Hans Sydney Pty Ltd

Preliminary Remedial Action Plan

Stage 2
338 Pitt St, Sydney
NSW 2000

10 March 2021

57557/134,350 (Rev 2)

JBS&G Australia Pty Ltd

www.jbsg.com.au

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Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by Hans Sydney Pty Ltd (Hans, the client) to prepare a Remedial Action Plan (RAP) for the Hans 338 project site, located at 338 Pitt Street, Sydney, NSW (the site). The site comprises nine properties (comprised of 10 Lots), fronting Pitt, Castlereagh and Liverpool Streets in the Sydney central business district (CBD). The site location and layout are shown on **Figures 1** and **2**, respectively.

The site is currently used for commercial purposes, including offices, retail stores and eateries and is currently zoned as B8 Metropolitan Centre under the Sydney Local Environmental Plan 2012.

This report supports a State Significant Development Application (SSDA) for the mixed-use redevelopment of 338 Pitt Street, Sydney, which was submitted to the City of Sydney pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). China Centre Development Pty Ltd is the proponent of the SSDA. The mixed-use redevelopment comprises hotel, residential (i.e. apartments), commercial and retail uses.

An Environmental Site Assessment (ESA) (JBS&G 2021[1]) was previously completed for the site and comprised a desktop review of readily available historical records. JBS&G (2021) concluded that it is 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 mixed commercial and residential land-use. Notwithstanding this conclusion, assessment of soils, groundwater and soil vapour on the site is considered necessary to close out the uncertainties surrounding the nature, extent and associated risks from potential contamination at the site. This information would also be required to ensure appropriate remediation/ management of materials occurs during redevelopment and the site is rendered suitable for the proposed use.

This RAP is therefore preliminary in nature and provides a framework for managing potentially contaminated media identified in the PSI (2021), during the redevelopment of the site. Following the completion of future data gaps assessment (**Section 4**), this RAP will require revision and review and approval by the appointed Site Auditor prior to implementation to ensure the proposed remedial approach is consistent with relevant guidance and in order to make the site suitable for use.

This RAP document presents a summary of known and suspected site conditions, a conceptual site model (CSM) of contamination conditions and identification of existing data gaps in relation to the proposed development scheme, an evaluation of potential remedial strategies, identification of preferred strategies and details of site management and associated possible validation requirements to be implemented during the proposed works.

Overall, it is considered that the proposed actions outlined in this RAP 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.

Subject to the successful implementation of the measures described in this RAP and with consideration to the Limitations presented in **Section 11**, it is considered that the Site can be made suitable for the intended uses and that the risks posed by contamination can be managed in such a way as to be adequately protective of human health and the environment.

[1] *Preliminary Site Investigation, Stage 2 338 Pitt St, Sydney NSW 2000, JBS&G Australia Pty Ltd, 25 February 2021 (JBS&G 2021).*

Abbreviations

Term	Definition
ACM	Asbestos Containing Materials
AEC	Areas of Environmental Concern
AHD	Australian Height Datum
ASRIS	Australian Soil Resource Information System
ASS	Acid Sulfate Soils
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene
CLM Act	Contaminated Land Management Act
COC	Chain of Custody
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DBYD	Dial Before You Dig
DP	Development Plan
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DSI	Detailed Site Investigation
EC	Electrical Conductivity
EIL	Ecological Investigation Levels
EPA	NSW Environmental Protection Authority
ESA	Environmental Site Assessment
ESLs	Ecological Screening Levels
Ha	Hectare
HAR	Heritage Assessment Report
HILs	Health Investigation Levels
HSLs	Health Screening Levels
JBS&G	JBS&G Australia Pty Ltd
JRA	Job Risk Assessment
LEP	Local Environmental Plan
LOR	Limit of Reporting
NATA	National Accreditation Testing Authority
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
RPD	Relative Percentage Difference
SAQP	Sampling Analytical and Quality Plan
SCID	Stored Chemical Information Database
SWMS	Safe Work Method Statement
TRH	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
UST	Underground storage tank
VOC	Volatile Organic Compounds

1. Introduction & Objectives

1.1 Introduction

JBS&G Australia Pty Ltd (JBS&G) was engaged by Hans Sydney Pty Ltd (Hans, the client) to prepare a Remedial Action Plan (RAP) for the Hans 338 project site, located at 338 Pitt Street, Sydney, NSW (the site). The site comprises nine properties (comprised of 10 Lots), fronting Pitt, Castlereagh and Liverpool Streets in the Sydney central business district (CBD). The site location and layout are shown on **Figures 1** and **2**, respectively.

The site is currently used for commercial purposes, including offices, retail stores and eateries and is currently zoned as B8 Metropolitan Centre under the Sydney Local Environmental Plan 2012.

This report supports a State Significant Development Application (SSDA) for the mixed-use redevelopment of 338 Pitt Street, Sydney, which was submitted to the City of Sydney pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). China Centre Development Pty Ltd is the proponent of the SSDA. The mixed-use redevelopment comprises hotel, residential (i.e. apartments), commercial and retail uses.

The site is located at the corner of Pitt Street and Liverpool Street, within the 'Mid Town' precinct of Sydney's CBD. The site is approximately 150m west of Museum Station and Hyde Park, and approximately 350m from Town Hall Station. The site includes several allotments and constitutes nearly one third of the city block between Bathurst Street, Pitt Street and Liverpool Street. The site is an irregular shape and has a combined area of approximately 6,000 m².

An Environmental Site Assessment (ESA) (JBS&G 2021[2]) was previously completed for the site and comprised a desktop review of readily available historical records. JBS&G (2021) concluded that it is 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 mixed commercial and residential land-use.

Notwithstanding this conclusion, assessment of soils, groundwater and soil vapour on the site is considered necessary to close out the uncertainties surrounding the nature, extent and associated risks from potential contamination at the site. This information would also be required to ensure appropriate remediation/ management of materials occurs during redevelopment and the site is rendered suitable for the proposed use.

This RAP is therefore preliminary in nature and provides a framework for managing potentially contaminated media identified in the PSI (2021), during the redevelopment of the site. Following the completion of future data gaps assessment (**Section 4**), this RAP will require revision and review and approval by the appointed Site Auditor prior to implementation to ensure the proposed remedial approach is consistent with relevant guidance and in order to make the site suitable for use.

This report has been prepared in accordance with the requirements of the NSW Environment Protection Authority (EPA) published and endorsed guidelines.

1.2 Objective

The objectives of this RAP are to establish a suitable framework for management of potentially contaminated media such that upon completion of works, the site will be considered suitable for the proposed use. As such, the objectives are to: identify the known and/or anticipated extent of site contamination via presentation of a conceptual site model, identification and evaluation of remedial/management options in relation to regulatory requirements, the development details and overall objectives; and to document the procedures and standards to be followed such that

[2] *Preliminary Site Investigation, Stage 2 338 Pitt St, Sydney NSW 2000, JBS&G Australia Pty Ltd, 25 February 2021 (JBS&G 2021).*

(potentially) contaminated media are appropriately managed whilst ensure the protection of human health and the surrounding environment.

1.3 Proposed Development

The most recent concept plans for the proposed redevelopment are provided as **Appendix A**. This will comprise hotel, residential (i.e. apartments), commercial and retail uses and will include:

- demolition of all existing structures;
- excavation and site preparation, including any required remediation;
- construction and use of a mixed-use development, with an iconic 258 m high two-tower built form above a podium and internal courtyard;
- four basement levels and a lower ground level accommodating residential, retail and hotel car parking, motorcycle parking, bicycle parking, loading dock, storage and relevant building services. Based on a review of the proposed development plans, it appears that the level 1 basement footprint covers the site extent, while the level 2-4 basement footprint does not extend into the south-western corner of the site due to the Sydney Metro easement. The client has indicated that the Level 4 of the basement car park will be approximately 20 m below the adjacent street levels;
- improvements to the public domain, including landscaping, pedestrian thoroughfares/connections, and landscaping; and
- augmentation and extension of utilities and services.

1.4 Previous Assessments

The RAP has been substantially prepared on the basis of the site conditions documented in Preliminary Site investigation prepared by JBS&G (JBS&G 2021).

2. Site Condition & Surrounding Land Uses

2.1 Site Identification

2.2 Site Identification

The site location is shown in **Figure 1**, and current site layout is shown in **Figure 2**. The site details are summarised in **Table 2.1** and described in the following sections.

Table 2.1: Summary of Site Details

Lot/DP	Part Lot 3 DP 1044304 Lot 1 DP 66428 Lot 10 DP 857070 Lot A DP 448971 Lot B DP 183853 Lot 1 DP 70702, Lot 1 DP78245 (under the same property) Lot 1 DP 90016 Lot B DP 448971 Lot C DP 448971
Address	338 Pitt Street, Sydney NSW 2000
Local Government Authority	City of Sydney
Easting **Northing**	334296.691 (GDA94 - MGA56) 6250096.635 (GDA94 - MGA56)
Site Zoning	B8 Metropolitan Centre (Sydney Local Environmental Plan 2012)
Current Use	Commercial – Offices, retail, eateries.
Proposed Use	Mixed use, comprising hotel, residential, commercial and retail land-uses
Site Area	Approximately 6,091 m^2

2.3 Site Description

Inspection of the greater site area was initially completed by one of JBS&G's qualified and trained environmental consultants on the 19 and 20 September 2016. The inspection included readily accessible areas of site, the exterior of buildings at ground level, and the two basement car parks. A summary of general site features is provided below.

The site occupies a portion of a city block occupied by six multistorey buildings. At street level the buildings are predominately occupied by eateries and building foyers. No indications of ACM building materials were noted, from a limited inspection of the exterior of the buildings, and no peeling paint was noted on painted surfaces. An open area between buildings was noted at the end of Dungate Lane, which connects to Castlereagh Street to the east. This area appeared to be in use as a loading zone and as a bin collection area, as well as vehicle access to underground car parking.

Two basement carparks were noted at the site. The basement carpark within the Lots 10 in DP 857070 and A in DP 4488971 was noted to be set into natural materials, with sandstone bedrock observed in the wall of the upper basement level. No exposed soil/bedrock was observed in the other basement carpark, at Lot 3 DP 104414. There was no evidence of underground storage tanks (USTs) in the building basements or other accessible areas of site, with no risers, bowsers or fill/dip points observed. Additionally, there was no evidence of bulk chemical storage within the basement areas. A trade waste pipe and a suspected commercial grease trap or oil-water separator was noted within the basement at Lot 3 DP 104414, and were observed to be in good condition, with no signs of leakage.

Evidence of services were observed frequently at ground level within footpaths, with numerous gatics observed. The ground surface at the site was paved, with tiles on all footpaths, and asphalt roadway within Dungate Lane. No accessible soils were observed within the site.

Overall, the site appeared well maintained and in good condition. There were no odours or significant staining observed on the paved ground surfaces.

In addition, a second site inspection (from the street frontages) was completed by one of JBS&G's qualified and trained environmental consultants on the 22 November 2019. The site appeared consistent with the description provided above. In addition, the two properties located at 128 and 130 Liverpool Street were used as commercial eateries in which the buildings comprised of two-storey brick construction. There were no obvious potential sources of contamination viewed within these two properties from the street frontage.

2.4 Surrounding Land Use

Current land use of adjacent properties or properties across adjacent roads is summarised below:

- North – multistorey commercial buildings that includes a Fire and Rescue NSW Station and Telstra Exchange buildings;
- East – Castlereagh Street, followed by multistorey commercial buildings;
- South – Liverpool Street, followed by multistorey commercial buildings.
- West – Pitt Street, followed by multistorey commercial buildings.

2.5 Topography

Review of the regional topographic data (SixMaps[3]) indicated that the site has an elevation of between 15 to 20 m Australian Height Datum (AHD). The regional topography slopes gently to the northwest towards Cockle Bay, approximately 800 m from the site.

2.6 Geology

Review of the regional geological map (DMR 1983[4]) indicated the site lies within Ashfield Shale, part of the Wianamatta group of sedimentary rocks. Ashfield shales typically lie on Mittagong formation and comprise of black mudstones, grey silty shales and sideritic clay ironstone bands, often containing high iron and low calcium levels.

Review of the Sydney Soil Landscape series (eSPADE[5]) indicates soils at the site comprise the residual Lucas Heights Landscape. These typically occur on undulating crests and ridges on plateau surfaces of the Mittagong formation, bands of shale and fine-grained sandstones with low relief to 30 m and slopes of less than 10 percent. The soils typically are moderately deep (50-150cm), hardsetting yellow podzolic soils and yellow soloths, and yellow earths on outer edges. This soil landscape group often exhibits stony soil, low fertility and low available water capacity.

2.7 Acid Sulphate Soils

Review of the acid sulphate soil map from Australian Soil Resource Information System (ASRIS[6]) indicates that the site is located in an area of low probability of acid sulphate soils (ASS). As such, management of development activities is unlikely to be required to address the potential for impacts to ASS on the site. In addition, the Council 10.7 certificates provided in JBS&G (2021), indicates the site is not situated within a location that has been mapped as Class 1 or 2 ASS.

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3 *NSW Government Spatial Information Exchange website, http://maps.six.nsw.gov.au/, accessed 15 September 2016*

4 *Sydney 1:100 000 Geological Series Sheet 9130.* Department of Mineral resources, 1983 (DMR 1983)

5 *NSW Government Environment & Heritage, NSW soil and land information, eSPADE, http://www.enviornment.nsw.gov.au/eSpadeWebapp/, accessed 15 September 2016*

6 *Australian Soil Resource Information System, http://www.asris.csiro.au/, accessed 15 September 2016*

2.8 Hydrology

Rainwater at the site is likely to enter stormwater infrastructure, as buildings occupy the majority of the site and the remaining ground surfaces are paved. The regional topography suggests collected rainwater would then migrate northwest via the city stormwater system towards Cockle Bay. Additionally, an open drain was noted at the site with adjacent painted message “drains to Sydney Harbour” as presented in JBS&G (2021).

2.9 Hydrogeology

Review of information obtained from the Office of Water database indicated that there are no registered groundwater bores within a 500 m radius of the site. As such, data from the 10 closest bores is summarised below**.** No data was available for groundwater quality for any of the bores reviewed.

- GW112175 is located approximately 900 m to the east of the site, on Bourke Street, and is registered as a monitoring bore. No Standing Water Level (SWL) data was available.
- GW112179 is located approximately 1.0 km to the southeast of the site, on Flinders Street, and is registered as a monitoring bore. No SWL data was available.
- GW200690 is located approximately 1.0 km to the southeast of the site, on Albion Street, and is registered for domestic purposes. No SWL data was available.
- GW112180 is located approximately 1.2 km to the southeast of the site, on Flinders Street, and is registered as a monitoring bore. No SWL data was available.
- GW109238 is located approximately 1.1 km to the southeast of the site, on Short Place, and is registered as a monitoring bore. The bore is located through clay loam and shale to 7.0 m bgs and the SWL was recorded at 4.59 m bgs.
- GW109239 is located approximately 1.1 km to the southeast of the site, on Marys Place, and is registered as a monitoring bore. The bore is located through clay loam and shale to 7.45 m bgs and the SWL was recorded at 4.57 m bgs.
- GW109086 is located approximately 1.3 km to the northwest of the site, near Sussex Street, and is registered as a monitoring bore. The bore is located through sand to 5.68 m bgs. No SWL data was available.
- GW113599 is located approximately 1.5 km to the northwest of the site, near Waterman’s, Quay and is registered as a monitoring bore. No SWL data was available.
- GW109649 is located approximately 1.2km to the southwest of the site near Wattle Street, and is registered as a monitoring bore. The bore is located through sand then sandstone to 7.20 m bgs and the SWL was recorded at 2.95 m bgs.
- GW109502 is located approximately 1.3km to the southwest of the site, near Abercrombie, Street and is registered as a monitoring bore. No SWL data was available.

It is anticipated that shallow groundwater at the site will occur at approximately 3-5 m bgs, based on the reported SWL at nearby bores. Regional groundwater is likely to occur within sandstone/shale bedrock, especially within zones of relatively higher permeability associated with inconsistencies in the bedrock (faults, joints, weathered zones, etc.). Regional topography suggests groundwater migration may move towards Cockle Bay.

