Prepared for
John Holland Pty Ltd
Prepared by
Ramboll Australia Pty Ltd
Date
14 June 2024
Project Number
318001049
Audit Number
TO-079

SITE AUDIT REPORT
WATERLOO STATION, 150 AND PART 140 COPE STREET, WATERLOO

RAMBOLL Bright ideas. Sustainable change.

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ENVIRONMENT
& HEALTH

14 June 2024

John Holland Pty Ltd
[redacted]

By email: [redacted]

Dear Sally

SITE AUDIT REPORT - WATERLOO STATION, 150 AND PART 140 COPE STREET, WATERLOO

[redacted]

I have pleasure in submitting the Site Audit Report for the subject site. The Site Audit Statement, produced in accordance with the NSW *Contaminated Land Management Act 1997*, is included as Appendix B of the Site Audit Report. The Audit was commissioned by John Holland Pty Ltd to assess the suitability of the site for its intended metro train station land use (Section A1 audit).

The Audit was initiated to comply with requirements of Condition E67 of Infrastructure Approval, application SSI 15_7400, approved by the Minister for Planning on 9 January 2017, and is therefore a statutory audit.

Thank you for giving me the opportunity to conduct this Audit. Please call me on 9954 8100 if you have any questions.

Yours faithfully,
Ramboll Australia Pty Ltd

[redacted]

[redacted]
EPA Accredited Site Auditor 1505

cc: NSW EPA – Statement only
City of Sydney Council

[redacted]

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LIST OF ABBREVIATIONS

Measures

%	per cent
ha	Hectare
km	Kilometres
m	Metre
m^2	Square Metre
m^3	Cubic Metre
mbgl	Metres below ground level
mg/kg	Milligrams per Kilogram
mm	Millimetre

General

ACL	Added Contaminant Limit
ACM	Asbestos Containing Material
AF	Asbestos Fines
ALS	Australian Laboratory Services
ANL	Australian Native Landscapes Pty Ltd
ANZG	Australian & New Zealand Guidelines
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes & Naphthalene
CCME	Canadian Council of Ministers of the Environment
CLM Act	NSW Contaminated Land Management Act 1997
COC	Chain of Custody
Council	City of Sydney Council
CSM	Conceptual Site Model
DP	Douglas Partners Pty Ltd
DQI	Data Quality Indicator
DQO	Data Quality Objective
EDP	EDP Consultants Pty Ltd
EIL	Ecological Investigation Level
EnRiskS	Environmental Risk Sciences Pty Ltd
Envirolab	Envirolab Services Pty Ltd
EPA	Environment Protection Authority (NSW)
EPL	Environment Protection Licence
ESL	Ecological Screening Level
FA	Fibrous Asbestos
GSW	General Solid Waste
HHRA	Human Health Risk Assessment
HIL	Health Investigation Level
HSL	Health Screening Level
IAA	Interim Audit Advice
JH	John Holland Pty Ltd
LCS	Laboratory Control Sample
LEP	Local Environment Plan
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury
MDR	Metropolitan Demolitions & Recycling Pty Ltd
ML	Management Limits
MQD	Waterloo Metro Quarter Development
MS	Matrix Spike
NATA	National Association of Testing Authorities
NC	Not Calculated
ND	Not Detected
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NL	Non-Limiting
n	Number of Samples
OCPs	Organochlorine Pesticides
OEH	Office of Environment and Heritage
OPPs	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons

PCBs	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PFAS	Per- and Poly-fluoroalkyl substances
PID	Photoionisation Detector
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
Ramboll	Ramboll Australia Pty Ltd – previously Ramboll Environ Australia Pty Ltd and ENVIRON Australia Pty Ltd
RAP	Remediation Action Plan
RPD	Relative Percent Difference
RRE	Resource Recovery Exemption
RRO	Resource Recovery Order
SAR	Site Audit Report
SAS	Site Audit Statement
SEPP R&H	Resilience and Hazards State Environment Planning Policy (2021)
SQG	Soil Quality Guidelines
SSI	State Significant Infrastructure
TEQ	Toxic Equivalence Quotient
TPHs	Total Petroleum Hydrocarbons
TRHs	Total Recoverable Hydrocarbons
UCL	Upper Confidence Limit
USEPA	United States Environmental Protection Agency
VCH	Volatile Chlorinated Hydrocarbons
VENM	Virgin Excavated Natural Material
VOCs	Volatile Organic Compounds
-	On tables is "not calculated", "no criteria" or "not applicable"

1. INTRODUCTION

1.1 Audit Details

A site contamination audit has been conducted in relation to the Waterloo Station site of the Sydney Metro City and South West, which is located at [redacted]) (**Attachment 1, Appendix A**).

The site comprises Areas B1 to B7 as shown on **Attachment 2, Appendix A**. Areas B1, B2 and B3 comprise the station box, whilst Areas B4 to B7 comprise ancillary areas for station access and landscaping. Areas B8 to B10 do not form part of the site.

The Audit was conducted to provide an independent review by an EPA Accredited Auditor of whether the land is suitable for any specified use or range of uses, i.e. a "Site Audit" as defined in Section 4 (1) (definition of a 'site audit' (b) (iii)) of the NSW *Contaminated Land Management Act 1997* (the CLM Act).

A State Significant Infrastructure (SSI) development application (SSI 15_7400) was approved by the NSW Minister for Planning on 9 January 2017 for the construction and operation of a metro rail line, approximately 16.5 km long (of which approximately 15.5 km is located in underground rail tunnels) between Chatswood and Sydenham, including the construction of a tunnel under Sydney Harbour, links with the existing rail network, seven metro stations, and associated ancillary infrastructure. Condition E67 of the SSI development approval relates to contamination and requires a site audit as follows:

> *"If a Site Contamination Report prepared under Condition E66 finds such land contains contamination, a site audit is required to determine the suitability of a site for a specified use. If a site audit is required, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor. Contaminated land must not be used for the purpose approved under the terms of this approval until a Site Audit Statement is obtained that declares the land is suitable for that purpose and any conditions on the Site Audit Statement have been complied with."*

The Audit was initiated to comply with condition E67 of the SSI approval and is therefore a statutory audit.

Details of the Audit are:

Requested by:	[redacted] on behalf of John Holland Pty Ltd (JH)
Request/Commencement Date:	28 September 2020 for current audit, previous audit commenced 5 October 2017 on behalf of John Holland CPB Ghella Joint Venture
Auditor:	[redacted]
Accreditation No.:	1505

1.2 Project Background

As part of the Sydney Metro City and South West (Sydney Metro) Tunnel and Station Excavation (TSE) Works Package, a Remediation Action Plan (RAP) was developed to detail the work required to remediate the site during construction of the station. Interim Audit Advice (IAA) letter (IAA5) was prepared by the Auditor as part of the previous audit in May 2018 which provided an initial review of the suitability and appropriateness of the RAP, as well as a review of the previous investigations undertaken at the site. The IAA is provided in **Appendix C**.

