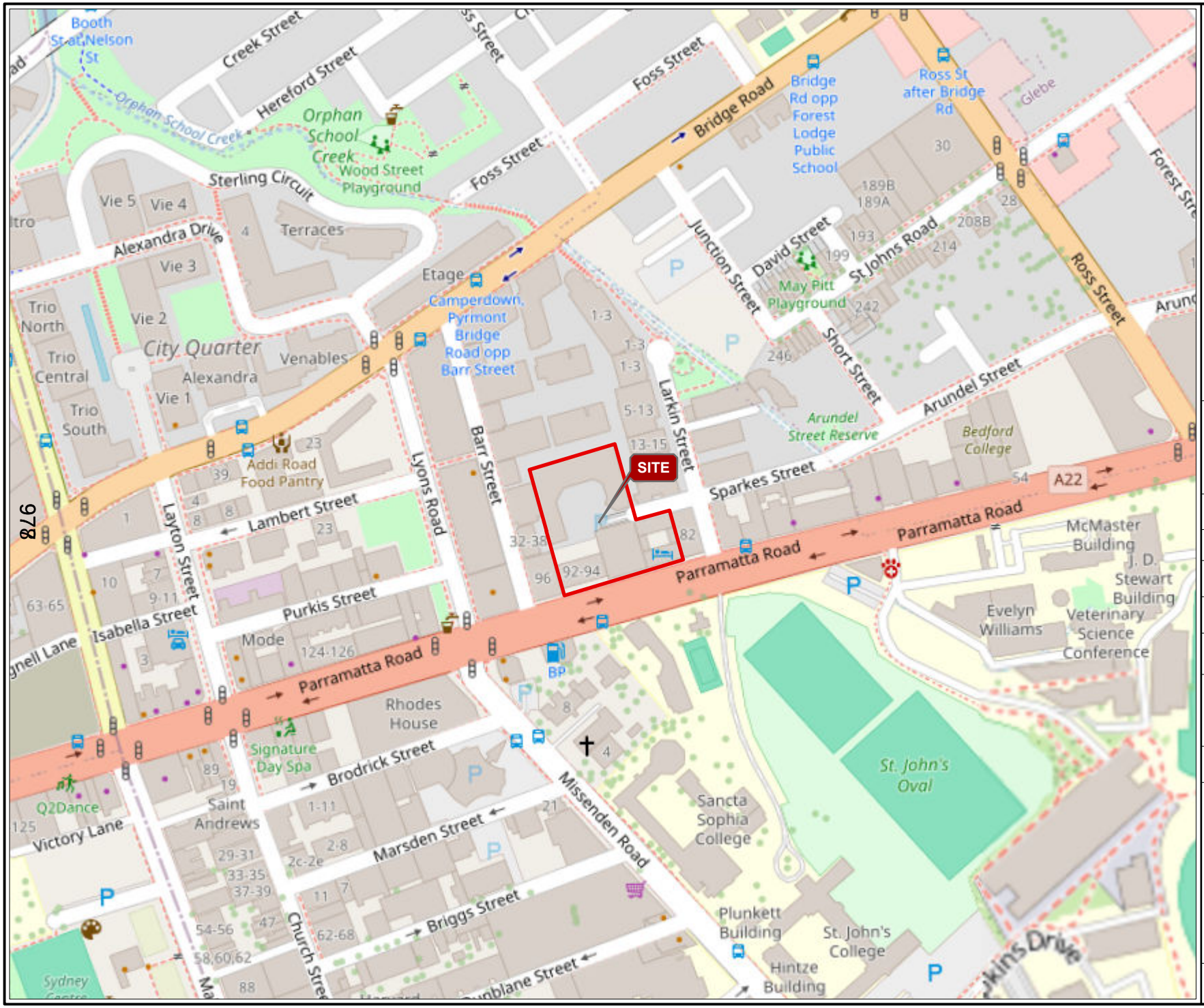
Limited sampling and laboratory analyses

. were undertaken as part of the investigations undertaken, as described herein. Conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

# Figures




Legend

Approximate Site Boundary

JBS&G

Job No: 69242

Client: Wentworth Capital

| Version: R01 Rev A | Date 13/05/2025 |
|---|---|
| Drawn By: IA | Checked By: AH |

Scale 1:3,500

0 30 60

metres

Coord. Sys. GDA 1994 MGA Zone 56

**84-94 Parramatta Road**
**Camperdown, NSW**

**SITE LOCATION**

**FIGURE 1**

File Name: 69242_ParramattaRoadCamperdown_R01_RevA

Reference: © OpenStreetMap (and) contributors, CC-BY-SA




Legend

Approximate Site Boundary

84 Parramatta Road

88-90 Parramatta Road

92-94 Parramatta Road

NSW Cadastre

JBS&G

Job No: 69242

Client: Wentworth Capital

Version: R01 Rev A | Date 13/05/2025

Drawn By: IA | Checked By: AH

Scale 1:750

0 7 14

metres

Coord. Sys. GDA2020 MGA Zone 56

**84-94 Parramatta Road**
**Camperdown, NSW**

**SITE LAYOUT**

**FIGURE 2**

File Name: 69242_ParramattaRoadCamperdown_R01_RevA
Reference: Nearmap - www.nearmap.com (Capture Date: 2025/04/03)

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## Document Status

| Rev No. | Author | Reviewer | Approved for Issue | | |
|---|---|---|---|---|---|
| | | Name | Name | Signature | Date |
| A | Amy Holland | Chris Bielby | Chris Bielby |  | 3/07/2025 |
| B | Amy Holland | Chris Bielby | Chris Bielby |  | 29/09/2025 |

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