Localised, shallow subsoil groundwater seepage may also occur at the site, particularly following periods of significant wet weather. This may result in perched groundwater at the soil-bedrock interface and within highly weathered rock beneath surface soils. Seepage flow is influenced by topography, including local bedrock topography, and is expected to be toward the north-west.

2.10 Previous Environmental Assessments

As listed in **Section 1.4**, a PSI for the site was documented in JBS&G (2021) that documented the known site history. It was reported that from 1880, the site was largely developed for commercial / industrial purposes that included a cabinet maker (eastern portion), blacksmith (central portion), foundry (northern portion) and various work sheds and retail stores across the balance of the site. Surrounding land-uses appear consistent (commercial / industrial) to the site, noting that a Fire Station to the north of the site was constructed in 1886.

From 1930, the site was identified to be used primarily for commercial purposes that largely comprised of retail showrooms (furniture, clothing, hardware etc). Some light industrial land-uses, comprising automotive workshops and leather and boot making were noted, however the foundry was no longer present. It is noted that the Telstra exchange building was present to the north of the site since at least 1930. From 1947, it appears the site was primarily used for commercial purposes that included hotels, restaurants, and retail showrooms. From 1975 and 1994, large commercial buildings (with basements) were constructed in the respective northern and south-western portions of the site.

3. Preliminary Conceptual Site Model

3.1 Potential Areas of Environmental Concern

Based on the history review and observations of the site, potential AECs and associated COPCs have been identified and are presented in **Table 3.1**.

Table 3.1: 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 furniture making, leather and boot making and motor vehicle maintenance and repairs	Heavy metals, TRH, BTEX, PAHs, VOCs
Potential underground storage tanks (USTs) that may have been abandoned in-situ on site.	Heavy metals, TRH, BTEX, PAHs, VOCs
Offsite sources (e.g. current and former industry surrounding the site that includes a Fire Station, Telstra Exchange and a potential former sewage pumping station)	Heavy metals, TRH, BTEX, PAH, per- and polyfluoroalkyl substances (PFAS) and VOCs

3.2 Potentially Contaminated Media

Each of the AECs and corresponding COPCs identified in **Section 3.1** 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 3.1,** have the potential to migrate from shallow soils into groundwater.

3.3 Potential for Migration

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 site (as is proposed as part of the site redevelopment).

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 3.5**). 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.

3.4 Potential Human and Ecological Receptors and Exposure Pathways

Table 3.2 summarises potential human receptors and associated exposure pathways for the site, based on the range of exposure scenarios that may occur under the proposed future land uses.

Table 3.2: Summary of Potential 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) Oral (infiltrating seepage water within basement if present) Dermal (infiltrating seepage water within basement if present)
Construction worker or intrusive maintenance worker (short duration)	Construction areas/ Excavations	Soil	Inhalation (vapours and particulates) Oral Dermal
		Groundwater	Inhalation (vapours) Oral (infiltrating seepage water) Dermal (infiltrating seepage water)

Currently the site is primarily covered by hardstand pavements and building footprints. On this basis, there are limited on-site terrestrial 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 from the site into Cockle Bay. Off-site ecological receptors are therefore limited to the organisms living within the estuarine system of Cockle 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 Cockle Bay comprise an off-site human receptor.

3.5 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.

3.6 Data Gaps

While the PSI (JBS&G 2021) has identified five AECs on the site, to date no investigations have been conducted to characterise the quality of in-situ materials including soil, groundwater and soil vapour underlying the site in order to assess its suitability for the proposed development.

4. Data Gap Investigation

A complete Sampling, Analysis and Quality Plan (SAQP) document is required to be prepared for the data gap investigation (DGI). The SAQP will document the methodologies to be employed to assess potential contamination of soil, groundwater and soil vapour underlying the site and is required to be reviewed and endorsed by the Site Auditor prior to implementation of sampling activities. The SAQP will be prepared in a manner that is consistent with the following guidelines made or endorsed by the EPA:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999, Amendment No.1 2013,* National Environment Protection Council (NEPC 2013).
- *Contaminated Sites: Sampling Design Guidelines, September 1995* (EPA 1995).
- *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines, EPA 2020P2233, April 2020, updated 5 May 2020* (EPA 2020).

It is understood that the intrusive investigations will be completed following the demolition of existing site structures in order to facilitate appropriate access to complete the investigations. Upon completion of the intrusive investigations, a DGI report will be prepared for review and approval by the Site Auditor. This RAP will subsequently require revision, review and approval by the appointed Site Auditor prior to implementation in order to ensure the proposed remedial approach is consistent with relevant guidance and is likely to make the site suitable for use.

5. Remediation Options

5.1 Remedial Goals

The goal of the site management/remediation works is to ensure that the following is achieved:

- Prevention of exposure of human populations occupying/working on/using the site to potential contamination on or underlying the site;
- Appropriate management and/or disposal of soil and/or water disturbed during development activities in accordance with in force regulations and relevant EPA guidelines;
- Removal of potential ongoing sources of environmental contamination;
- Validation of site management and remedial works in accordance with the relevant EPA guidelines; and
- Documentation of works as completed is appropriate to demonstrate the suitability of the site for the proposed land use and compliance with applicable legislation, regulations, guidelines and development consent conditions as may apply to the site.

5.2 Guidance Framework

The RAP has been prepared with consideration to the following list of NSW EPA endorsed guidelines:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999, Amendment No.1 2013,* National Environment Protection Council (NEPC 2013).
- *Contaminated Sites: Sampling Design Guidelines, September 1995* (EPA 1995).
- *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines, EPA 2020P2233, April 2020, updated 5 May 2020* (EPA 2020).
- *Contaminated Sites: Guidelines for NSW Site Auditor Scheme*, 3rd edition October 2017 (NSW EPA 2017).
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018).
- *Guidelines for the Assessment and Management of Groundwater Contamination*, DECC March 2007 (DECC 2007).

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:

- *Guidelines for implementing the POEO (Underground Petroleum Storage Systems) Regulation 2019 (December 2020)*.
- *Waste Classification Guidelines, Part 1 - Classifying Waste*. NSW EPA 2014
- *Addendum to the Waste Classification Guidelines (2014)* – Part 1: classifying waste. October 2016. NSW EPA 2016.
- *Waste Classification Guidelines, Part 2 – Immobilising Waste*. NSW EPA 2014
- *Waste Classification Guidelines, Part 3 - Waste Containing Radioactive Material*. NSW EPA 2014
- *Waste Classification Guidelines, Part 4 – Acid Sulfate Soils*. NSW EPA 2014.

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

- *Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017.*

- *Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land* (DUAP 1998).
- *How to safely remove asbestos Code of Practice, Safe Work Australia, July 2020 (SWA 2020)*
- *Code of Practice How to Safely Remove Asbestos, NSW Government,* August 2019 (NSW 2019).

5.3 Regulatory and Planning Requirements

Where a proponent seeks approval for a change of permitted use of the land, either in the form of a rezoning, sub-division or project approval, 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.

5.3.1 Requirements in Relation to Planning Approvals

Under SEPP55 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 an investigation of the land prepared in accordance with the contaminated land planning guidelines. The consent authority may also require the applicant to provide further information if the findings of the preliminary investigation warrant such additional assessment. Further investigations and reports that can be required by the consent authority include a detailed site investigation (DSI) (which is proposed in **Section 4**) and a RAP (i.e. this document).

With regard to classification as Category 1 or 2 works, given the proposed remediation works are considered to be "ancillary to the proposed development works" development consent for the remediation works will be obtained as part of the broader State Significant Development (SSD) and as such are de facto Category 1 works.

5.3.2 Other Requirements

In addition to the requirements of SEPP55 as outlined above, consideration of the regulatory requirements under NSW legislation will also necessary as briefly outlined following:

- *POEO Act (1997)* – All potential discharges from the site during remediation works will require to be maintained below applicable assessment criteria/threshold guidelines during the remediation/development works. This would apply to potential emissions in air, water and discharges to surface and groundwater. Levels of discharges are typically assessed at a site boundary. The acceptance criteria/limits for air, noise, odour and water quality moving beyond the boundaries of the site will be required to be specified in the Remediation Environmental Management Plan (REMP) (**Section 8**). The RAP prepared for the assessment area has provided a process to be followed during the remediation activities and subsequent development works to ensure that the beneficial re-use and importation of materials does not cause site contamination and pollution of groundwater and/or waters by reference to

any applicable criteria as may be used to assess pollution under the POEO Act (including s120).

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. These activities may for this project relate to: the treatment of contaminated soil and/or groundwater, dredging and/or quarrying activities, etc.
The proposed remediation/validation activities are not expected to require a licence given the work will not involve the treatment of contaminated soil originating on-site with the capacity: (i) to incinerate more than 1000 m^3 per year of contaminated soil, or (ii) to treat (otherwise than by incineration) and store more than 30 000 m^3 of contaminated soil, or (iii) disturb an aggregate area of 3 hectares of contaminated soil. In addition, the remediation works will not require the treatment of more than 100 megalitres per year of contaminated water.

- *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 and other waste streams during transport/disposal, the approval of methods associated with the immobilisation of specific waste streams etc. as may be required under this RAP.
- *Work Health and Safety Act 2011* and associated *Regulations* including those related to Asbestos – Where asbestos impacts in soil are identified 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 and appropriate protections implemented with respect to the exposure of site workers and nearby sensitive receptors. In such instances, management requirements are outlined in *Code of Practice How to Safely Remove Asbestos, NSW Government,* August 2019 (NSW 2019). NSW (2019) further defines and refers to competent persons carrying out asbestos assessments and management activities and, therefore, a competent person must carry out such activites where asbestos is identified on site.
- *Waste Classification Guidelines (2014)* - All wastes generated and proposed to be disposed offsite shall be assessed, classified and managed in accordance with this guideline. Where wastes require immobilisation prior to offsite disposal (to reduce waste classifications) an immobilisation approval shall be sought in accordance with Part 2 of this guideline. Immobilisations are only anticipated to be required with unexpected finds that cannot be retained on site and cannot be disposed directly offsite to a licensed facility.
- *City of Sydney (2004) "Contaminated Land Development Control Plan"* - The Council development control plan (DCP) provides a number of environmental and site management provisions required to be employed during remediation works. These have been incorporated into this RAP as minimum standards for the environmental management of remediation works.

5.4 Extent of Remediation and/or Management Required

To date, intrusive investigations have not been completed at the site, 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 RAP) 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.

5.4.1 Soil

To date intrusive investigations have not been conducted at the site, and as such no soil requiring remediation has been identified. **Section 4** does however include requirements for intrusive investigations to close out this datagap and for use in finalising the appropriate management/ remedial scope. Once these investigations are completed, it is anticipated that environmental impacts identified at the site, if any, are considered likely to comprise material (fill material and natural soil) identified as excess to site requirements. This is anticipated to generally comprise piling spoil, trenching spoil associated with foundations and bulk excavation of basements.

For the purposes of this RAP, it has been assumed that soil conditions at the site may require some minor remediation and/or management where disturbed during development activities to ensure the site is suitable upon completion of the development works. The following sections of the RAP have been prepared for this assumption.

5.5 Consideration of Possible 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 material so that the contaminant is either destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated material 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 material 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.

Consideration of each of the approaches (EPA 2017), is presented in **Table 5.1**.

Table 5.1: Remedial Options Screening Matrix

Remedial Option	Applicability	Assessment
1. On-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level.	Any material likely to require management is likely to be surplus material on-site with respect to the proposed development. On this basis, this is not a viable option. These surplus materials will originate from piling spoil, and excavation of fill/natural soils to accommodate basement construction.	Not a viable option.
2. Off-site treatment so that the contaminants are either destroyed or the associated hazards are reduced to an acceptable level, after which the soil is returned to the site.	As above (**Option 1**).	Not a viable option.
3. On-site in-situ management of the material by capping and cover, and ongoing management.	As with **Option 1,** any material likely to require management is likely to be surplus material on-site with respect to the proposed development. On this basis, this is not a viable option.	Not a viable option.
4. Excavation and off-site removal of the impacted material.	For this option material is required to be transported to a facility lawfully able to accept the type of waste and 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). In the unlikely event that material is identified to be impacted such that contaminant concentrations exceed the thresholds for characterisation as GSW, GSW mixed with Special or RSW, material may require to be treated prior to off-site disposal to a lawful facility as discussed above. Social impacts, including high volume truck movements and potential environmental emissions associated with on-site activities and vehicle movements also require consideration in relation to this strategy.	This is the preferred option for all surplus materials or materials acting as on-going source material to groundwater and/or soil vapour impacts.

Should the data gaps investigation (**Section 4**) identify any impacts that require remediation, the remedial options screening matrix in **Table 5.1** will be required to be reviewed. Notwithstanding, it is anticipated that any impacts will be relatively isolated given that the primary on-site historical land-uses (cabinet/furniture making, blacksmith, foundry, leather and boot making and automotive workshops) with the greatest potential to have caused contamination at the site, largely ceased around 1950. It is therefore considered likely that the majority of environmental impacts associated with these historical land-uses would have been removed from the site during the construction of the large commercial buildings currently present in the northern and south-western portions of the site, where multi-level basements are present that extend into bedrock. As such, the data gaps identified in **Section 4** are not considered to affect the successful execution of this RAP.

6. Remediation Plan

A summary of the remedial scope of works is provided in the following sections.

6.1 Data Gap Assessment

In order to refine the finalised remedial scope, a data gap assessment should be completed prior to any remedial works. The details of the required data gaps assessment are provided in **Section 4**.

6.2 Site Establishment

All safety and environmental controls are to be implemented as the first stage of remediation works. These controls will include, but not be limited to:

- Locate and isolate all required underground utilities within the site such that excavation works can safely proceed;
- Assess the potential impacts of the excavation works to neighbouring properties. It is recommended that a suitably qualified engineer be consulted prior to any excavation works, such that appropriate controls (if required) can be implemented;
- Assess need for traffic controls;
- Work area security fencing; and
- Site signage and contact numbers.

6.3 Buildings and Structure Demolition

Existing structures on the site require demolition and removal from the site prior to remedial works. The key processes are briefly summarised below:

- Consult the findings and recommendations of a pre-demolition hazardous materials buildings survey (HMBS) prepared for all structures to be demolished in order to safely and lawfully remove hazardous material previously identified prior to commencement of general demolition activities;
- Removal and disposal of hazardous materials in accordance with relevant regulatory guidance including SWA (2020)[7] and the Waste Classification Guidelines 2014 (EPA 2014);
- Conduct hazardous materials clearances to confirm the successful removal of all hazardous building materials;
- Demolish remainder of buildings/structures and remove redundant infrastructure;
- Beneficial reuse of environmentally validated material onsite (i.e., reuse of crushed recycled concrete) or lawfully remove all materials off-site; and
- Expose underlying soils as required to allow the DSI to address the data gaps summarised in **Section 4** and subsequently facilitate the commencement of construction activities.

6.4 Disturbed/Excavated Material Management Principles

As part of 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 as a result of contaminant characteristics identified during the data gap and/or unexpected find investigation activities. Such material is characterised as having contaminant concentrations in exceedance of site validation criteria

[7] *How to safely remove asbestos Code of Practice*, Safe Work Australia, July 2020 (SWA 2020)

for the proposed landuse, or fill comprising waste, and so will require disposal to a lawful waste facility; or

- required to be removed as part of bulk excavation requirements to achieve site development objectives (ie. basement excavation), that could potentially be beneficially reused on off-site land, but will otherwise require disposal as waste if it could not be reused on site.

Appropriate sampling protocols including the required density of sampling for differing materials types, sampling methodology and documentation requirements will be required for each material type to ensure compliance with NSW EPA Regulations and guidance. Further sampling protocols for these materials is provided in **Section 7.2**.

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. Material for the second category will require management under a material tracking plan appropriate to document the source and final destination, such as off-site re-use properties, for inclusion of such information in the final validation report. In addition, uncontaminated natural soils and bedrock need to be verified as meeting the definition of VENM (which may require additional testing) and an appropriate VENM Certificate is required as part of any proposed off-site beneficial reuse.