An offsite source of volatile organic compounds (VOCs) (chlorinated hydrocarbons) was identified immediately adjacent to the site. The primary source of contamination (dry-cleaner) had been

removed, however secondary impact by chlorinated hydrocarbons was expected to remain in soil and groundwater. The risk from contamination migrating on to the site was expected to be limited by the secant pile wall, the proposed tanking of the station, and the station ventilation system (once constructed).

Remediation of the station box was undertaken by excavation and offsite disposal of all fill material and natural soil/bedrock to a depth of approximately 28 metres below ground level (mbgl) within the site. A secant pile wall was constructed along the site boundaries to facilitate the excavation. A review of the remediation and validation undertaken for the station box excavation (Areas B1-B3) was documented by the Auditor in a site audit report (SAR) and Section B site audit statement (SAS) (TO-024-1) dated 2 June 2020. Ancillary areas for station access and landscaping surrounding the station box (Areas B4-B7) were not part of the previous audit, however, are included in the current audit area.

After issue of TO-024-1, a strategy for the assessment and management of potential risks from contamination at the proposed Waterloo Station was prepared by Douglas Partners Pty Ltd (DP). The strategy document provided a summary of the design requirements for the station box, including waterproofing and ventilation. A human health risk assessment (HHRA) was prepared by Environmental Risk Sciences Pty Ltd (EnRiskS) to evaluate the potential risks to human health associated with contamination in offsite groundwater, in the context of the development of the site as Waterloo Station. The HHRA concluded that health risks to future users of Waterloo Station, including members of the public and workers, were low and acceptable. No further work, including vapour intrusion risk management measures, were required for the site.

An addendum to the RAP was prepared by DP which outlined supplementary assessment requirements for ancillary areas not previously assessed and also included remedial options for any contamination identified during these supplementary assessments. The RAP Addendum was reviewed by the Auditor before implementation.

Construction of the station box, investigation of the ancillary areas and remediation works were completed by February 2024. These works have been documented in a Validation Report and are reviewed herein.

1.3 Scope of the Audit

The scope of the Audit included:

- Reference to previous audit documentation relating to the site and key documents reviewed therein, including:
  - 'Remediation Action Plan, Sydney Metro City and South West, Tunnel and Station Excavation Works Package, [redacted] Waterloo', report reference: Revision 0, dated 13 April 2018, prepared by Douglas Partners Pty Ltd (DP) (**the RAP**).
  - 'Interim Audit Advice Letter No. 5 - Remediation Action Plan, [redacted] Waterloo, NSW', 22 May 2018, prepared by Tom Onus of Ramboll (**IAA5**)
  - 'Site Audit Report - Waterloo Station Box Excavation and Validation, [redacted] prepared by Tom Onus of Ramboll and Section B SAS TO-024-1 dated 2 June 2020 (**TO-024-1**)
- Review of the following reports:
  - 'Human Health Risk Assessment: Sydney Metro Waterloo Station Development', 15 June 2021, Environmental Risk Sciences Pty Ltd (EnRiskS) (**the HHRA**).

  - 'Contaminated Land Management Strategy, Sydney Metro City & South West - Waterloo Station Development [redacted] Waterloo', 3 June 2022, DP (**the CLMS**)
  - 'Addendum to Remediation Action Plan, Sydney Metro City & South West - Waterloo Integrated Station Development, [redacted], Waterloo', 3 June 2022, DP (**the RAP Addendum**)
  - 'WISD – Quality Assurance/Control Report – Waterproofing (Areas B1 to B3) and Ventilation (North and South Buildings)', 15 February 2024, JH (**the QA/QC Report**)
  - 'Validation Assessment of Remediation, Sydney Metro City & South West - Waterloo Integrated Station Development, [redacted], Waterloo NSW', 24 May 2024, DP (**the Validation Report**)
- Site visits by the Auditor on 23 October 2020 and 23 February 2024 during the current audit. Also on 6 March 2018 during the previous audit.
- Discussions with JH, and with DP who undertook the investigations and remediation.

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

- National Environment Protection Council (NEPC) *'National Environment Protection (Assessment of Site Contamination) Measure 1999'*, as Amended 2013
- NSW EPA (2015) *'Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997'*
- NSW EPA (2017) *'Guidelines for the NSW Site Auditor Scheme (3rd Edition)'*
- NSW EPA (2020) *'Contaminated Land Guidelines, Consultants Reporting on Contaminated Land'*
- Chapter 4 Remediation of Land in the Resilience and Hazards State Environment Planning Policy (SEPP) (2021) (SEPP R&H, formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (1998) *'Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land'*
- Western Australia Department of Health (2021) *'Guidelines for the assessment, remediation and management of asbestos contaminated sites'*
- NSW EPA (2022a) *'Contaminated Land Guidelines, Sampling design part 1 – application'* and *'Contaminated Land Guidelines, Sampling design part 2 – interpretation'*
- NSW EPA (2022b) *'Contaminated Land Consultant Certification Policy'*.

2. SITE DETAILS

2.1 Location

The site locality is shown on **Attachment 1, Appendix A**. The site comprises Areas B1 to B7 as shown on **Attachment 2, Appendix A**. Areas B1, B2 and B3 comprise the station box, whilst Areas B4 to B7 comprise ancillary areas for station access and landscaping. Areas B8 to B10 do not form part of the site and are described as the Waterloo Metro Quarter Development (MQD).

[redacted]

[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
Site Area:	Approximately 0.55 hectares (ha)

The northern, eastern and southern boundaries of the site are well defined by Raglan Street (north), Cope Street (east) and Buckland Street (south). The western boundary is defined by the secant pile wall and capping beam.

A survey plan of the site is provided in **Attachment 2, Appendix A** and identifies the Site Audit boundary.

2.2 Zoning

The current zoning of the site is MU1 Mixed Use under Sydney Local Environment Plan (LEP) 2012, State Environmental Planning Policy Amendment (Land Use Zones) 2023.

2.3 Adjacent Uses

The site is located within an area of mixed land use including commercial and high density residential. The surrounding site use includes:

North: [redacted] and high rise mixed-use building beyond.

East: [redacted] and multi-level residential buildings beyond.

South: [redacted] and commercial and residential buildings beyond.

West: [redacted] and commercial buildings located further west.