The information outlined above is required to be included in the final validation report, so that the Site Auditor can verify that waste and VENM transported off-site has been assessed and disposed / reused appropriately.

6.5 Excavation of Impacted Materials / Generation of Material Excess to Site Requirements

Should the data gaps assessment identify the requirement to remediate environmental impacts, it will likely be required to be undertaken through the controlled excavation of impacted materials. However, depending upon the nature of the impact, different remedial methods may be required and would be documented in an updated revision of this RAP.

The excavation works will be designed to remove source material as potentially causing impacts to the surrounding area. Remediation activities associated with the removal of impacted source materials will include:

- Excavation of the contaminated material to the depth of identified contamination as delineated via visual/olfactory observations by the remediation consultant during remedial works. The excavated material will be required to be stockpiled on plastic sheeting with appropriate environmental controls.
- Excavations are to be validated as per **Section 7.2.1** by the remediation consultant. Should validation fail, the failed wall/s or base of the excavation will be excavated a further 0.3 m in the direction of the failure, or as otherwise indicated by visual/olfactory observations and the validation process repeated until validation is achieved.
- Following validation of the excavation as outlined in **Section 7.2.1**, the excavations generated by the removal of impacted soil will be backfilled, if required, using fill material validated in accordance with **Section 7.2**.
- Stockpiled (impacted) material is to be sampled by the remediation consultant for the purposes of waste classification for off-site disposal to an appropriately licensed facility lawfully able to accept the waste in accordance with EPA (2014).

Natural materials (if present), beyond the excavation footprint may require additional testing to confirm they are uncontaminated and meet the definition of VENM (as per **Section 6.4**), if they are proposed to be taken off-site for beneficial reuse.

Some form of validation is also required of the final basement construction level to characterise the nature of material remaining in-situ beneath the new built forms. This may be undertaken by:

- By sampling across the basement construction level on completion of all bulk excavations works. This should be completed as per **Table 7.3**; or
- Where the basement construction level is terminated in bedrock and the datagap assessment (as described in **Section 4**) has not identified the presence of impacted fill on the site then sampling as per **Table 7.3** may not be necessary. In this case inspection of the final basement construction level may be acceptable to validate the building basement, provided sufficient photographic and survey records are provided.

A decision on which method of the two listed above is to be used to validate the basement should be made on completion of the datagap assessment, as described in **Section 4**.

6.6 Off-site Disposal

Material identified as requiring management/remediation is proposed to be disposed of off-site to a facility lawfully able to receive it. Materials shall be classified in accordance with EPA (2014) requirements or an appropriate exemption as created under the *Protection of the Environment Operations (Waste) Regulation* 2014.

Details of completed additional assessment activities including material characterisation reports will be included in the final validation documentation to be prepared in accordance with the requirements of an area specific 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.

Where material is proposed to be taken off-site for beneficial re-use, the materials must be demonstrated to be compliant with the definition of VENM as presented in the POEO Act 1997 via an appropriate VENM certificate. In addition, a summary of off-site removal activities that includes volumes and the destination of the materials must be provided by the contractor.

6.7 Material Importation

Based on the scope of remedial works described herein, it is not anticipated that there will not be a significant requirement to import materials to establish site levels. However, it is noted that detailed excavations may result in requirements for importation of select materials, potentially including trench backfill aggregate, pavement backfill, growing media, etc, such materials.

Prior to importation of all material, appropriate assessment of such materials must be completed to demonstrate the material is both fit for purpose and suitable from a contamination view point. In accordance with EPA requirements, the extent of assessment will be determined by the type of material proposed to be imported. The following overall principles will require consideration.

Where material proposed to be imported is Virgin Excavated Natural Material (VENM), an assessment must demonstrate that the material is compliant with the definition of VENM as presented in the POEO Act 1997, adopting in the minimum requirements for characterisation of fill material as presented in EPA (1995).

Where material proposed to be imported has been characterised under the Resource Recovery Framework (Order/Exemption), the material must firstly be demonstrated by the supplier as suitable for use in accordance with the requirements of the Order via provision of a statement of compliance. Such materials are anticipated to comprise, but will not necessarily be limited to: excavated natural material – ENM, recycled aggregate, basalt fines compost, mixed organic waste, pasteurised garden organics and recovered fines, with reference to the list of current orders and exemptions on the NSW website required to be reviewed.

In addition to the testing completed by the supplier, given the low frequency of compliance testing required under these Exemptions, the specific material proposed to be imported will require an additional compliance assessment prior to approval to import. The additional assessment is required to ensure that the incoming material does not pose an unacceptable risk to human health and/or environment at the placement site and is therefore suitable for use. It is anticipated that such assessment activities will include visual inspections, representative sampling and laboratory analysis of material to demonstrate the material meets the requirements as outlined in **Table 7.3**.

In summary, the chemical concentrations for materials imported to site under the Resource Recovery Framework (Order/Exemption), must meet the limits specified in the Orders and the site validation criteria outlined in **Section 7.3**.

Material tracking records in addition to the import assessment report are required to be included in the final validation report for the site.

6.8 Validation

Validation of the remedial works will be conducted by the Remediation Consultant to demonstrate the remediation/management objectives have been achieved and to document the final condition of the site at the completion of works such that conclusions may be drawn on the end use suitability of the site for the proposed development. Details of the validation program are provided in **Section 7**.

The remediation consultant is required to be a suitably trained and experienced in site contamination. Noting the potential for ACM at the site, the remediation consultant will also be required to be a competent person or Licenced Asbestos Assessor, in accordance with SafeWork NSW requirements.

6.9 Site Dis-establishment

On completion of the remediation works all plant/equipment and safety/environmental controls shall be removed from the site. Details are provided in the Site Management Plan in **Section 8**.

7. Validation Plan

Data will be required to be collected during remediation/management and developments works to assess the effectiveness of the implemented management actions and document the final condition of the site at the completion of all works such that conclusions may be drawn on the end suitability of the site for the proposed development use. The general principles to be implemented with regard to the validation assessment are discussed in accordance with EPA (2017) requirements in the following sections.

It is anticipated that the validation assessment will be required to address the following broad issues:

- Confirm the site conditions are consistent with those identified during previous site investigation activities as documented herein and characterise identified data gaps identified in preparation of this RAP via implementation of the assessment as discussed in **Section 4**;
- Removal of any contaminated material and/or contamination sources as may be identified during the data gap assessment;
- Verification that uncapped / accessible soils (including imported filling and growing media), if any, are suitable for the proposed use;
- Characterisation and off-site disposal and/or beneficial use of materials excess to development requirements;
- Characterisation of material required to be imported to achieve development objectives, potentially including subgrade material, trench aggregate, growing media, etc to demonstrate its suitability for use at the site; and
- Assessment and close out of any Unexpected Finds assessments that may include ACM, USTs, groundwater and / or soil vapour contamination.

It is noted that the validation approach described in the subsequent sections applies only to soil, but will be updated to include groundwater and soil vapour (as required) based on the outcomes of the DGI (**Section 4**).

7.1 Data Quality Objectives

Data quality objectives (DQOs) have been developed for the validation assessment, as discussed in the following sections.

7.1.1 State the Problem

The site, which is located within the Sydney CBD and has been used for commercial or industrial uses since at least the 1880s, is proposed to be redeveloped for mixed use that will include hotel, residential (i.e. apartments), commercial and retail uses. A previous investigation documented in JBS&G (2021) has not included environmental sampling but have identified that some potential site contamination issues exist and which would require a final validation assessment to confirm the suitability of the site for the proposed use as required under the NSW planning framework.

As such, during remediation activities, sufficient validation of site activities is required to demonstrate that the identified health-based risks (if any) to site users have been adequately managed to render the site suitable for the proposed land use.

7.1.2 Identify the Decision

The following decisions are required to be made during the validation works:

- Are there any unacceptable risks to future on-site receptors from any residual contamination following the implementation of the proposed in-ground development works at the site?
- Have all aesthetic issues been addressed?
- Has the potential for migration of contaminants from the site been appropriately addressed?
- Have the Site remediation activities been undertaken in compliance with the regulatory requirements set by the EPA, WorkSafe NSW, local government and other agencies?
- Were the impacted/surplus materials appropriately classified and disposed off-site to a facility licensed to accept the classified waste, or details of off-site properties that accepted materials for beneficial re-used off-site, had development approval for accepting the materials?
- Has all material imported to site to achieve development objectives been demonstrated as suitable for use?
- Have Site works been completed in accordance with the RAP requirements, or where variations to the works required by the RAP have occurred, have these been appropriate to meet the objectives of the RAP, with respect to site validation?
- Is the site suitable for the proposed land use?

During the remediation/management activities, sufficient validation of Site activities is required to demonstrate that the identified risks to human health and environment based on the future use(s) of the Site have been adequately managed to render the Site suitable for the proposed land use.

7.1.3 Identify Inputs to the Decision

The inputs to the decisions are:

- Previous investigation results including the data gaps assessment (**Section 4**) to be completed prior to the remediation works;
- Any applicable development consent requirements;
- Field observations in relation to inspection of all excavation bases, walls and stockpiles for odours, sheen, discolouration, and other indicators of potential contamination;
- Environmental data as collected from the validation of remedial excavations (if required);
- Waste classification and material characterisation data obtained during assessment of surplus material prior to off-site disposal;
- Disposal dockets and relevant documents in relation to appropriate disposal of material to be removed from site as part of the remediation works (landfill dockets, beneficial reuse / recycling dockets, trade waste disposal, etc.);
- Material characterisation data (including field observations, sampling and analytical data) obtained during assessment of material proposed to be imported to the site;
- Relevant guideline criteria for validation and waste classification as well as the concentration limits of applicable resource recovery exemptions / orders for material imported to site; and
- Data quality indicators (DQIs) as assessed by quality assurance / quality control (QA/QC).

Specifically, sufficient data needs to be collected from each of the identified potentially impacted media (e.g. fill material and natural soils) across the Site for associated COPC (**Section 3.1**).

7.1.4 Define the Study Boundaries

The validation study boundaries are restricted to the lateral extent of the approved development works, comprising the site as shown on **Figure 1**. The vertical extent of the validation study is anticipated to be restricted to soils/bedrock extending to the maximum depth of disturbance as part of basement construction.

Due to the nature of potential contaminants identified, temporal variables will not be assessed as part of this investigation. The temporal boundaries of this investigation will be limited to the period of field validation assessment works.

7.1.5 Develop a Decision Rule

The decision rules adopted to answer the decisions identified in **Section 7.1.2** are discussed below.

Table 7.1: Summary of Decision Rules

Decision Required to be Made	Decision Rule
1. Are there any unacceptable risks to future on-site receptors from any residual contamination following the remediation of contaminated materials on-site?	Environmental analytical data will be compared against EPA endorsed criteria established as validation criteria. For the validation sample sets, statistical analysis of the data will be undertaken in accordance with relevant guidance documents, as appropriate, to facilitate the decisions. The following statistical criteria will be adopted: Either: the reported concentrations will be all below the site criteria; Or: the average site concentration for each analyte will be below the adopted HILs / HSLs criterion; no single analyte concentration exceeded 250% of the adopted site criterion; and the standard deviation of the results will be less than 50% of the site criteria. And: the 95% UCL of the average concentration for each analyte will be below the adopted site criteria. If the statistical criteria stated above is satisfied, the answer to the decision will be No. If the statistical criteria are not satisfied, the answer to the decision will be Yes.
2. Are there any aesthetic issues remaining following remediation works?	If there are any remaining unacceptable inclusions or soil discolouration, odours, or petroleum hydrocarbon concentrations in excess of the management limits, the answer to the decision will be Yes. Otherwise, the answer to the decision will be No.
3. Is there any evidence of, or potential for, migration of contaminants from the site?	Based on the data gap assessment results, was there any evidence of, or the potential for, contaminant to migrate from the site via groundwater or soil vapour? If yes, the answer to the decisions is Yes. Otherwise, the answer to the decision is No.
4. Are there any outstanding regulatory compliance issues associated with Site remediation activities?	Qualitative assessment of the works in relation to EPA, WorkSafe NSW, Department of Planning, etc. approvals will be undertaken during and following the completion of remediation/management activities. If there are any outstanding requirements with respect to the regulatory approvals, the answer to the decision will be Yes. Otherwise, the answer to the decision will be No.

Decision Required to be Made	Decision Rule
5. Was all material required to be removed from site classified and disposed of off-site to a facility lawfully able to accept the classified waste or materials for beneficial re-use?	Soil analytical data will be compared against EPA (2014) criteria for materials disposed off-site to landfill. In addition, analytical data and observations of natural materials removed from the site for beneficia re-use will be required to confirm that the materials are consistent with VENM as defined in the POEO Act 1997. Statistical analysis of the data in accordance with relevant guidance documents will be undertaken, where appropriate, to facilitate the decisions (as detailed above). Documentation from the operation receiving the material including the dates, tonnage and classification of the accepted material will be required to facilitate the decision. If the statistical criteria stated above are satisfied, the decision is Yes, and if receipts are provided recording the disposal/beneficial re-use of material to an off-site licensed facility, or transported to a property (for beneficial re-use of materials only), the decision is Yes. If the material fail the criteria, and no disposal receipts/materials tracking information is provided, the answer is No.
6. Where material is imported to site for development purposes are there any outstanding issues identified in relation to documentation of the material's suitability for use?	Analytical data sets and inspection data will be reviewed for each proposed material type/source against established definitions for acceptable material (ie. VENM, resource recovery exemptions, etc) and EPA endorsed criteria as established in the RAP as validation criteria. If the complete data set for the applicable material meet the requirements relevant to the material type, the answer to the decision is No and material may be imported to site. If the data set exceeds the adopted criterion, the answer to the decision is Yes and the material cannot be imported to site for use in development activities.
7. Have remedial works met requirements of the RAP?	Were any of the answers to Question 1 to 6 Yes, the answer to the decision is No. Further assessment is required to establish the nature and extent of additional remediation/management as may be required. If the RAP requirements were addressed, and there are no outstanding issues, the answer to the decision is Yes.
8. Is the Site considered suitable for the proposed use?	If there are outstanding issues from Questions 1-6? If yes, can be the outstanding issues appropriately addressed by further assessment/remediation/management or implementation of an EMP? If the issues have been appropriately addressed, the answer to the decision is Yes, potentially subject to ongoing implementation of the EMP. Otherwise, the decision is No and the requirements for further remediation of the Site and/or implementation of additional management measures are required to be documented such that the answer to the decision can be Yes.

7.1.6 Specify Limits of Decision Error

This step is to establish the decision maker's tolerable limits on decision errors, which are used to establish performance goals for limiting uncertainty in the data. Data generated during this project must be appropriate to allow decisions to be made with confidence.

Specific limits for this project have been adopted in accordance with the appropriate guidance from the NSW EPA, NEPC (2013), appropriate indicators of data quality (DQIs used to assess quality assurance / quality control) and standard JBS&G procedures for field sampling and handling.

To assess the usability of the data prior to making decisions, the data will be assessed against pre-determined DQIs for to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters). The acceptable limit on decision error is 95% compliance with DQIs.

The pre-determined DQIs established for the project are discussed below in relation to the PARCC parameters, and are shown in **Table 7.2**.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD[8]) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** –expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; and ensuring analysing laboratories use consistent analysis techniques; and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

[8] $$RPD(\%) = \frac{|C_o - C_d|}{C_o + C_d} \times 200$$

Where C0 is the analyte concentration of the original sample
Cd is the analyte concentration of the duplicate sample

Table 7.2: Summary of Data Quality Indicators

Data Quality Indicators	Frequency	Data Quality Criteria
Precision		
Split duplicates (intra laboratory)	1 / 20 samples	<30% RPD[1]
Blind duplicates (inter laboratory)	1 / 20 samples	<30% RPD[1]
Laboratory Duplicates	1 / 20 samples	<30% RPD[1]
Accuracy		
Surrogate spikes	All organic samples	70-130%[2]
Laboratory control samples	1 per lab batch	70-130%[2]
Matrix spikes	1 per lab batch	70-130%[2]
Representativeness		
Sampling appropriate for media and analytes	All samples	-[2]
Samples extracted and analysed within holding times.	All samples	Soil: organics (14 days), inorganics (6 months) Water: organics (7 days to extract and 14 days to analyses). Metals (6 months)
Laboratory Blanks	1 per lab batch	<Limit of reporting (LOR)
Trip spike	1 per lab batch	70-130% recovery
Storage blank	1 per lab batch	<LOR
Rinsate sample	1 per sampling event/media	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All Samples
Standard analytical methods used for all analyses	All Samples extracted and analysed within holding times	NATA accreditation
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples[2]
Limits of reporting appropriate and consistent	All Samples extracted and analysed within holding times	All samples[2]
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples[3]
Appropriate documentation	All Samples	All samples[3]
Satisfactory frequency and result for QC samples		95% compliance
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted Site assessment criteria	All samples	LOR is greater than the Site assessment criteria

(1) If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgment will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

(2) The recoveries specified will be used for initial screening when evaluating the accuracy of the dataset. Where the reported recoveries are outside these nominated ranges, reference will be made to the recovery limits specified by the analytical laboratory for the applicable compounds as held under their NATA accreditation.

(3) A qualitative assessment of compliance with standard procedures and appropriate sample collection methods will be completed during the DQI compliance assessment.

7.1.7 Optimise the Design for Obtaining Data

The purpose of this step is to identify a resource-effective field validation sampling design that generates data that are expected to satisfy the decision performance criteria, as specified in the preceding steps of the DQO process. The output of this step is the sampling design that will guide development of the field sampling and analysis plan. This step provides a general description of the activities necessary to generate and select data collection designs that satisfy decision performance criteria.

The remediation validation and subsequent laboratory analysis program as outlined in the following sections will need to be implemented during site remediation activities to demonstrate the successful completion of works in compliance with the RAP goals. The validation / characterisation sampling and analytical program for the site is outlined in **Table 7.3** in **Section 7.2** below.

7.2 Validation Inspections and Sampling

The validation inspections, sampling and analysis required for remediation of potential soil impacts arising from the data gaps assessment are summarised in **Table 7.3** and detailed in the following sections.

Table 7.3: Validation Sampling Plan

Item	RAP Sampling Frequency			Analytical Suite
Potential Source Removal Remedial Excavation				
	Excavation Floors	Excavation Walls	Materials	
Excavations formed by the removal of impacted materials and/or at the final basement construction level	1 / 100 m^2 (10 m grid)	1 / 10 m (from each distinct horizon / material type / 1 m vertical soil profile)	N/A	Informed by the PSI and the nature of the contamination (if present) identified in the DGI or an unexpected find. The PSI identified the following COPCs in soils: TRH/BTEX PAHs Heavy Metals OCP/PCBs VOCs PFAS Asbestos (500 ml)
Site Validation				
	Excavation Floors	Excavation Walls	Materials	
Final basement construction level terminated in soil (once completion of all bulk excavation works have been completed across the site), or if data gap investigations indicate contaminants have the potential to impact underlying bedrock	1 / 100 m^2 (10 m grid)	N/A	N/A	Informed by the PSI and the nature of the contamination (if present) identified in the DGI or an unexpected find. The PSI identified the following COPCs in soils: TRH/BTEX PAHs Heavy Metals OCP/PCBs VOCs PFAS Asbestos (500 ml)
Materials Importation				
Imported VENM	Minimum of 3 samples per source site. In addition, an assessment must demonstrate that the material is compliant with the definition of VENM as presented in the POEO Act 1997.			Minimum suite: TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (500 ml) + any site specific COPCs identified in the desktop review of the source site.
Quarry VENM Materials (e.g. blue metal, sandstone, shale)	Confirmation that the material is quarried rock (VENM) prior to importation, and visual confirmation.			Site Inspection required.
Material subject to a NSW EPA Resource Recovery Order/Exemption	Confirmation by the supplier that the material meets the terms of the order. Then Remediation Consultant will subsequently sample the materials at a density of 1/25 m^3 (with a minimum of 3 samples per stockpile) to a maximum stockpile volume 200 m^3 as consistent with the Table 4 of Schedule 2 from NEPC (2013) to confirm on-site suitability.			TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos (500 ml)

Item	RAP Sampling Frequency	Analytical Suite
Export of Materials		
Surplus materials for off-site disposal are to be classified in accordance with NSW EPA (2014)	Stockpiled materials for off-site disposal require a sampling density of 1/25 m^3 (with a minimum of 3 samples per stockpile) to a maximum stockpile volume 200 m^3 as consistent with the Table 4 of Schedule 2 from NEPC (2013). Consistent with Section 7.5.2 of NEPC (2013), in-situ samples taken prior to excavation may be helpful for informing the decision on the number of samples required for adequate characterisation of stockpiles. As such, this sampling density may require revision following the results of the DGI.	TRH/BTEX PAH Heavy Metals OCP/PCBs Asbestos + any COPCs identified from the PSI and the nature of the contamination (if present) identified in the DGI or an unexpected find.
Surplus natural and uncontaminated materials for off-site beneficial re-use	Not required for VENM bedrock where the data gap assessment or the results of validation sampling (e.g. during the removal of impacted materials as detailed in **Section 6.**5) indicates low potential for impact to bedrock and an appropriate certificate has demonstrated the materials meet the definition of VENM as defined in the POEO Act 1997.	Informed by the PSI and the nature of the contamination (if present) identified in the DGI or an unexpected find.

Notes: 1) The sampling density proposed for assessment of stockpiles is derived from Table 4 of Schedule 2 from NEPC (2013).

7.2.1 Impacted Material Removal

The validation program for the removal of impacted materials (should they be identified in the data gaps assessment as described in **Section 4**) comprises:

- Inspection of the excavated areas by a suitably trained and experienced remediation consultant to confirm the extent of potentially impacted materials have been removed. If additional potentially impacted material is identified, further excavation will be conducted (under the supervision of the remediation consultant) and the affected area will be re-inspected until such time as visual and olfactory validation is obtained (to ensure no aesthetic impacts remain).
- Following visual and olfactory validation, soil samples (to demonstrate appropriate source removal as related to soil and/or groundwater impacts) will be collected from the remediation area walls at a rate of 1 sample per 10 linear m (and vertically every 1 m in the excavation walls or at each distinct profile or potentially contaminated layer), and from the excavation bases at a rate of 1 sample per 100 m^2;
- Excavation validation samples will be analysed at a laboratory NATA accredited for the required analyses that will be informed by the results of the PSI (JBS&G 2021), the DSI and/or nature of the impact identified as part of an unexpected find. If the concentration of COPCs are identified in any of the excavation validation samples exceeding criteria (including management limits for petroleum hydrocarbon impacts as applicable to potential aesthetic issues), then the soils will be excavated 0.3 m further in the direction of failure and the validation process repeated. Alternatively, where impact exceeding criteria is not identified by the laboratory, the remedial areas will be deemed to have been successfully remediated and validated;
- Excavated soils shall be stockpiled and the materials will be required to be classified in accordance with NSW EPA (2014) and disposed off-site to a facility legally able to accept the waste. Material classified as VENM may be beneficially re-used off-site subject to the provision of appropriate certification in accordance with **Section 6.4**.

During the excavation of impacted materials (including fill), the remediation consultant is required to be on-site to segregate potentially contaminated soil from uncontaminated natural soils during excavation – to support tracking of material and waste minimisation.

7.2.2 Soil Sampling Methodology

The soil sampling method shall be determined by the Remediation Consultant as consistent with the observations of the site sub-surface and appropriate to generate representative samples. The soil sampling method shall be consistent with the data quality indicators in **Section 7.1.6**.

Where sample locations are placed by boreholes, undisturbed samples as collected by push tube or SPT sampler, are preferred if able to be effectively implemented. Otherwise samples may be recovered from solid flight augers, via test pitting or direct sampling of stockpiles as per below. Re-usable equipment shall require to be decontaminated (with PFAS and phosphate free detergents) between sampling locations.

Samples of near surface material shall be collected by appropriately trained and experienced personnel by the use of a stainless steel hand trowel or via grab samples. Where used, a hand trowel will be thoroughly decontaminated using PFAS and phosphate free detergent and distilled water before each sample is collected. Where deeper soil samples are required from excavation walls or floor as well as stockpiled soils, the material shall be retrieved using an excavator. Samples of the retrieved material shall be collected from the centre of the excavator bucket ensuring that no part of the sample has contacted the sides of the excavator bucket. Stockpiles will be appropriately characterised by sampling across the lateral extent (i.e. grid) and through (i.e. at depth) the stockpile. PFAS free nitrile gloves will be used during sample collection.

Sufficient sample material will be collected to allow both field and laboratory analyses. Additional samples will be collected from any soil horizons which exhibit staining, odours, or other physical evidence of potential contamination.

During the collection of soil samples, features such as seepage, discolouration, staining, odours and other indications of contamination will be noted on the field documentation. Collected soil samples will be immediately transferred to laboratory supplied sample jars or bags that are Teflon and PFAS free when samples are being collected for PFAS analysis. The sample containers will be transferred to a chilled esky for sample preservation prior to and during shipment to the testing laboratory. A chain-of-custody form will be completed and forwarded with the samples to the testing laboratory.

7.2.3 Laboratory Analyses

Laboratory methods and LOR as summarised in **Table 7.4** are proposed to be adopted for analysis of soil samples collected during remediation/validation activities. All laboratories are required to be National Association of Testing Authorities (NATA) registered for the relevant analyses. Appropriate methods and LORs are required for comparison to relevant criteria noting that the LORs presented in **Table 7.4** are less than validation criteria.

Table 7.4: Soil Laboratory Analysis Methods (all units in mg/kg unless stated)

Analyte	Limit of Reporting	Laboratory Method
METALS		
Arsenic	4.0	ICP-AES (USEPA 200.7)
Cadmium	1.0	ICP-AES (USEPA 200.7)
Chromium (total)	1.0	ICP-AES (USEPA 200.7)
Chromium (VI)	1.0	Alkali leach colorimetric (APHA3500-Cr/USEAP3060A)
Copper	1.0	ICP-AES (USEPA 200.7)
Lead	1.0	ICP-AES (USEPA 200.7)
Nickel	1.0	ICP-AES (USEPA 200.7)
Zinc	1.0	ICP-AES (USEPA 200.7)
Mercury (inorganic)	0.05	ICP-AES (USEPA 200.7)
TRH		
F1 C_6-C_{10}	10	Purge Trap-GCMS (USEPA8260)
F2 >C_{10}-C_{16}	50	Purge Trap-GCFID (USEPA8000)
F3 >C_{16}-C_{34}	100	Purge Trap-GCFID (USEPA8000)
F4 >C_{34}-C_{40}	100	Purge Trap-GCFID (USEPA8000)

Analyte	Limit of Reporting	Laboratory Method
BTEX		
Benzene	1.0	Purge Trap-GCMS (USEPA8260)
Toluene	1.0	Purge Trap-GCMS (USEPA8260)
Ethylbenzene	1.0	Purge Trap-GCMS (USEPA8260)
Total Xylenes	3.0	Purge Trap-GCMS (USEPA8260)
PAH		
Benzo(a)pyrene as TEQ	0.5	GCMS (USEPA8270)
Total PAHs	0.5	GCMS (USEPA8270)
PCBs		
PCBs (total)	0.9	GCECD (USEPA8140,8080)
OCP/OPP		
Aldrin + Dieldrin	0.2	GCECD (USEPA8140,8080)
Chlordane	0.1	GCECD (USEPA8140,8080)
DDT + DDD + DDE	0.3	GCECD (USEPA8140,8080)
Heptachlor	0.1	GCECD (USEPA8140,8080)
PHENOLS		
Total Phenols	5	Distillation-Colorimetric (APHA 5530)
VOC		
PCE	1.0	Purge Trap-GCMS (USEPA8260)
TCE	1.0	Purge Trap-GCMS (USEPA8260)
Cis 1,2 DCE	1.0	Purge Trap-GCMS (USEPA8260)
Trans 1,2 DCE	1.0	Purge Trap-GCMS (USEPA8260)
VC	1.0	Purge Trap-GCMS (USEPA8260)
OTHER		
Asbestos	Presence/0.1 g/kg	PLM / Dispersion Staining as per AS4964:2004
Soil pH	0.1	5:1 leach

7.3 Validation Criteria

7.3.1 Soil

The site is to be used for commercial and residential purposes and is required to be validated as suitable for high density residential and commercial industrial land use, pursuant to the NEPC (2013). As such, health-based criteria for residential land use with Minimal Access to soil (HIL-B) and Commercial/Industrial (HIL-D) land use will be adopted for remedial excavation / site validation. The criteria are based on NSW EPA endorsed investigation levels which, while being used as clean-up levels instead of site-specific criteria derived through a process of risk assessment, are considered adequately conservative for the purposes of characterising and validating the site.

Decisions with respect to criteria have been developed based on the proposed end uses as follows:

- Health based Investigation Levels (HILs) for Residential – Minimal Opportunities for Soil Access – NEPC 2013, HIL B;
- HILs for commercial/industrial land use - HIL-D;
- HSL for petroleum hydrocarbons considering potential for vapour intrusion, coarse grained soil for residential with minimal opportunities for soil access and commercial/industrial land use at 0.0-1.0 m depth. It is noted that the HSLs are for petroleum hydrocarbon handling sites and may not be appropriate for other sources of hydrocarbons (e.g. pure petroleum hydrocarbon solvents);
- As a conservative measure, generic and site specific EILs derived through the added contaminant limits for residential with minimal opportunities for soil access land use;
- Management Limits for TRH, coarse grained soils for residential with minimal opportunities for soil access and commercial/industrial land use;
- ESLs for TRH fractions, BTEX and benzo(a)pyrene in coarse grained soil for residential with minimal opportunities for soil access and commercial/industrial land use; and

- Where there are no NSW EPA endorsed thresholds the laboratory LOR has been adopted as an initial screening value for the purposes of this assessment.

Given the adopted validation criteria will in some instances be dependent upon soil texture and depth below final ground level, final site validation criteria will only be defined at the time of data evaluation.

Where a valid statistical data set can be generated, based on the assessment of the soils within the site (i.e, samples collected on a systematic (e.g. grid or random) pattern) and based on the potential exposure scenarios, the following statistical criteria may be applied:

Either:

- all contaminant concentrations were less than the adopted site assessment criteria,

Or:

- The 95 % upper confidence limit (UCL) average concentrations shall be below the soil criteria;
- The standard deviation of the generated data set shall be below 50 % of the soil criteria; and
- The maximum concentration shall be below 250 % of the soil criteria.

Existing data for chemical constituents (not asbestos) from materials remaining at the Site shall also be included in analytical data sets created for the soils.

In the event of accessible soils, further consideration is also required to the following, observations will also supplement the validation process:

- There shall be no visible asbestos in addition to laboratory analyses results; and
- Soils shall not emit recognisable odours, be discoloured as a result of contamination and/or have any significant additional aesthetic concerns with respect to future site users.

7.4 Validation Reporting

At the completion of the remedial works, a validation report will be prepared in general accordance with the *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines* (EPA 2020), documenting the works as completed. The report will contain information including:

- Update relevant portions of the site description and CSM as prepared in this RAP to the condition of the validation assessment footprint at the time of the validation assessment;
- Present all sampling field notes and laboratory data including calibration certificates for field monitoring equipment, environmental monitoring etc.;
- Undertake an assessment of QA/QC of analytical data generated by the works and identify data that is reliable for use in characterising the applicable portion of the site;
- Sort data into data sets as required by the decision rules;
- Assess whether sufficient data has been obtained to meet required limits on decision error;
- Undertake assessment to the decision rules and identify any environmental data which causes decision rules to be failed;
- Provide a summary of waste disposal/off-site removal activities and volumes of material removed from the Site including supply of all waste disposal dockets confirming final waste disposal/landfill destination as well as VENM certificates and detail beneficial re-use destination;

- Provide a summary of material importation activities (general fill soil/crushed rock, growing media, earthworks aggregates, drainage backfill etc), including material source, type, assessment of suitability, approximate quantities, date of importation and final placement location;
- Details of the remediation works conducted including details of any unexpected finds and how they were managed/addressed;
- Information demonstrating that the objectives of the RAP have been achieved, in particular the validation sample results and assessment of the data against both the pre-defined data quality objectives and the remediation acceptance (validation) criteria;
- Information demonstrating compliance with appropriate regulations and guidelines;
- Document any variations to the strategy undertaken during the implementation of the remedial works;
- Details of any environmental incidents occurring during the course of the remedial works and the actions undertaken in response to these incidents;
- Other information as appropriate, including requirements (if any) for ongoing monitoring / management; and
- Provide a comment on the suitability of the site for the proposed use and requirements for any ongoing monitoring/management (where applicable).