The site is in a relatively flat area of Waterloo which slopes to the west. DP identified the closest sensitive ecological receptor for groundwater as Sheas Creek located approximately 530 m to the southwest.

2.4 Site Condition

TO-024-1 noted that prior to demolition of structures for the development the Waterloo Station and MQD site were occupied by various commercial properties including an automotive centre and smash repairers. A former laundry/dry-cleaner was located in the MQD site, to the west of the Waterloo Station site. During the Auditor's site visit on 6 March 2018, the site was an active construction site. The majority of the site surface had been cleared of slabs and pavements, and

exposed soil was visible over the majority of the site. TO-024-1 reported that the station box, which covered the majority of the site, had been excavated into sandstone bedrock with a partial concrete slab observed to assist tunnel boring machines.

Based on the information provided by JH, DP reported in the Validation Report that there were two areas of the site where fill was not substantially removed or covered by the capping beam. These comprised Area B6 (covering an area of 128 m^2) and Area B4-B5 (covering approximate area of 25 m^2) (**Attachment 2, Appendix A**). These areas required further assessment. Fill material in other areas of the site shown in **Attachment 2, Appendix A** was either removed during station box excavation or were covered by capping beams associated with the station box works.

DP reported in the Validation Report that a final inspection was undertaken on 23 February 2024. At this time the station had been constructed and areas surrounding were mostly paved with some minor areas still awaiting completion. Two garden beds in B6 had not been filled at the time of this inspection however these garden beds were observed to have been completed during a final inspection undertaken on 9 April 2024.

The Auditor undertook an inspection on 23 February 2024 and identified site conditions consistent with those reported by DP.

2.5 Proposed Development

The development comprises a new below ground station building and pedestrian accessways. The depth of excavation for the station was approximately 28 mbgl and consists of six basement levels of varying height. The station is an undrained, tanked structure designed to resist hydrostatic uplift. Minimum 1.1 m thick reinforced concrete perimeter walls and 1.43 m thick base slab have been constructed including a waterproof membrane. An Environmental Control System was constructed comprising mechanical ventilation systems, chilled water systems, water cooled variable refrigerant flow systems, retail provisions and life safety mechanical systems.

The ancillary areas around the station box were landscaped with a mixture of soft and hard landscaping and include access ways to the station. Excavation works were required in these areas to either remediate impacted fill material, to remove geotechnically unsuitable materials or required to be removed to accommodate landscaping.

For the purposes of this audit, the 'commercial/industrial' land use scenario has been assumed.

3. SITE HISTORY

IAA5 included the Auditor's review of the site history for the Waterloo Station and MQD site which was based on the consultant's review of historical business listings, historical title deeds, aerial photographs, NSW EPA records, Section 149 (2&5) certificates (now known as Section 10.7 certificates) and NSW Safe Work records. The site history from IAA5 was summarised in TO-024-1 and is presented below.

Aerial photographs indicated that MQD site was developed and mainly used for residential purposes with some commercial land uses until the 1950s. From 1950 the majority of the site was occupied by commercial buildings. Commercial uses included: manufacturing of batteries, forging, chemical, mirrors, glass, hospital equipment, plastic, tiles and electrical equipment; metal workers and merchants, motor electricians, motor painters, panel beaters, welders, coppersmith, printers, blacksmiths, steam engineers and boilermakers. Demolition of site structures commenced in 2017.

A review of the SafeWork NSW information did not identify any records for the storage of dangerous goods including hazardous chemicals at the site.

TO-024-1 noted that previous assessments by another consultant (Environmental Investigations Australia Pty Ltd (EI)) in 2015 identified residual contamination on [redacted] Lot 5 DP215751) and recommended site remediation. A RAP was understood to have been prepared by EI in 2015 however it is not known if remediation was undertaken.

A laundry/dry-cleaner was located to the west of the site within the MQD site.

A review of the NSW EPA public records did not find any notices for the site. Two sites in the immediate vicinity were listed as regulated by the EPA. They include the former Gas-N-Go service station at 10-20 Botany Road located approximately 140 m northwest and Lawrence Dry Cleaners at 887-893 Bourke Street located approximately 780 m to the east. The former service station has the potential to impact the site, however, the dry-cleaners is considered to be across gradient of the site and unlikely to be a potential source of impact.

As documented in TO-024-1, the majority of the site was excavated to a depth of approximately 28 mbgl between 2017 and 2019. Excavated fill and natural soil/bedrock were disposed offsite.

3.1 Auditor's Opinion

In the Auditor's opinion, the site history indicates past activities have a high potential for contamination. Sources of contamination are associated with commercial/industrial land use (including an automotive centre and smash repairer), fill and surface soil imported to achieve site levels, hazardous building materials from demolition of former buildings, and offsite land use including the dry-cleaner, motor garages and service stations. The majority of soil impacts were removed from the site during station box excavation documented in TO-024-1, however fill remained in Areas B4-B7 and groundwater impact associated with the dry-cleaner had the potential to migrate onto the site.

The Auditor considers that the site history is broadly understood and adequate for identification of contaminants of concern (**Section 4**) and remediation of the site (**Section 10**).

4. CONTAMINANTS OF CONCERN

TO-024-1 noted that the main contaminants of concern for remediation included asbestos, VOCs, lead and organochlorine pesticides (OCP).

Following excavation of the station box, TO-024-1 reported that an offsite source had the potential to impact future site users, namely VOC contamination associated with the former offsite dry-cleaner immediately to the west of the site within the MQD.

DP provided a list of potential sources of contamination and associated contaminants of concern in the Validation Report. These have been tabulated in **Table 4.1**.

Table 4.1: Contaminants of Concern

Area	Activity	Potential Contaminants
[redacted]	Fill of unknown origin and contaminant levels, in areas of former industrial land use	Asbestos, metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), BTEX (benzene, toluene, ethylbenzene and total xylenes), OCP, organophosphorus pesticides (OPP) and phenols.
[redacted]	Migration of groundwater contamination on to the site from the offsite dry-cleaning facility	VOCs

4.1 Auditor's Opinion

The Auditor considers that the analyte list used by DP during validation adequately reflects the site history and condition.

There has been no assessment by the consultants for the presence of per- and poly-fluoroalkyl substances (PFAS). The Auditor notes that the site condition following construction of the station (waterproofing installed to eliminate groundwater ingress into the station box) would eliminate any potential exposure to PFAS in groundwater (if present). Further consideration of PFAS as a potential contaminants of concern is therefore not considered to be warranted.

5. STRATIGRAPHY AND HYDROGEOLOGY

5.1 Stratigraphy

DP reviewed geological maps and reported that the site is located within the Aeolian soil landscape underlain by Quaternary age transgressive dunes comprising of marine sand with podsols. The subsurface profile summarised in TO-024-1 comprised relatively shallow fill underlain by natural sand and clay soil. The sub-surface profile of the site prior to remediation/excavation is summarised in **Table 5.1**.

Table 5.1: Stratigraphy

Depth (mbgl)	Subsurface Profile
0.0 – 0.35 (maximum)	Concrete pavements/slab.
0.15 – 1.0	Fill material comprising sand, gravel and clay with inclusions of demolition rubble, brick, glass, tile, ash, fly ash, charcoal, coal, wood, concrete and metal. Ash/coal was detected in 3 sampling locations. Potential asbestos containing material (ACM) was detected in test pit TP10 between 0.2 mbgl and 0.3 mbgl.
1 – 5.5	Natural sand, clayey sand and silty sand.
5.5 to 7.5	Natural clay (possible residual).

mbgl – metres below ground level

As documented in TO-024-1, fill material and natural soil/rock were removed from the majority of the site area to a depth of approximately 28 mbgl for the station box excavation (Areas B1-B3). Residual fill material remained in Areas B4-B7, which was removed during remedial works documented in the Validation Report.

5.2 Hydrogeology

TO-024-1 reported that a search of the groundwater information database maintained by the NSW Government identified eight registered groundwater bores within a 0.5 km radius of the site. The majority of the bores were registered for monitoring or recreational use. One bore (GW106192) located approximately 150 m southwest of the site was registered for domestic use. The depth of standing water in the bores ranged from 3.49 m to 11.6 mbgl. The Auditor undertook a search for registered bores in April 2024 and identified similar bores.

Based on the topography, groundwater was anticipated by DP to flow to the southwest. DP identified the closest sensitive ecological receptor for groundwater to be Sheas Creek located approximately 530 m to the southwest. The creek drains into Alexandra Canal then to Cooks River and Botany Bay located approximately 6 km to the south of the site. Excess surface water run-off is anticipated to flow into the local stormwater network.

The site is located in the Botany Sand Aquifer Embargo zone where the abstraction of groundwater for domestic use is banned due to historical regional contamination of the aquifer.

TO-024-1 reported that four groundwater monitoring wells were installed on the site. Groundwater observations and sampling were undertaken in December 2017 and the depth to groundwater was recorded between 3.3 m to 3.7 mbgl.

The RAP includes a summary of a Hydrogeological Interpretive Report by PSM (2018) which modelled the groundwater seepage rates expected during and post construction. DP summarised the findings as follows:

- Drawdown will occur in the immediate vicinity of the excavation due to vertical leakage through the residual soil of the Botany Sands Aquifer. Considering the high transmissivity of the sand aquifer, drawdown will be relatively flat with a large zone of influence;

- Contaminants are likely to be transmitted rapidly through the Botany Sands Aquifer. Considering that the structure will be tanked (constructed to limit groundwater inflow), the potential for inflow will be minimised;
- Maximum modelled seepage rate during construction (with inflows from faults) was 185 kL/day;
- Modelled steady state seepage rate prior to tanking the station structure was 147 kL/day;
- Water table in the Botany Sands Aquifer was at depths of 3 to 5 m;
- The modelled zone of capture for the first 10 years would extend to approximately 670 m from the site. The actual capture zone will depend on the time lapse between construction and tanking of the final structure; and
- Historical land use (existing and former commercial/ industrial premises in the vicinity, former Gas-N-Go service station, dry-cleaners) may have an impact on groundwater quality and potential for contamination migration (TRH, BTEXN, heavy metals and VOCs).

DP reported in the Validation Report that records from a round of groundwater monitoring undertaken prior to commencement of dewatering for the station box excavation recorded groundwater at depths of between approximately 3 and 4 mbgl, which is consistent with the PSM (2018) observation records of between 3 and 5 mbgl.

5.3 Auditor's Opinion

The Auditor considers that the site stratigraphy and hydrogeology are sufficiently well known for the purpose of the audit.

6. EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL

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

Table 6.1: Summary of Investigations and Remediation

Stage of Works	Field Data	Analytical Data
Validation Report (DP, 2024) *Fieldwork date: June 2023 to March 2024*	Three boreholes (WP-BH1 to WP-BH3) providing coverage and targeting fill materials within B4-B5 area (**Attachment 3, Appendix A**). Three test pits (B6-BTP1 to B6-TP3) providing coverage and targeting fill materials within the B6 area (**Attachment 4, Appendix A**). Sixteen validation soils samples targeting the base and walls of the B6 Area remedial excavation (**Attachment 5, Appendix A**). 41 primary samples obtained from six different imported materials. Gravimetric assessment of all samples for asbestos by field screening 10 litre bulk samples.	Soil (B4-B5 and B6 areas): Metals, TRH/BTEX, PAHs, phenols, OCPs, OPPs, PCBs and asbestos fines/fibrous asbestos (AF/FA) (500 mL) (% w/w) Validation Area B6 (Soil): AF/FA (500 mL) (% w/w) Imported materials: Metals, TRH/BTEX, PAHs, phenols, OCPs, OPPs, PCBs and AF/FA (500 mL) (% w/w). Select samples analysed for foreign materials.

The Auditor's assessment of data quality follows in **Tables 6.2 and 6.3.**

Table 6.2: QA/QC – Sampling and Analysis Methodology Assessment

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
Data Quality Objectives (DQO) DP defined specific DQOs in accordance with the seven-step process outlined in Schedule B2 of NEPM (2013). The following decision for the supplementary investigations reported in the validation report were identified in the DQOs: • Establish whether or not the results fall below the site assessment criteria (SAC) or (were appropriate) whether or not the 95% upper confidence limit (UCL) of the sample population falls below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective will be derived and a decision made on whether (or not) further assessment and/or remediation will be required.	The identified DQOs were considered appropriate.
Sampling pattern and locations Investigation locations were spaced to gain coverage of the majority of the areas. The various fill materials were also targeted for sampling. Validation samples targeted the base and walls of the remedial excavation. Samples of imported materials were collected from stockpiles and/or areas where materials had been placed.	In the Auditor's opinion, these locations are adequate. The absence of locations in B7 is acceptable.
Sampling density *Investigation:* The sampling density of three locations over approximately 130 m² (Area B6) and three locations over approximately 25 m² (Area B4-B5) is below the minimum recommended (8 locations for 0.05 ha) by EPA (2022) *Sampling Design Part 1 - Application*. The asbestos sample methodology adopted was in accordance with NEPM (2013).	The investigation sampling density was considered acceptable given the very small areas assessed. In the Auditor's opinion, the various sampling densities adopted were appropriate.