The report will serve to document the remediation works for future reference.

7.5 Contingency Plan

Given the development history of the site and that the existing assessment data does have a number of identified data gaps, consideration has been given to the potential for additional small scale issues that may arise during works (from a contamination viewpoint). Contingency plans for a range of potential identified scenarios are discussed following to ensure firstly the safety and health of people and the environment and secondly that the overall project objectives are achieved.

7.5.1 Groundwater Dewatering

In the event that groundwater is encountered during redevelopment works and require dewatering, a dewatering license shall be obtained in accordance with the *Water Management Act 2000*. The license must be obtained prior to the installation of the dewatering system. The license application must be submitted to the WaterNSW, and a Dewatering Management Plan should be included as part of the submitted licence application.

It is noted that excavation dewater may require treatment prior to disposal, potentially including pH correction, sediment concentrations and potentially chemical contaminants. Procedures for treatment and validation of water will be documented in the Dewatering Management Plan. Sampling and analysis to assess potential groundwater management during (and potentially following) dewatering should be informed by the results of the PSI and DGI.

In accordance with the Council development controls[9], no wastewater, chemicals or other substances harmful to the environment shall be permitted to discharge to Council's stormwater system. Only clean, unpolluted water is permitted for discharge. Wastewaters not suitable for discharge to stormwater must be the subject of on-site treatment to address contaminant concentrations prior to stormwater disposal, disposed of using a licensed liquid waste contractor or alternatively directed to the sewer of the Sydney Water Corporation (SWC) under a Trade Waste

[9] City of Sydney, (2004) 'Contaminated Land Development Control Plan'.

Agreement (TWA). The pre-treatment of wastewater may be a requirement of SWC prior to discharge.

7.5.2 Excavation Validation Failure

In the unforeseen event that the proposed remediation works do not meet the validation criteria, or if the selected remedial strategy is unsuccessful, the following actions will be considered to ensure firstly the safety and health of people and the environment and secondly that the overall project objectives are achieved:

- Continued controlled excavation and off-site disposal or treatment until validation is achieved; and
- Reassessment of remedial options for excavated materials, including:
- Alternate on-site treatment options; and/or
- Onsite containment.

7.5.3 Groundwater and / or Soil Vapour Contamination

In the unforeseen event that site impacts are causing contamination to groundwater that has the potential for off-site migration and/or if groundwater or soil vapours represent a risk to future on and/or off-site receptors, it is anticipated that the impacts will be relatively isolated and could be appropriately managed through the controlled excavation and off-site disposal of impacted soil materials acting as source material. The resulting remedial excavations will be required to be validated by the remediation consultant in accordance with **Section 7.2**. Should groundwater and/or soil vapour impacts be more widespread and not able to be managed though source material removal, then the remedial options screening matrix in **Table 5.1** as well as the validation of remediation works will be required to be reviewed and a revision of this RAP will be required.

7.6 Unexpected Finds Protocol (UFP)

A DGI (**Section 4**) is proposed to characterise potential contamination of soil, groundwater and soil vapour underlying the site prior to any remediation works being implemented. However, ground conditions between sampling points may vary, and further hazards may arise from unexpected sources and / or in unexpected locations during bulk excavation works of the basement and/or remediation. The nature of any residual hazards which may be present at the site are generally detectable through visual or olfactory means, for example:

- The presence of significant aggregates of friable asbestos materials (visible) as ACM and or AF/FA impacted material;
- Bottles / containers of chemicals (visible);
- Ash and/or slag and/or tar contaminated soils / fill materials (visible);
- Drums, waste pits, former pipework or unrecorded USTs (visible); and
- Volatile organic compound (VOC) contaminated soils (odorous) and vapours.

As a precautionary measure to ensure the protection of the workforce and surrounding community, should any of the abovementioned substances be identified (or any other unexpected potentially hazardous substance), the procedure summarised in **Flowchart 7.1** is to be followed.

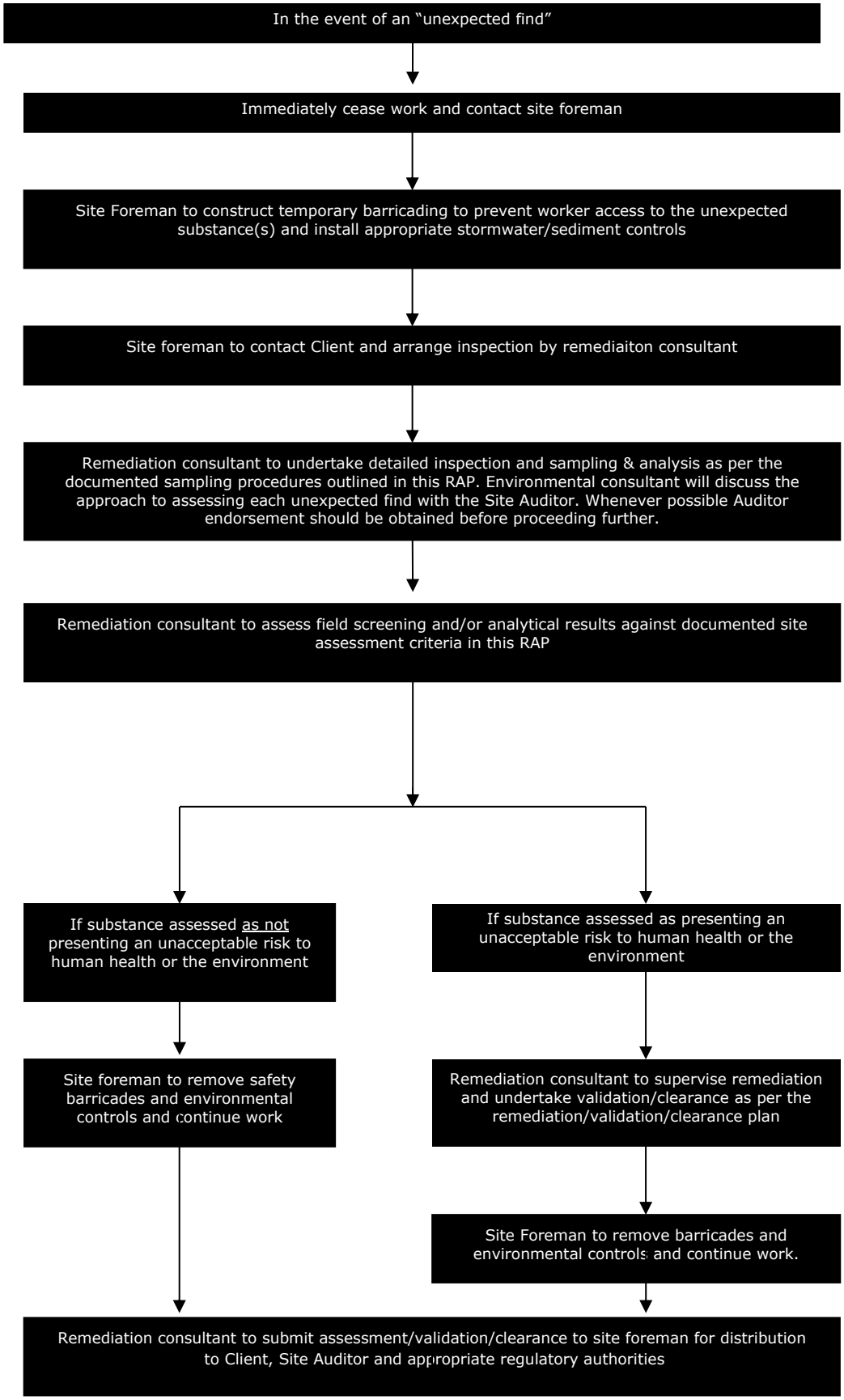
An enlarged version of the unexpected finds protocol, suitable for use on-site, should be posted in the site office and referred to during the site specific induction by the remedial / principal contractor.

The sampling strategy for each “unexpected find” shall be designed by the remediation consultant. The strategy will, however, be aimed at determining the nature of the substance – that is, is it

hazardous and, if so, is it at concentrations which pose an unacceptable risk to human health or the environment. The remediation consultant will discuss the approach to assessing each unexpected find with the Site Auditor. Whenever possible, Site Auditor endorsement should be obtained prior to remedial and assessment works.

The sampling frequency of the identified substance/materials shall meet the minimum requirements outlined in EPA (1995) in addition to those outlined in **Section 7.2**. In the event of an Unexpected Find, it is anticipated that the suitability of the implemented characterisation assessment and the proposed validation strategy be discussed with the site auditor prior to finalisation of the Unexpected Find works.

Flowchart 7.1 – Unexpected Finds Protocol



8. Site Management Plan

This section contains procedures and requirements that are to be implemented as a minimum requirement during the remedial works at the site. Please note that the procedures outlined in the following sections may require to be updated to reflect any future conditions of consent for the development.

8.1 Hours of Operation

It is understood that the hours of operation for remedial works will be conducted in accordance with the recommended site hours suggested by the EPA[10], however hours may vary from typical hours of operation and consistent with any future conditions of consent.

Typical hours of operation for remedial works are:

- Monday to Friday: 7am to 6pm.
- Saturday: 8 am to 1 pm.
- Sunday and public holidays: No work permitted.

8.2 Preparation of a Remediation Environmental Management Plan

Prior to commencement of any ground disturbance works, a site specific REMP shall be prepared by the Remediation Contractor, which documents the environmental monitoring and management measures required to be implemented during the remediation and construction related activities associated with the construction of development. The Contractor is required to have the REMP reviewed and endorsed as acceptable by the Remediation Consultant and the Site Auditor prior to the commencement of remediation works.

The REMP shall address each of the nominated items in **Section 8.2.1** and shall include the Contingency Plan, referred to in **Section 7.5**, above.

8.2.1 Required Elements

An assessment of the proposed activities and the associated elements required to be incorporated into the REMP is provided in **Table 8.1**. The REMP is required to address each of the required elements and procedures in full detail and to include detailed monitoring processes and procedures, corrective actions and reporting requirements. **Table 8.1** below has been developed with consideration of City of Sydney (2004) 'Contaminated Land Development Control Plan'. Following receipt of the Development Consent, any additional terms and conditions not discussed below should be incorporated in the REMP. In addition, any items listed within **Table 8.1** will require further consideration to reflect the outcomes of the proposed DGI as well as relevant legislation/guidance when preparing the REMP.

Table 8.1 Required Elements of the REMP

Element	Specific Minimum Requirements to be included in REMP
1. Dust and Airborne Hazard Control	Asbestos air monitoring (as required) Provisions for dust control based on monitoring results In accordance with DA conditions Overall, the control measures, monitoring requirements and acceptance limits / criteria to be met to prevent potential adverse impacts to the health and safety of surrounding human and ecological receptors.
2. Visual Impacts	Visual monitoring at site boundary Specific colour requirements for various controls/measures, including PPE, signage etc.
3. Emergency Response	As appropriate

[10] *Interim Construction Noise Guideline.* Department of Environment & Climate Change NSW. DECC 2009/265. July 2009.

Element	Specific Minimum Requirements to be included in REMP
	Procedures required for spill incident response including material storage breach and potential unexpected finds (as applicable)
4. Noise Control	Hours of operation, consistent with the consent conditions Boundary monitoring at commencement of work site activities with potential for environmental noise emissions Potential noise monitoring at nearest receptors Procedures for control and management of noise emissions, as appropriate (e.g., restricted hours) In accordance with DA conditions, all works must be carried out in accordance with the appropriate Demolition/Construction management plan documentation prepared at Consent Stage. Reference should be made to DA conditions with regards to control measures, noise criteria, hours during which noisy works can occur and Council/Community liaison requirements Overall, the control measures, monitoring requirements and acceptance limits / criteria to be met to prevent potential adverse impacts to the health and safety of surrounding human and ecological receptors.
5. Traffic	Controls on vehicle movements on public roads Reference should be made to Consent Condition requirements including loads covering and vehicle cleaning requirements
6. Protection of Adjoining Structures	As appropriate and in accordance with any DA conditions (where relevant)
7. Odour Control	Enclosure of all potential odour generating activities (i.e., excavation of petroleum hydrocarbon contaminated soils) with appropriate odour controls incorporating safeguards and monitoring Daily monitoring of odour levels at boundary during handling of malodorous materials. Procedures for addressing elevated odour monitoring results, including, but not limited to: reduction in earthworks activities within odorous material areas during adverse meteorological conditions; application of odour masking solutions at the odour source or between identified source(s) and receptor(s); review of stockpiling measures and covering identified potential odour sources by hydromulching or with less odorous materials Overall, the control measures, monitoring requirements and acceptance limits / criteria to be met to prevent potential adverse impacts to the health and safety of surrounding human and ecological receptors.
8. Handling of Contaminated Soil and Sediment and Water	Soil and water management (stockpiling, site access, excavation pump out, reinstatement). Reference should be made to DA conditions. No wastewaters, chemicals or other substances harmful to the environment shall be permitted to be discharged to the environment or the stormwater system. Only unpolluted water is permitted to discharge from the site
9. Soil Storage/Placement Areas	Soil and water management (stockpiling, site access, excavation pump out, reinstatement) Bunding. Heavy vehicle/personnel decontamination Interim storage requirements for materials requiring later treatment Site drainage requirements, incorporating clean/dirty areas and modifications to existing surface water and drainage controls beneath retained pavements Monitoring as required
10. Sediment Control	Bunding Collection/treatment/handling impacted sediments Reference should be made to DA conditions
11. Operation of Site Office	As appropriate
12. Decontamination of Heavy Equipment	As appropriate Reference should be made to DA conditions
13. Environmental Monitoring	Monitoring of dusts, noise, odour and fibres Monitoring as required for vibration and water releases Inspection checklists and field forms Reference should be made to DA conditions
14. Environmental Criteria	Soil criteria as sourced from RAP
15. Material Classification	As detailed in this RAP which have included NSW EPA and Consent authority requirements Materials tracking, including QA/QC inspection and sampling
16. Community Relations Plan	Refer to project specific communication commitments, incorporating nomination of specific contact persons & details and requirements for communications/response register Reference should be made to DA requirements

Element	Specific Minimum Requirements to be included in REMP
17. Incident Reporting	As appropriate, including standard form/checklist
18. Security and Signage	Secure site perimeter Site boundary signage
19. EMP Review	As appropriate
20. Training	As appropriate
21. Contact Details	Company/personnel details, including names/phone numbers for: - Principal Contractor - Site Auditor - Remediation Consultant - Remediation Contractor - OH&S Compliance - Environmental Compliance
22. Chemical storage or dispensing (e,g, refuelling of plant)	If applicable, as part of construction related activities. Procedures may be required for chemical handling, storage and spill incident response

8.3 Health and Safety

8.3.1 Work Health and Safety Management Plan

A WHSP shall be prepared by the Remediation Contractor prior to commencement of any ground disturbance works. The Plan shall contain procedures and requirements that are to be implemented as a minimum during the works, in addition to the Contingency Plan, referred to in **Section 7.5**.

The objectives of the WHSP are:

- To apply standard procedures that minimises risks resulting from the works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards, mandatory safety practices and procedures;
- Monitoring of potential hazards and implementation of corrective measures; and
- Provision for contingencies that may arise while operations are being conducted at the Site.