Sampling and Analysis Plan and Sampling Methodology	Auditor's Opinion
Validation: A total of 16 samples were obtained from the exposed soils within the excavation base (1 per 10 m^2) and walls (one per approximate 10 lineal metres and only along the northern and eastern walls). *Imported Materials*: A total of 41 primary samples were obtained from the six sources/material types imported to the site. The primary sampling was undertaken at the following frequencies: • Recycled DGB: 1 per 29.4 tonnes (t) • Recycled DGB: 1 per 12.7 t • Turf underlay: 1 per 13.5 t • Organic garden mix: 1 per 0.75 m^3 • Euci Mulch: 1 per 2.25 m^3 • 80/20 Sand: 1 per 0.66 m^3	
Sample depths Investigation samples were collected and analysed from a range of depths within fill materials. Validation samples were collected from the walls and floor of the excavation. Samples of imported materials were collected and analysed from a range of depths, however, the majority were obtained upon first contact/surface. Depths were dependant on depth of placement and thickness.	In the Auditor's opinion, this sampling strategy was appropriate and adequate to characterise the material.
Sample collection method Sample collection was via boreholes, presumably from auger flights, and test pits, however, no other collection details were provided. Select imported materials were sampled as grab samples either directly from the surface or applicable depth while validation samples were obtained as grab samples directly from the excavation faces.	Sample collection from the auger flights and open test pits is not ideal as it can result in loss of volatiles and sample cross contamination. Given the key contaminants within fill material was asbestos, this deficiency is not considered to be of great significance. Overall, in the context of the remediation works undertaken, the sample collection method was found to be acceptable.
Decontamination procedures Sampling equipment was cleaned with detergent, tap water and then de-ionised water prior to sampling and between sampling events to prevent cross contamination. New gloves were reportedly used for each new sample.	Acceptable
Sample handling and containers Samples were placed into prepared and preserved sampling containers provided by the laboratory and chilled during storage and subsequent transport to the laboratories. Samples for asbestos analysis (500 mL) were placed in plastic zip-lock bags.	Acceptable
Chain of Custody (COC) Completed COC forms were provided in the report.	Acceptable
Detailed description of field screening protocols Field screening for volatiles was not undertaken. 10 L samples were subject to a gravimetric assessment using a 7 mm sieve in the field in accordance with NEPM (2013).	Given the key contaminant during the current stage of remediation was asbestos, the absence of screening for volatiles is not considered to be of great significance.
Sampling logs Soil logs were provided within the text of the validation report for investigation boreholes and test pits, indicating depth and lithology. With the exception of anthropogenic materials, the logs report no indications of contamination were found. A separate sample register was provided for validation samples.	Acceptable

Table 6.3: QA/QC – Field and Lab Quality Assurance and Quality Control

Field and Lab QA/QC	Auditor's Opinion
Field quality control samples Field quality control samples including trip blanks, trip spikes, field intra-laboratory and inter-laboratory duplicates were undertaken at appropriate frequencies. Rinsate blanks were not required since dedicated sampling equipment was used for each location.	Acceptable.
Field quality control results The results of field quality control samples were generally within appropriate limits. The following exceptions were noted: • Relative Percent Difference calculations (RPDs) for two intra- and one inter-laboratory soil duplicate exceeded adopted limits for metals (lead and zinc) and TRH. The exceedances were not considered to be of concern by DP.	Overall, in the context of the dataset reported, the elevated RPD results are not considered significant and the field quality control results are acceptable.
NATA registered laboratory and NATA endorsed methods Laboratories used included: Envirolab (primary) and ALS (secondary). Laboratory certificates were NATA stamped.	Acceptable
Analytical methods Analytical methods were included in the laboratory test certificates. Both Envirolab and ALS provided brief method summaries of in-house NATA accredited methods used based on USEPA and/or APHA methods (excluding asbestos) for extraction and analysis in accordance with NEPM (2013). Asbestos identification was conducted using polarised light microscopy with dispersion staining by method AS4964-2004 *Method for the Qualitative Identification of Asbestos Bulk Samples*. The NEPM (2013) methodology of assessing a 500 ml sample to achieve a lower detection limit is not NATA accredited.	The analytical methods are considered acceptable for the purposes of the site audit, noting that the AS4964-2004 is currently the only available method in Australia for analysing asbestos.
Holding times Review of the COCs and laboratory certificates indicate that the holding times had been met. DP also reported that holding times were met.	Acceptable
Practical Quantitation Limits (PQLs) *Soil:* PQLs (except asbestos) were less than the threshold criteria for the contaminants of concern. *Asbestos:* The NATA approved limit of detection for asbestos in soil was 0.01% w/w, although NEPM (2013) analyses were reported to 0.001% w/w for AF/FA.	*Soil (except asbestos):* Overall the soil PQLs are acceptable. *Asbestos:* In the absence of any other validated analytical method, the detection limit for asbestos is considered acceptable.
Laboratory quality control samples Laboratory quality control samples including laboratory control samples, matrix spikes, surrogate spikes, blanks and duplicates were undertaken by the laboratory.	Acceptable
Laboratory quality control results The results of laboratory quality control samples were generally within appropriate limits, with the following exceptions: • Percent recovery for the surrogate/matrix spike of PAHs was not possible to report as the high concentration of analytes in samples caused interference. • The laboratory RPD acceptance criteria was exceeded for individual metals in four samples. Therefore, a triplicate result was issued. • Percent recovery for metals was not possible to report due to the inhomogeneous nature of the elements in the two	The slightly elevated spike recoveries are not considered to affect the usability of the data as TRH and BTEX were not detected above guidelines in any of the samples analysed. In the context of the dataset reported, the elevated RPDs and PQLs are not considered significant and the laboratory quality control results are acceptable.

Field and Lab QA/QC	Auditor's Opinion
samples. However, an acceptable recovery was obtained for the LCS. • PQLs were raised for PAHs, OCP, OPP, PCBs and TRH in three samples due to the light weight nature of the samples which resulted in a higher than routine dilution factor. DP concluded that the PQLs were acceptable.	
Data Quality Indicators (DQI) and Data Evaluation (completeness, comparability, representativeness, precision, accuracy) Predetermined data quality indicators (DQIs) were set for laboratory analyses including blanks, replicates, duplicates, laboratory control samples, matrix spikes and surrogate spikes. These were discussed with regard to the five category areas. DP concluded "*Based on the results of the field QA and field and laboratory QC, and evaluation against the DQI it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.*".	An assessment of the data quality with respect to the five category areas has been undertaken by the Auditor and is summarised in **Section 6.1** below.