8.3.2 Additional Site-Specific Elements/Procedures

In addition to the normal construction-related matters, the WHSP shall address the following site-specific specific hazards associated with the works relating to the management of contaminated soil, groundwater and/or soil vapour:

- Use of plant and machinery within confined spaces (i.e. remedial excavations);
- Potential for contact to asbestos contaminated soils and/or airborne fibres;
- Contact with contaminated soil (incl. dust), groundwater and vapours, including requirements for specific Personal Protective Equipment (PPE);
- Potential for under/aboveground services, specifically former petroleum infrastructure (if encountered); and
- Heat/cold stress.

8.4 Air Quality

During remedial works, dust emissions and any odours will be confined within the site boundary. This will be assessed by a program of air monitoring undertaken during remediation works and implemented by air emission controls as required by the Contractor. Air monitoring requirements are summarised in this section.

8.4.1 Real-time Exposure Monitoring

Preference is given for all environmental monitoring to be undertaken using real time methods. To this extent, the Remediation Consultant shall monitor works on the site by the use of DustTrak real-time aerosol monitors. A sufficient number of sample locations will be monitored throughout the remediation works as assessed by the Remediation Consultant.

The consultant will advise the Principal and Contractor when the time averaged DustTrak particulate measurement (PM10) exceeds 0.05 mg/m3. WA DoH (2009) reports that this level is protective of potential asbestos fibre exposures. Further, this level is well below the inspirable dust inhalation standard, and is further protective of potential respirable dust impacts at the site boundary.

If dust levels exceed the adopted criteria of 0.05 mg/m3, the Contractor will be notified, and works will require to be modified to reduce dust emissions to below the adopted criteria. All exceedances will be required to be "closed-out" by re-sampling at the exceedance location subsequent to implementation of modified work routines (such as increased dust controls).

8.4.2 Occupational Asbestos Air Monitoring

Where asbestos and/or contaminated soil is being disturbed during the proposed works, applicable air monitoring activities will be employed on a daily basis at relevant locations to demonstrate the suitable application of contaminant migration control measures. Monitoring activities as may be employed are discussed following.

During the remedial works, perimeter asbestos in air monitoring will be conducted at each applicable remedial works area boundary when soils impacted with asbestos are being disturbed.

Air monitoring will be conducted on a daily basis at relevant locations during any ground disturbance activities within impacted soil within the Site to verify that implementation of appropriate control measures have been successful at managing the risk of air borne fibre generation.

Air monitoring will be undertaken in accordance with the requirements of the National Occupational Health and Safety Commission (NOHSC) *Asbestos Code of Practice* and Guidance Notes, in particular the *Guidance note for the estimation of airborne asbestos dust* [NOHSC 3002:2005]. Air filters shall be analysed by a NATA accredited laboratory and results shall be required to be below 0.01 fibres/mL. All detections of fibres shall be further analysed by scanning electron microscope (SEM) to confirm the fibres are asbestos.

Should friable asbestos be identified, air monitoring will be conducted by Licensed Asbestos Assessor (LAA, as per Safe Work NSW requirements). All removal works will further be required to be completed by a Class A Asbestos licenced removalist.

In establishing site trigger levels for evaluation of the monitoring results, reference is made to the appropriate TWA *(Workplace Exposure Standards for Airborne Contaminants, 17 December 2019 – SafeWork Australia)* levels:

- Amosite - 0.1 fibre/mL;
- Chrysotile – 0.1 fibre/mL;
- Crocidolite - 0.1 fibre/mL;
- Other forms of asbestos - 0.1 fibre/mL; and

- Any mixture of these, or where the composition is unknown - 0.1 fibre/mL.

With consideration to these levels the following trigger levels have been developed:

- If airborne fibre levels reach 0.01 fibres/mL the source of fibre release is to be found and rectified. Work in the affected area does not have to stop; and
- If airborne fibre levels reach 0.02 fibres/mL work in the work area should stop and additional controls measures employed. This will involve additional water spraying during excavations.

Air monitoring results will be obtained within 24 hours of sample collection on week days. While this precludes "real time" monitoring, inspections will be made during all excavation works and, if there are any visible dusts, light water sprays will be used to wet the excavation and prevent the release of any airborne asbestos fibres.

If respirable asbestos fibres are confirmed and present between 0.01 and 0.02 fibres/mL, the following controls must be implemented by the Class A licensed asbestos removalist, in accordance with NSW (2019);

- Review control measures;
- Investigate the cause; and
- Implement controls to eliminate or minimise exposure and prevent further release.

If respirable asbestos fibres are confirmed and present above 0.02 fibres/mL, the following controls must be implemented by the licensed asbestos removalist, in accordance with SWA 2011;

- Stop removal work;
- Notify Safe Work NSW by phone, then by fax or written statement that work has ceased;
- Investigate the cause;
- Implement controls to eliminate or minimise exposure and prevent further release; and
- Do not recommence removal work until further air monitoring is conducted and fibre levels are detected below 0.01 fibres/mL.

A daily report air monitoring report will be prepared documenting the previous/same days airborne asbestos fibre air monitoring results. This report will be made available to all relevant stakeholders, upon request, including but not limited to:

- Site workers;
- Council and, WorkSafe NSW and/or EPA officers;
- Neighbouring facilities; and
- Unions.

8.4.3 Additional Consideration of Chemical Contaminants

In addition to general assessment of the potential for exposure to chemical contaminants, the WHSP should also consider the chemical substances potentially or known to be present based on the results of the PSI and DGI. As a precautionary measure, the WHSP should include the requirement for the plan to be revised in the event of an unexpected find of contaminated material during remediation and/or construction.

When working with contaminated materials in general, care needs to be taken to ensure that the contamination is not introduced to the worker via ingestion, inhalation or absorption. The WHSP must detail the PPE and decontamination requirements to be followed to control the risks posed by potential exposure to chemical contaminants at the site.

8.5 Materials Tracking

It is anticipated that disturbed materials will require removal from the site or placement in other areas of the site. A Materials Compliance Management System (MCM) shall be developed for the documentation of material movement and reuse of materials at the site to ensure that it can be demonstrated all material has been appropriately managed. The MCM is required to consider both the quality and quantity of material for each element.

The MCM will include the following specific details:

- Definition of responsibilities, including the Remediation Contractor(s), other contractor(s) e.g. Remediation Consultant (JBS&G) and the Site Auditor;
- Procedures for confirming material quality, summarising existing analytical (in-situ) data, additional analytical (ex-situ) data, additional observations to satisfy other acceptance criteria (e.g., occurrence of asbestos containing materials) and alignment of any environmental data to enable beneficial re-use of the material at the point of placement (where appropriate) and/or provide a waste classification for off-site removal of the material;
- Procedures for confirming where the materials have originated and what classification have they been given, noting that source depths are not critical if tied to material type, while placement depths are critical since tied to potential future exposures on the site;
- Procedures for recording where the materials have been placed (lateral & vertical limits) and inspections during placement and/or where the material has been disposed of;
- Identification of hold points where materials are proposed to be temporarily stockpiled;
- Procedures for recording the quantity of placed materials;
- Site grid squares or sub zones/site survey data (GPS/GIS), noting size of grid and elevations;
- Frequency of data collection, with consideration to both program (time) and area/material type;
- Material Tracking Records that includes the final fate (location) of materials. This will be applicable to materials re-used on-site (i.e. relocated from original in-situ location on site), materials imported to site and materials exported from site as waste (i.e. landfill details) or as beneficial re-use (i.e. the property accepting VENM from the site);
- Standard forms/documentation;
- Non-conformances/Unexpected Finds; and
- QA/QC.

The MCMS may also need to include or make reference to additional material placement requirements to meet design elements such as those relating to subsurface drainage or compatibility with service corridors, and engineering properties of materials to be placed, which are outside the scope of this RAP.

Further detail regarding the requirements for off-site removal and importation of materials is provided in **Section 6.5** and **6.6** respectively.

8.6 Disposal of Waste Material

All waste materials including soil and liquids to be removed from the site will classified, managed and disposed in accordance with the requirements of the *NSW Protection of the Environment Operations Act 1997* (POEO Act), the *NSW POEO Waste Regulation* (2014) and/or exemptions issued

under these regulations. Waste materials will be classified in accordance with the requirements of **Sections 6.6** and **7.2** and the *Waste Classification Guidelines* (EPA 2014) prior to off-site disposal.

For discharge of collected surface water, appropriate monitoring and validation of conditions will be required such that it can be demonstrated water quality is suitable for discharge to the environment in accordance with the POEO Act provisions on water pollution and any relevant conditions of consent. Where water does not meet the appropriate standards (as established from relevant guidance including trigger values published in ANZG August 2018 and relevant conditions of consent and will be documented in the REMP), consideration will be required to either on-site treatment opportunities, or alternatively off-site disposal as liquid waste to an appropriately licensed facility.

Documentary evidence for all waste disposal shall be kept for inclusion in the Validation Report/s.

9. Environmental and Health and Safety Management

9.1 Environmental Management and REMP

The REMP as described in **Section 8.2**, shall be used to document the environmental monitoring and management measures required to be implemented during remediation of the site. The REMP be prepared once the outcomes of the DSI and final scope of remediation known, and consent conditions prescribed.

9.2 Health and Safety Management

A Work Health & Safety Management Plan (WHSP) shall be prepared by the contractor prior to commencement of remediation works on the site. A WHSP should be prepared once the outcomes of the DSI and final scope of remediation known, and consent conditions have been prescribed. The Plan shall contain procedures and requirements that are to be implemented as a minimum during the works.

The objectives of the WHSP are:

- Ensure all regulatory requirements for the proposed works are satisfied;
- To apply standard procedures that minimises risks resulting from the works;
- To ensure all employees are provided with appropriate training, equipment and support to consistently perform their duties in a safe manner; and
- To have procedures to protect other site workers and the general public.

These objectives will be achieved by:

- Assignment of responsibilities;
- An evaluation of hazards;
- Establishment of personal protection standards, mandatory safety practices and procedures;
- Monitoring of potential hazards and implementation of corrective measures; and
- Provision for contingencies that may arise while activities are being conducted at the site.

10. Conclusions

Overall, it is considered that the proposed actions outlined in this RAP 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.

Subject to the successful implementation of the measures described in this RAP and with consideration to the Limitations presented in **Section 11**, it is considered that the site can be made suitable for the intended uses and that the risks posed by contamination can be managed in such a way as to be adequately protective of human health and the environment. As previously noted, this RAP will be revised upon completion of the DGI, with the revised version to be reviewed and approved by the appointed Site Auditor prior to implementation.

11. 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 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.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

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.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground 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.

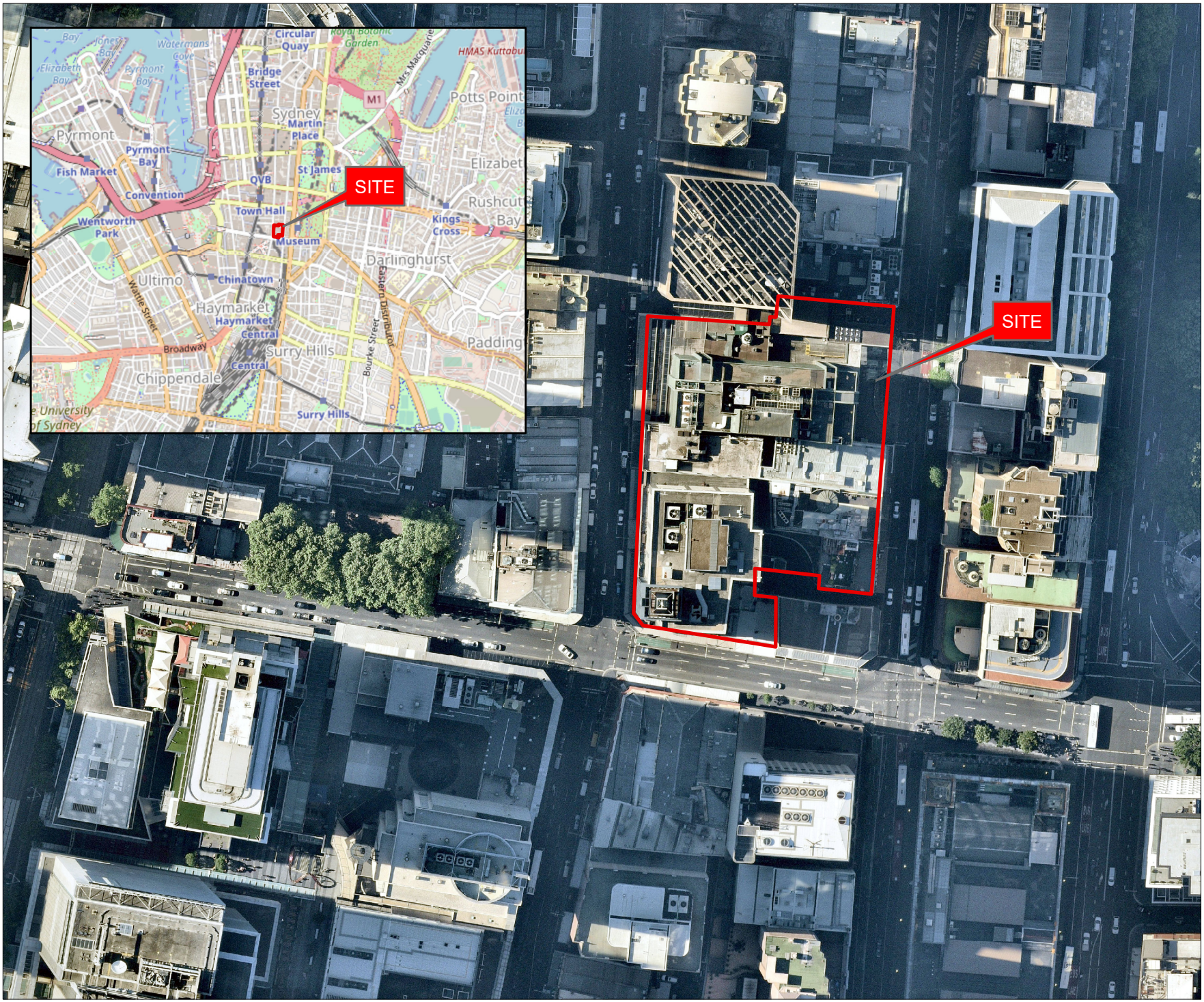
Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of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

References

- *National Environment Protection (Assessment of Site Contamination) Measure 1999, Amendment No.1 2013,* National Environment Protection Council (NEPC 2013).
- *Contaminated Sites: Sampling Design Guidelines, September 1995* (EPA 1995).
- *Consultants Reporting on Contaminated Land, Contaminated Land Guidelines, EPA 2020P2233, April 2020, updated 5 May 2020* (EPA 2020).
- *Contaminated Sites: Guidelines for NSW Site Auditor Scheme*, 3rd edition October 2017 (NSW EPA 2017).
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG 2018).
- *Guidelines for the Assessment and Management of Groundwater Contamination*, DECC March 2007 (DECC 2007).
- *Preliminary Site Investigation, Stage 2 338 Pitt St, Sydney NSW 2000, JBS&G Australia Pty Ltd, 25 February 2021 (JBS&G 2021).*
- *Guidelines for implementing the POEO (Underground Petroleum Storage Systems) Regulation 2019 (December 2020)*.
- *Waste Classification Guidelines, Part 1 - Classifying Waste*. NSW EPA 2014
- *Addendum to the Waste Classification Guidelines (2014)* – Part 1: classifying waste. October 2016. NSW EPA 2016.
- *Waste Classification Guidelines, Part 2 – Immobilising Waste*. NSW EPA 2014
- *Waste Classification Guidelines, Part 3 - Waste Containing Radioactive Material*. NSW EPA 2014
- *Waste Classification Guidelines, Part 4 – Acid Sulfate Soils*. NSW EPA 2014.
- *Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land* (DUAP 1998).
- *How to safely remove asbestos Code of Practice, Safe Work Australia, July 2020 (SWA 2020)*
- *Code of Practice How to Safely Remove Asbestos, NSW Government,* August 2019 (NSW 2019).