6.1 Auditor's Opinion

In considering the data as a whole, the Auditor concludes that:

- The data is considered to be representative of the remediated areas of the site and imported materials.
- The data is considered adequately complete.
- There data is considered adequately comparable.
- The laboratories provided sufficient information to conclude that data is of sufficient precision.
- While most of the data is likely to be accurate, there is some doubt regarding possible loss of volatiles from sampling of open test pits and sampling from boreholes. This is not considered to be significant given that volatiles are not a primary contaminant of concern in fill and were not identified in surficial fill material during TO-024-1.

7. ENVIRONMENTAL QUALITY CRITERIA

The Auditor has assessed the results against Tier 1 criteria from NEPM (2013). Other guidance has been adopted where NEPM (2013) is not applicable or criteria are not provided. Based on the proposed development (below ground train station and ancillary areas), the human health and ecological criteria appropriate for 'commercial/industrial' land uses were adopted.

7.1 Soil Assessment Criteria

7.1.1 Human Health Assessment Criteria

The Auditor has adopted human health assessment criteria from the following sources:

- NEPM (2013) Health Investigation Levels (HILs) for 'Commercial/Industrial' (HIL D) land use.
- NEPM (2013) Health Screening Levels (HSLs) for 'Commercial/Industrial' (HSL D) land use. The HSLs assumed a sand soil type. Depth to source adopted was <1 m as an initial screen.
- NEPM (2013) Management Limits (MLs) for petroleum hydrocarbons for 'Commercial/Industrial' land use and assuming coarse soil texture.
- NEPM (2013) HSLs for Asbestos Contamination in Soil for 'Commercial/Industrial' (HSL D) land use.

7.1.2 Ecological Assessment Criteria

The Auditor has adopted ecological soil assessment criteria from the following sources:

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

7.1.3 Soil Aesthetic Considerations

The Auditor has considered the need for soil remediation based on 'aesthetic' contamination as outlined in *Section 3.6 Aesthetic Considerations* of NEPM (2013) Schedule B1, which acknowledges that there are no chemical-specific numerical aesthetic guidelines. Instead, site assessment requires a balanced consideration of the quantity, type and distribution of foreign material or odours in relation to the specific land use and its sensitivity.

7.1.4 Imported Fill

Imported fill has been assessed in relation to attributes expected of virgin excavated natural material (VENM). The NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste* defines VENM as "*…natural material (such as clay, gravel, sand, soil or rock fines):*

- *'that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities*
- *'that does not contain sulphidic ores or soils, or any other waste, and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice in the NSW Government Gazette."*

On this basis, the Auditor considers that for soil to be classified as VENM, the following criteria generally apply:

- Organic compounds (including petroleum hydrocarbons, PAHs, OCPs, PCBs and phenols) should be less than the PQLs.
- Inorganic compounds should be consistent with background concentrations.
- The material should not contain or comprise actual or potential acid sulphate soil.

Imported material, such as excavated natural material (ENM) or mulch, was assessed against the requirements of the applicable resource recovery order (RRO) and resource recovery exemption (RRE) issued by the EPA under clause 93 of the *Protection of the Environment Operations (Waste) Regulation 2014*.

7.2 Auditor's Opinion

The environmental quality criteria referenced by the Auditor are consistent with the Site Acceptance Criteria (SAC) adopted by DP during validation of remediation.

8. SUMMARY OF TO-024-1 AND PREVIOUS REMEDIATION

IAA5 was prepared by the Auditor in May 2018 documenting the review of the suitability and appropriateness of the RAP, as well as a review of the previous investigations undertaken at the site. The IAA is provided in **Appendix C**.

Following issue of IAA5, further investigation of soil, groundwater and soil vapour were undertaken, followed by remediation and validation of the station box excavation. These works were specific to Area B1-B3 and were reviewed in TO-024-1, dated 2 June 2020.

The soil analytical results reviewed by the Auditor for IAA5 and TO-024-1 were consistent with the site history and field observations, with results indicating the fill to be locally impacted by lead, PCE and asbestos. Remediation of fill material was required during excavation of the station box, which was completed by excavation and offsite disposal.

The groundwater and soil vapour analytical results identified VOC impact associated with the former dry-cleaner located within the offsite MQD site. The primary source of contamination (dry-cleaner) had been removed, however secondary impact by chlorinated hydrocarbons remained in soil and groundwater. VOC contamination located onsite was removed during excavation of the station box to a depth of approximately 28 mbgl. The risk from further migration of contamination on to the site was expected to be limited by the secant pile wall, the proposed tanking of the station, and the station ventilation system (once constructed). The HHRA was undertaken to confirm this (discussed in **Section 10**). Implementation of these aspects during development of the site is reviewed in this SAR (**Section 10**).

Ancillary areas for station access and landscaping surrounding the station box (Areas B4-B7) were not part of the previous audit. These areas were investigated and results reported in the Validation Report (discussed in **Section 9**).

9. EVALUATION OF SOIL RESULTS

A summary of the soil investigations undertaken in ancillary areas (Areas B4-B7) for station access and landscaping surrounding the station box is provided in **Table 6.1**. The analytical results of these investigations are discussed below.

DP reported in the Validation Report that excavation and offsite disposal of some fill soils had already occurred in the B4-B5 Area at the time of fieldwork. The area appeared to have been backfilled with an imported recycled aggregate. DP understood that this was undertaken to provide a platform suitable for loading heavy plant into the station. DP reported that there were no conclusive records of the extent of excavation and imported fill replacement, however, the upper horizon of fill observed in the boreholes was considered consistent with a recycled aggregate product.

9.1 Analytical Results

The analytical results have been assessed against the environmental quality criteria and are summarised in **Table 9.1**. Soil sampling locations are shown on **Attachment 3 and 4, Appendix A**.