Figures



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Approximate Site Boundary

JBS&G

Job No: 57557

Client: Hans Sydney Pty Ltd

Version: R02 Rev A	Date: 19-Feb-2021
Drawn By: CA/RH	Checked By: CB

Scale 1:1,500

0 10 20

metres

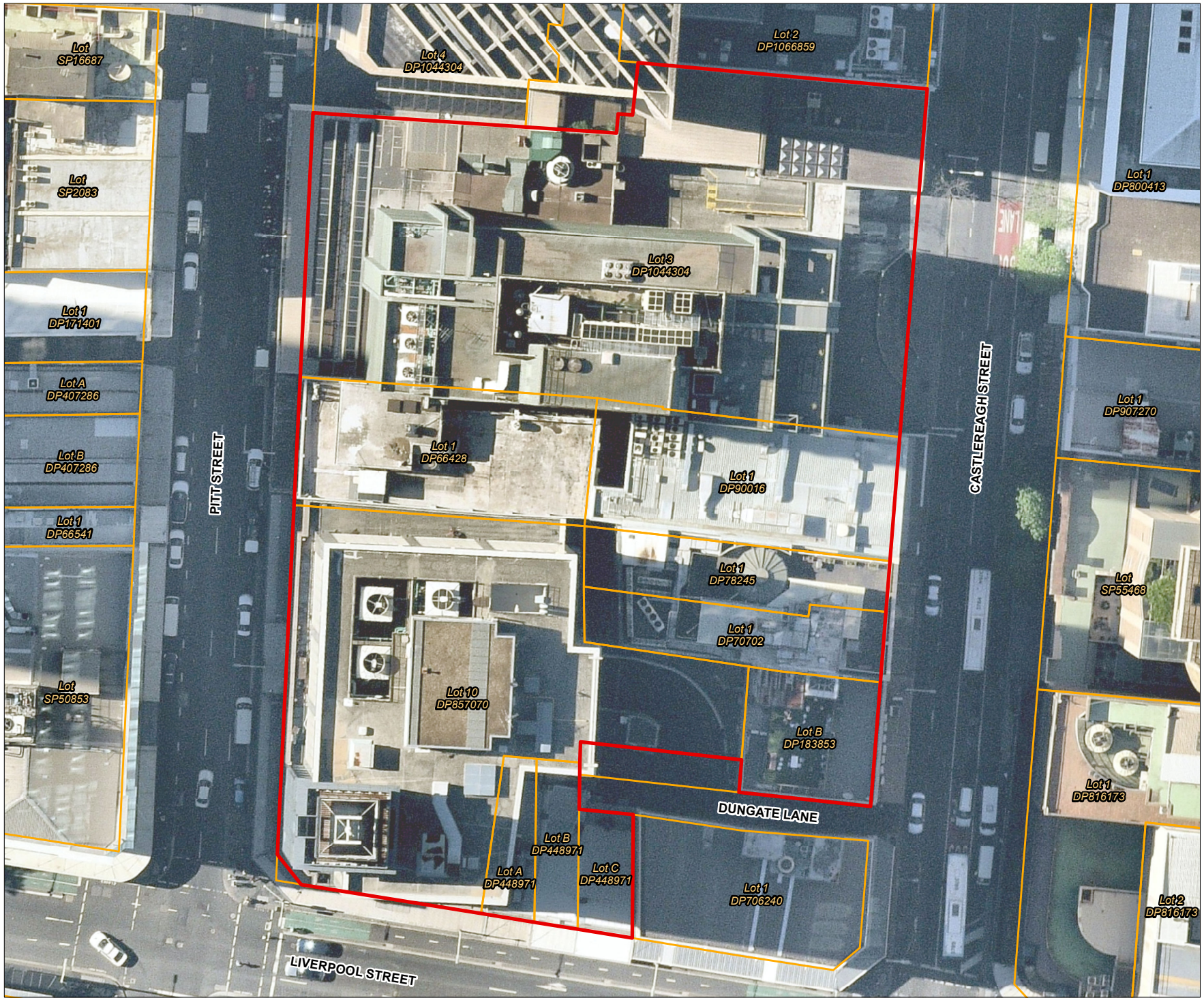
Coor. Sys. GDA 1994 MGA Zone 56

338 Pitt Street, Sydney, NSW

SITE LOCATION

FIGURE 1

File Name: N:\Projects\Hans City\57557 Hans 338 Pitt St Stage 2\GIS\Maps\R02-RevA\57557_01_SiteLocation.mxd
Reference: Aerial Imagery Supplied by Nearmap (Capture Date: 22nd of Oct., 2019)



Legend:

- Approximate Site Boundary
- NSW Cadastre (DFSI, 2020)

JBS&G

Job No: 57557	
Client: Hans Sydney Pty Ltd	
Version: R02 Rev A	Date: 19-Feb-2021
Drawn By: CA/RH	Checked By: CB

Scale 1:600

0 7.5 15
metres

Coor. Sys. GDA 1994 MGA Zone 56

338 Pitt Street, Sydney, NSW

SITE LAYOUT

FIGURE 2

File Name: N:\Projects\Hans City\57557 Hans 338 Pitt St Stage 2\GIS\Maps\R02-RevA\57557_02_Sitelay.mxd
Reference: Aerial Imagery Supplied by Nearmap (Capture Date: 22nd of Oct., 2019)

Appendix A – Proposed Development Plans

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0 2 5 10m

GENERAL NOTES

- ALL DIMENSIONS AND EXISTING CONDITIONS SHALL BE CHECKED AND VERIFIED BY THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK.
- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'.
- DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY.

legend

- 1 Bed Apartment
- 2 Bed Apartment
- 3 Bed Apartment
- Residential Amenities
- Parking
- Hotel Amenities
- Hotel
- Hotel Spa
- Hotel BOH
- Circulation
- Food and Beverage
- Retail
- Lift, Fire stair, Services
- Plant
- Boundary

rev	date	name	by	chk
07	12/3/20	For Approval	TS	
06	24/1/20	For Approval	KIK	
05	14/1/20	For Development Application	KIK	
04	13/12/19	For information	KIK	
03	6/12/19	For Coordination	TS	
02	2/12/19	For Coordination	PN	
01	8/11/19	For Coordination	KIK	

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sydney melbourne uk
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project

338 Pitt Street
338 Pitt Street
Sydney NSW 2000

title

General Arrangement Plans
Ground Floor - Hotel Lobby+Residential Lobby+Retail

scale	1:200 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		2007	07

For Approval

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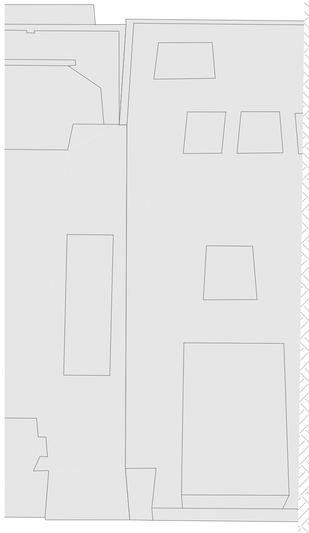

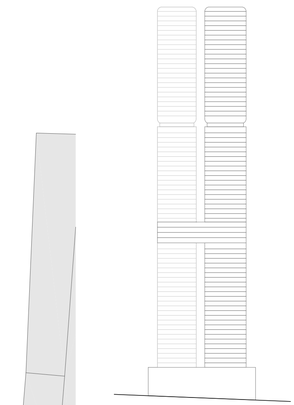

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legend

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02	2/12/19	For Coordination	PN	
01	8/11/19	For Coordination	KIK	

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project

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title

General Arrangement Plans
Lower Ground Plan-Hotel Drop off+Retail Parking+Plant

scale	1:200 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		2006	07

For Approval

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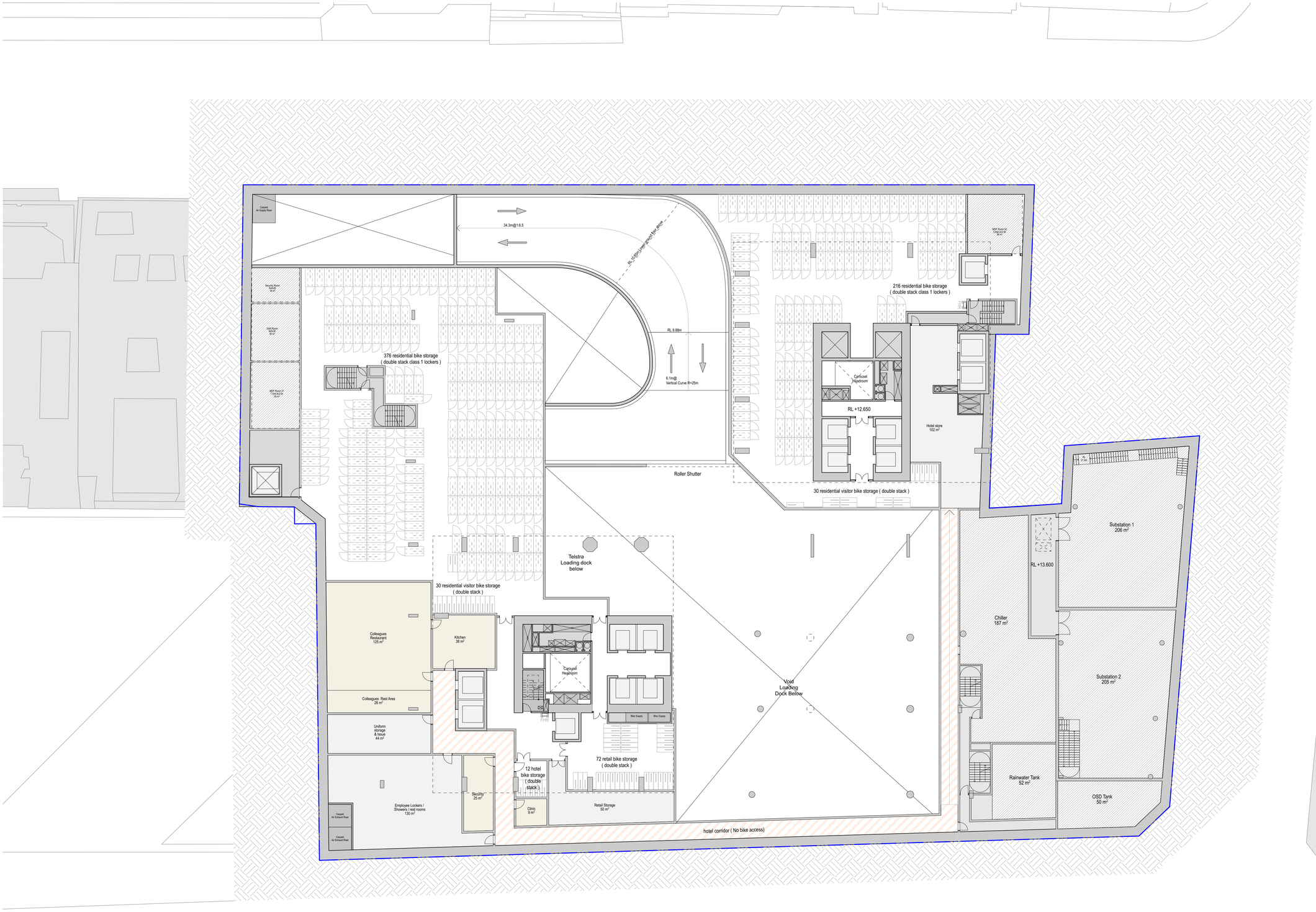

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Sydney NSW 2000

title

General Arrangement Plans Mezzanine - Residential Storage & Bike park

scale	1:200 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		2005	07

For Approval

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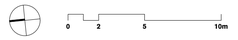

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legend

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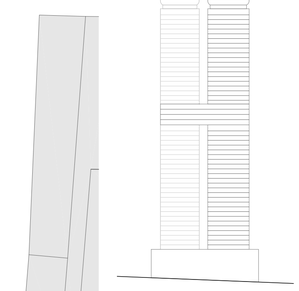
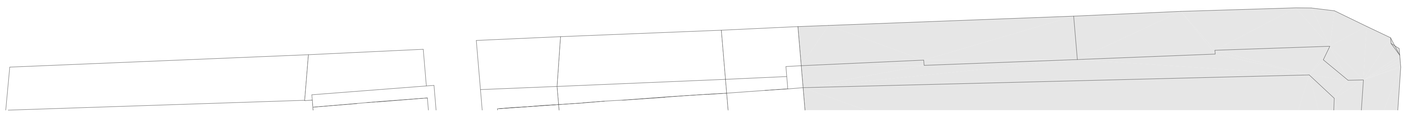
- Hotel Amenities
- Hotel
- Hotel Spa
- Hotel BOH
- Circulation
- Food and Beverage
- Retail
- Lift, Fire stair, Services
- Plant

Boundary





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02	2/12/19	For Coordination	PN	
01	8/11/19	For Coordination	KIK	

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project

338 Pitt Street
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Sydney NSW 2000

title

General Arrangement Plans
Basement 1 - Loading Dock+Telstra Parking+Hotel BOH+Plant

scale	1:200 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		2004	07

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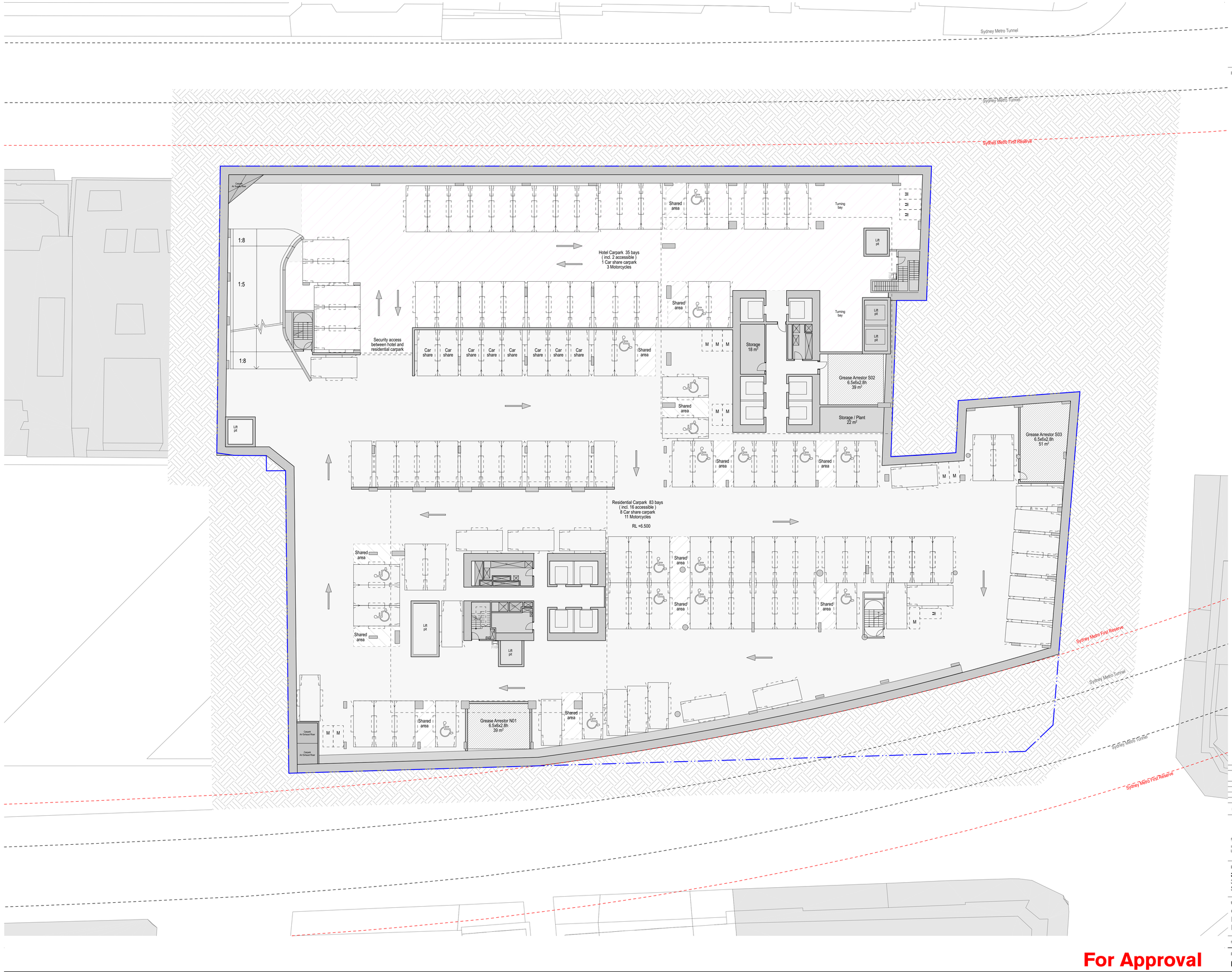

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338 Pitt Street
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Sydney NSW 2000

title

General Arrangement Plans
Basement 2 - Hotel Parking+Residential Parking+Plant

scale	1:200 @ A1	first issued	8/11/19

project code	sheet no.	revision
H338	2003	07

For Approval

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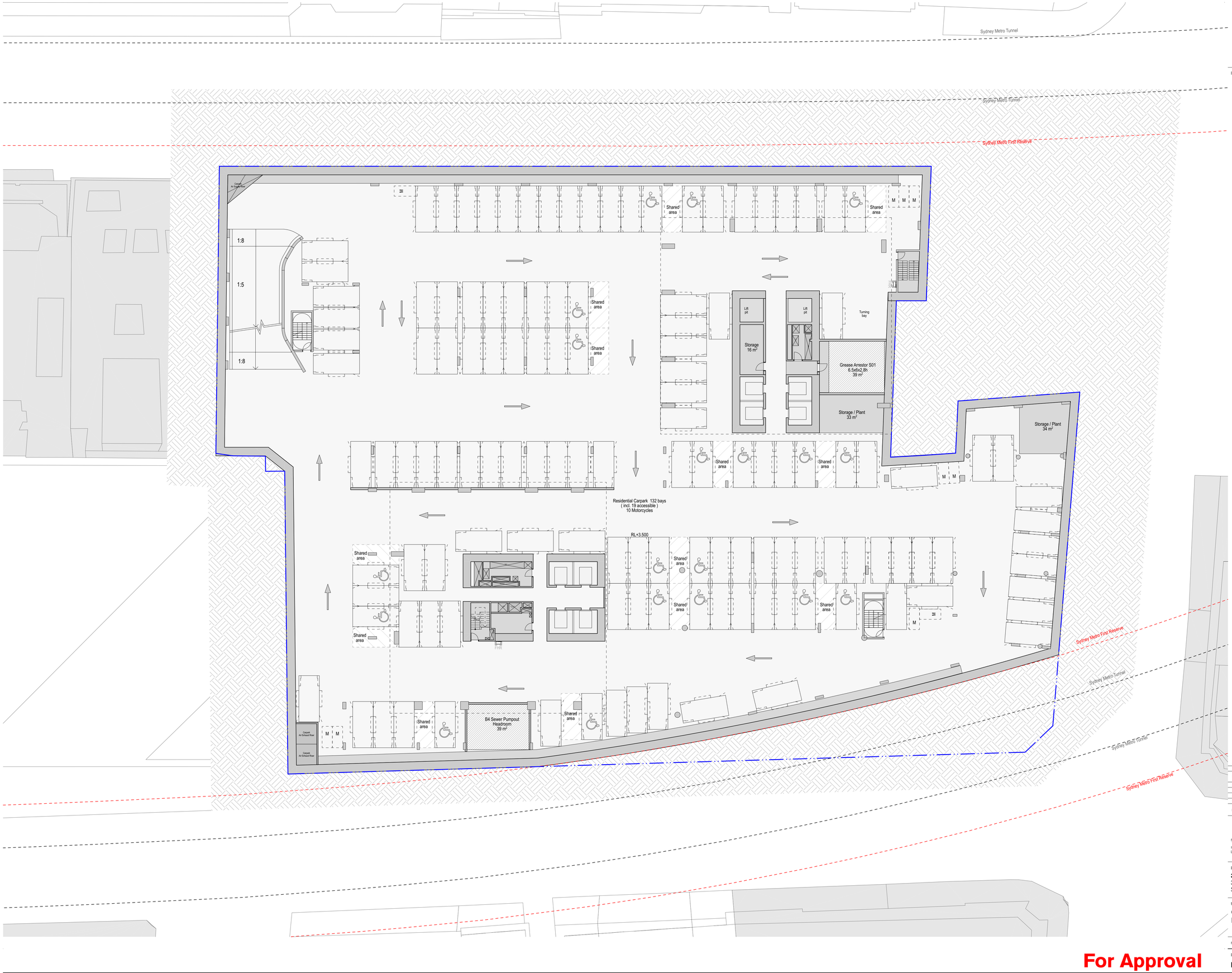

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01	8/11/19	For Coordination	KIK	

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project

338 Pitt Street
338 Pitt Street
Sydney NSW 2000

title

General Arrangement Plans
Basement 3 - Residential Parking+Plant

scale	1:200 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		2002	07

For Approval

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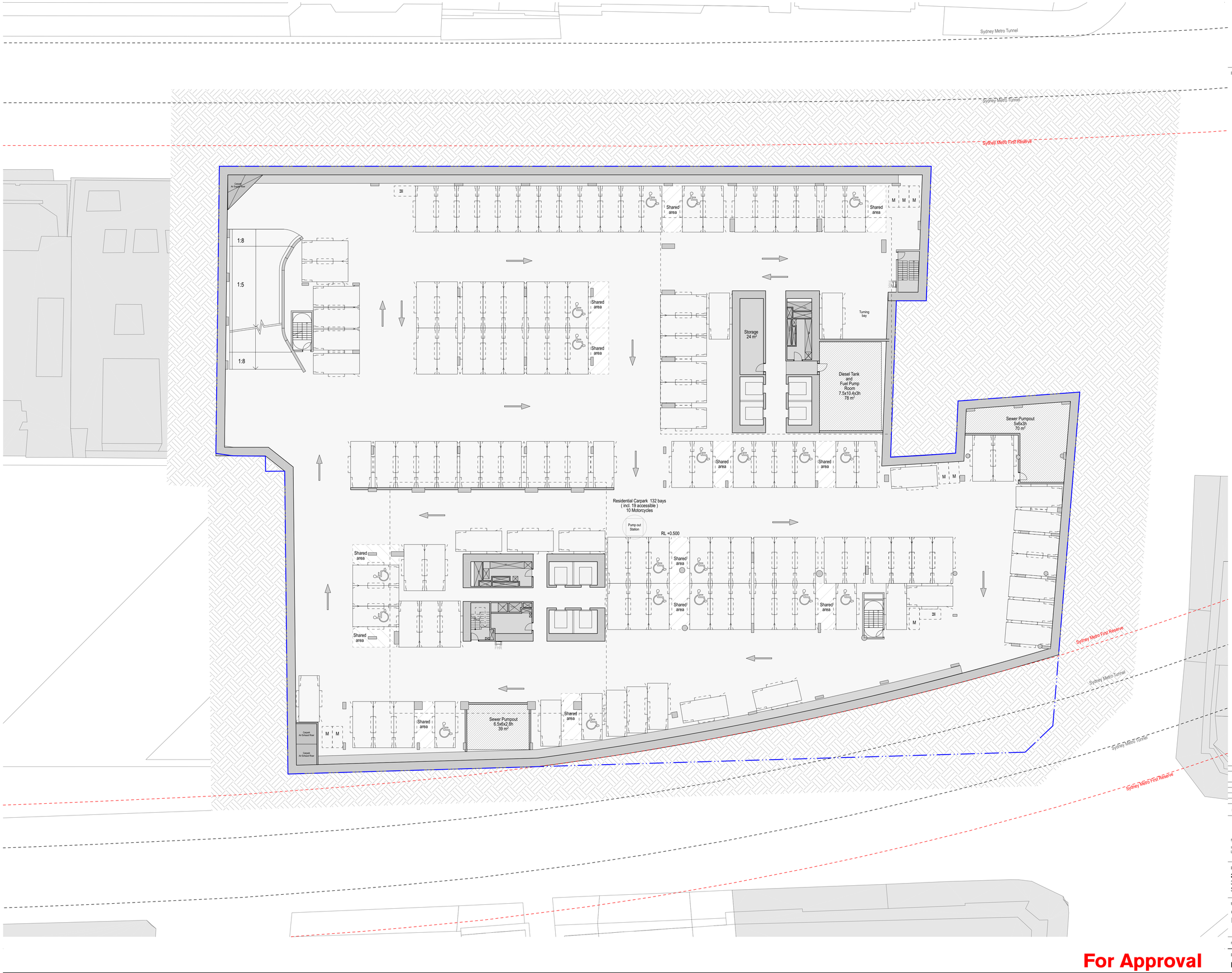

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- ALL LEVELS RELATIVE TO 'AUSTRALIAN HEIGHT DATUM'.
- DO NOT SCALE DRAWINGS. USE FIGURED DIMENSIONS ONLY.

legend

- 1 Bed Apartment
- 2 Bed Apartment
- 3 Bed Apartment
- Residential Amenities
- Parking
- Hotel Amenities
- Hotel
- Hotel Spa
- Hotel BOH
- Circulation
- Food and Beverage
- Retail
- Lift, Fire stair, Services
- Plant

Boundary

rev	date	name	by	chk
07	12/3/20	For Approval	TS	
06	24/1/20	For Approval	KIK	
05	14/1/20	For Development Application	KIK	
04	13/12/19	For information	KIK	
03	6/12/19	For Coordination	TS	
02	2/12/19	For Coordination	PN	
01	8/11/19	For Coordination	KIK	

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sydney melbourne uk
Level 5, 70 King Street t +61 2 9251 7077 w fjmtstudio.com

project

338 Pitt Street
338 Pitt Street
Sydney NSW 2000

title

General Arrangement Plans
Basement 4 -Residential Parking

scale	1:200 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		2001	07

For Approval

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Sydney Metro Tunnel

0 2 5 10m

GENERAL NOTES

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Sydney Metro Tunnel

Sydney Metro First Reserve

Circular Av Quay Road

1:8

1:5

Residential Carpark 30 bays
(incl. 3 accessible)

Shared area

Shared area

Shared area

Turning bay

Plant / Storage 244 m²

Plant / Storage 41 m²

Plant / Storage 24 m²

Plant

Lift pit

Lift pit

Lift pit

Lift pit

Sydney Metro First Reserve

Sydney Metro Tunnel

Sydney Metro Tunnel

Sydney Metro First Reserve

legend

- 1 Bed Apartment
- 2 Bed Apartment
- 3 Bed Apartment
- Residential Amenities
- Parking
- Hotel Amenities
- Hotel
- Hotel Spa
- Hotel BOH
- Circulation
- Food and Beverage
- Retail
- Lift, Fire stair, Services
- Plant
- Boundary

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02	12/3/20	For Approval	TS	
01	24/1/20	For Approval	KIK	

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project

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title

General Arrangement Plans
Basement 5 -Residential Parking

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project code		sheet no.	revision
H338		2000	02

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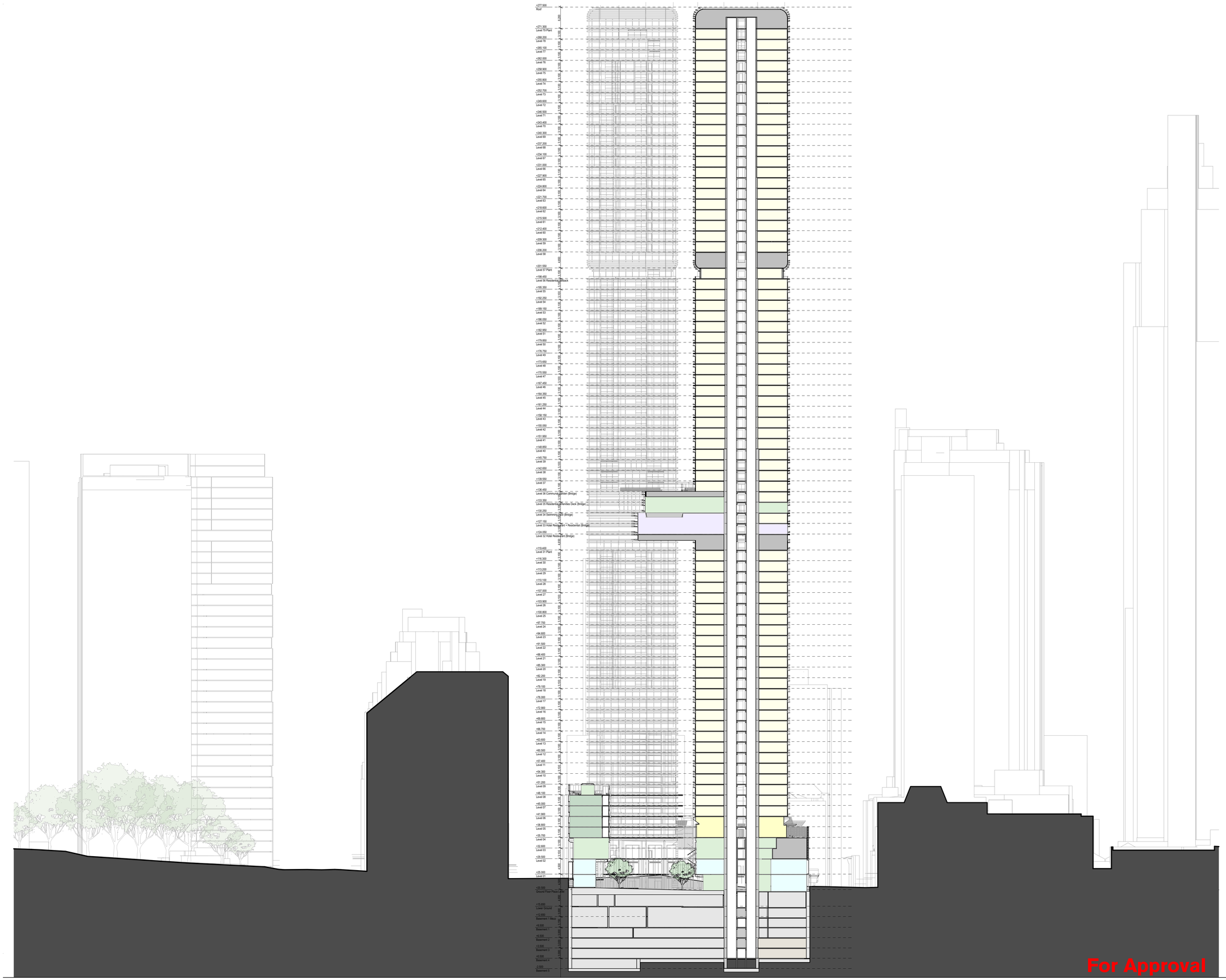

0 5 10 20m

GENERAL NOTES

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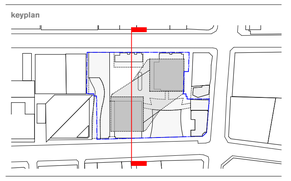
keyplan



legend

- Residential
- Residential Amenities
- Parking
- Hotel Amenities
- Hotel
- Hotel Spa
- Hotel BOH
- Circulation
- Food and Beverage
- Retail
- Lift, Fire stair, Services
- Plant

Site Boundary

rev	date	name	by	chk
08	12/3/20	For Approval	TS	
07	24/1/20	For Approval	KIK	
06	14/1/20	For Development Application	KIK	
05	13/12/19	For information	KIK	
04	10/12/19	For information	PN	
03	2/12/19	For Coordination	PN	
02	22/11/19	For Coordination	KIK	
01	8/11/19	For Coordination	KIK	

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4000 General Sections
Section- North Tower

scale	1:500 @ A1	first issued	8/11/19
project code		sheet no.	revision
H338		4000	08

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A	Sumi Dorairaj	John De Martin	Draft for client review	-	11/12/2020
0	Chris Bielby	John De Martin		-	22/02/2021
1	Chris Bielby	John De Martin		-	1/03/2021
2	Chris Bielby	John De Martin		-	10/03/2021