Table 9.1: Evaluation of Soil Investigation Analytical Results – Summary Table

Analyte	n	Detections	Maximum (mg/kg)	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
ACM >7 mm (10 L samples)	13	1	**0.06% (w/w)**	**1 above HSL D 0.05%**	-
AF/FA (500 mL samples)	16	0	<PQL	0 above HSL 0.001%	-
Asbestos in soil	17	0	Not Detected	0 above 0.1 g/kg	-
Asbestos trace analysis	17	0	Not Detected	-	-
Asbestos in material	1	1	**Detected**	-	-
BTEX	18	0	<PQL	0 above HSL D 0-1 m	0 above ESL (commercial/industrial) (sand)
F1 (TRH C_6–C_{10} minus BTEX)	18	0	<PQL	0 above HSL D 0-1 m, sand 260 mg/kg	0 above ESL (commercial/industrial) 215 mg/kg
F2 (TRH >C_{10}–C_{16} minus naphthalene)	18	0	<PQL	0 above HSL D 0-1 m, sand NL	-
TRH C_6–C_{10}	18	0	<PQL	0 above ML (commercial/industrial) 700 mg/kg	-
TRH >C_{10}–C_{16}	18	0	<PQL	0 above ML (commercial/industrial) 1000 mg/kg	0 above ESL (commercial/industrial) 170 mg/kg
TRH >C_{16}-C_{34}	18	8	870	0 above ML (commercial/industrial) 3500 mg/kg	0 above ESL (commercial/industrial) 1700 mg/kg
TRH >C_{34}-C_{40}	18	7	410	0 above ML (commercial/industrial) 10,000 mg/kg	0 above ESL (commercial/industrial) 3300 mg/kg

Analyte	n	Detections	Maximum (mg/kg)	n > Human Health Screening Criteria	n > Terrestrial Ecological Screening Criteria
Naphthalene	18	2	0.1	0 above HSL D 0-1 m, sand NL	0 above EIL (commercial/industrial) 370 mg/kg
Benzo(a)pyrene	18	15	1	-	0 above CCME SQG (commercial/industrial) 72 mg/kg
Benzo(a)pyrene TEQ	18	15	1.5	0 above HIL D 40 mg/kg	-
Total PAHs	18	15	11	0 above HIL D 4000 mg/kg	-
Total Phenols	12	0	<PQL	0 above HIL D 240,000 mg/kg	-
Arsenic	18	0	<PQL	0 above HIL D 3000 mg/kg	0 above EIL (commercial/industrial) of 160 mg/kg
Cadmium	18	0	<PQL	0 above HIL D 900 mg/kg	-
Chromium	18	6	19	0 above HIL D 3600 mg/kg	0 above most conservative ACL (commercial/industrial) 310 mg/kg
Copper	18	16	27	0 above HIL D 240,000 mg/kg	0 above most conservative ACL (commercial/industrial) 85 mg/kg
Lead	18	18	170	0 above HIL D 1500 mg/kg	0 above generic ACL (commercial/industrial) 1800 mg/kg
Mercury	18	8	0.2	0 above HIL D 730 mg/kg	-
Nickel	18	15	11	0 above HIL D 6000 mg/kg	0 above most conservative ACL (commercial/industrial) 55 mg/kg
Zinc	18	18	**180**	0 above HIL D 400,000 mg/kg	**1 above most conservative ACL (commercial/industrial) 110 mg/kg**
PCB	18	0	<PQL	0 above HIL D 7 mg/kg	-
OCP	18	0	<PQL	0 above HIL D	0 above EIL
OPP	18	0	<PQL	0 above HIL D	-

n number of samples
- No criteria available/used
NL Non-limiting
<PQL Less than the practical quantitation limit

In reviewing the analytical results, the Auditor notes the following:

- Suspected ACM was identified during gravimetric assessment of one 10 litre bulk sample (TP1 (0-0.5 m)) within Area B6. Laboratory analysis confirmed the presence of asbestos. The concentration of asbestos was calculated to be 0.06% (w/w) which exceeded the HSL for commercial/industrial land use. Asbestos was not observed or identified during remaining sampling or gravimetric assessment. AF/FA was not detected in the samples analysed by the laboratory.

- Concentrations of other contaminants, if detected, were generally marginally above the PQL and were below the adopted human health and ecological criteria. A concentration of zinc was detected in surface fill at TP1 within Area B6 which was above the most conservative ACL adopted for ecological receptors. The zinc concentration is likely to be below an EIL calculated based on background zinc concentrations in natural soil and a site-specific ACL based on soil parameters.

9.2 Auditor's Opinion

In the Auditor's opinion, the soil analytical results are consistent with the site history and field observations. The results indicate that the materials within Area B6 were impacted by ACM and required remediation. The development comprised minimal soft landscaping and therefore very limited ecological habitat (which comprised imported topsoil and mulch). The identified elevated zinc is considered to be of low risk, however, is collocated with the identified ACM which requires remediation.

Contamination requiring remediation was not identified within Area B4, B5 and B7 based on supplementary investigations completed, however fill required removal to install services, accommodate landscaping/paving or because it was geotechnically unsuitable.

10. EVALUATION OF REMEDIATION

10.1 Pre-remediation Conceptual Site Model

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

Based on the previous investigation results and the previous remediation/validation works undertaken for the station box (documented in IAA5 and TO-024-1), DP determined that two potential sources of contamination remained with potential complete SPR linkages. The pre-remediation CSM from the Validation Report is presented as **Attachment 6, Appendix A**. The Auditor notes that the CSM required further assessment of fill material in Areas B4-B7, however, assessment of these areas was undertaken and reported in the Validation report.

10.2 Remediation Planning and Remediation Required

A RAP was previously prepared for the bulk excavation for Waterloo Station and an evaluation of the RAP was undertaken by the Auditor as part of IAA5 (**Appendix C**), which included a comparison with the checklist included in OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites* (replaced by NSW EPA (2020) *Consultants Reporting on Contaminated Land*). The RAP was found to address the required information, and the Auditor concluded that the remediation approach was adequate to address contaminated fill material during redevelopment of the site through excavation and offsite disposal of contaminated fill material and natural soil and successful validation.

Contamination was removed from within the station box excavation, as reported in TO-024-1. However, the potential for new contamination to migrate onto the site from known offsite sources was identified. The offsite sources comprised a former dry-cleaner and service station, located within the MQD site to the west of the site. Remediation of these offsite contamination sources is anticipated to occur as part of the remediation and basement excavation works for the MQD development.

DP prepared the CLMS which reported that the offsite contamination sources could include abandoned underground petroleum storage systems and contaminated soil, groundwater and soil vapour. The potential for impact on users of the station would be through vapour intrusion of trace gases from these sources, comprising VOCs including volatile chlorinated hydrocarbons (VCH) and petroleum hydrocarbons. These contaminants of potential concern were previously identified in groundwater and soil vapour at the site prior to completion of excavation for the station box.

The CLMS outlined a strategy to be adopted for further assessment, management and/or remediation of contamination presenting a potentially unacceptable risk to future site users of the station. The CLMS also provided a summary of the station design and included specific design details relating to waterproofing and the Environmental Control System comprising mechanical ventilation systems, chilled water systems, water cooled variable refrigerant flow systems, retail provisions and life safety mechanical systems.

The strategy outlined in the CLMS included multiple steps and potential scenarios, however, noted that preparation of a HHRA was required along with potential for an updated RAP and a Construction Quality Assurance (CQA) Plan detailing the construction elements required to mitigate the risk from the identified contamination and the quality assurance measures required to record the construction/installation. A CQA Validation Plan, including a statement regarding the

suitability of the development for the proposed use, from a contamination perspective, was also required.

A HHRA was prepared by EnRiskS based on the proposed station use and design (structure, waterproofing, ventilation), along with the available investigation data. The HHRA concluded that health risks to future users of Waterloo Station were low and acceptable, provided that the waterproofing and ventilation of the completed structure were consistent with the parameters and assumptions made in the HHRA. The HHRA also concluded that no further work including vapour intrusion risk management measures were required. The HHRA was reviewed by the during the Audit and the conclusions were found to be appropriate. Sydney Metro prepared a Construction Specification for installation of waterproofing (SMCSWSWL-RBG-SWL-ST-SPC-100019).

Following preparation of the CLMS and HHRA, DP prepared the RAP Addendum including potential remedial strategies of onsite containment of contaminated soils if the requirement for remediation was identified during the supplementary assessment. The RAP Addendum was reviewed by the Auditor during the course of the Audit and the additional potential remedial strategies outlined were considered appropriate if required. The supplementary investigations indicated the requirement to remediate fill within Area B6. Based on the small quantity of fill material within Area B6, the preferred remedial option was excavation and offsite disposal. Supplementary assessment in Areas B4 and B5 did not identify the requirement for remediation, however, fill from these areas was removed and disposed offsite because they were either geotechnically unsuitable or required to be removed to accommodate landscaping/paving.

10.3 Remediation and Validation Works Undertaken

Remediation was undertaken between September 2020 and April 2024 by JH and its subcontractors, with environmental consulting provided by DP and EDP Consultants Pty Ltd (EDP).

The Validation Report summarised 19 site inspections undertaken by DP. The following subsections summarise the remediation and validation activities undertaken.

10.3.1 Remediation and Validation of Asbestos Impact (Area B6)

Asbestos contaminated fill was excavated from Area B6 during excavation events over four periods on 13 July 2023, August-November 2023, 6 December 2023 and 10 January 2024 with materials disposed offsite. The events were termed EDP Excavation, Watermain Excavation and Ward Excavation and locations are illustrated on **Attachment 7, Appendix A**. The Validation Report notes that the EDP Excavation covered a 25 m^2 area over the western portion of Area B6 and extended to a depth of 0.8 mbgl. The Watermain Excavation was also located over the western portion of Area B6 (including the EDP Excavation area) and extended to depths of 2 to 2.5 mbgl. The Ward Excavation covered the eastern portion of Area B6 and extended to 1.5 mbgl. DP reported that the previous investigations identified a fill depth of approximately 1.4 m in Area B6 and the excavation depths extended to 1.5 to 2.5 mbgl.

DP reported that excavation terminated at the northern and south-eastern site boundaries where electrical services were encountered. A concrete slab (approximate 0.7 m thick) was observed in the exposed areas of the southern wall of the excavation which JH advised was the capping beam that forms the southern boundary of Area B6. The base of the excavation appeared to be into natural sands with the exception of an approximate 1 m^2 area in the southwest of the excavation where residual fill was present.

16 soil validation samples were collected from base, southern, western and northeastern and eastern excavation face as shown in **Attachment 5, Appendix A**. Samples were collected from natural materials, with the exception of Sample B6-V-F1 which was collected from residual fill in the southwest of the excavation base. A natural sample was obtained (V-B1) by hand excavation approximately 0.4 m below the remaining fill. Samples were analysed at the laboratory for

AF/FA. Seven samples, including Sample B6-V-F1, were also selected for gravimetric assessment for the presence of ACM. AF/FA was not detected in the samples analysed and ACM was not identified during the gravimetric assessment.

DP reported that visually clean sand with a similar appearance to natural Botany Sands may have been placed in the area as part of previous works (i.e., for the water mains excavation and for forming of the piling cap). As a result, DP considered that some of the sampled wall materials may have been recently placed imported fill.

10.3.2 Validation of Station Construction and Risks from Offsite Groundwater and Soil Vapour

The QA/QC Report for the construction of the station waterproofing and ventilation system was provided in Appendix I of the Validation Report.

The QA/QC Report describes the construction works and the QA/QC process for the waterproofing and ventilation construction, provides summary and example QA/QC documentation, supporting figures and photographs, and installation certificates from Bluey Technologies Pty Ltd (the waterproofing contractor) certifying that the waterproofing to external areas was installed/implemented/constructed and were inspected, assessed and tested (where appropriate) in accordance with various relevant requirements.

The Validation Report documents that DP undertook six inspections during station construction. They observed portions of the concrete floors, walls and example methodologies of waterproofing installation and testing during these visits. The Validation Report noted that the observations during these visits were consistent with those described in the QA/QC Report, however, DP did not undertake any inspections of the ventilation installation.

The QA/QC Report concluded the following:

> "*Based on the fact that the waterproofing of the station box structure was constructed in accordance with the design and that necessary QAQC processes were undertaken during the construction, JHG are of the opinion that the Waterloo Metro Station Box, as a fully tanked system, is protected from potential future groundwater ingress. Waterproofing will prevent ingress of the potentially contaminated groundwater and associated VOCs in to the station box and impact on its future users. No significant outstanding issues were identified during the construction and sign-off processes of the waterproofing system.*
>
> *All one hundred and thirty construction (pre-commissioning) lots have been closed which include all materials approvals, factory acceptance of mechanical equipment, As-Built Drawings. Thirty-three related hold and witness points have been released by JHG, designer and the client.*
>
> *Three post construction lots for Testing and Commissioning (T&C) for ventilation which include one hundred and thirty completed test procedures for supply and exhaust fans. (North and South). Test procedures have been reviewed and closed by the subcontractor, designer and JHG. Based on the above, the ventilation system is considered to be installed as per the design and therefore the potential for VOC vapour intrusion into the Station box impacting future site users is considered unlikely.*"

Based on the HHRA and construction validation provided in the QA/QC Report, DP considered that "*the risk from vapour ingress into the station from VOC in groundwater and soil vapour has been appropriately mitigated to prevent unacceptable risk to site users*".

10.3.3 Material Disposed Offsite

Waste materials generated on-site from the B6 Area remediation and general fill removal works were sampled and classified in accordance with the EPA (2014) *Waste Classification Guidelines*. Sampling from stockpiles of excavated soils and in-situ material was undertaken to characterise and classify the waste materials prior to offsite disposal. Approximately 450 t of waste material was disposed offsite including the following waste types:

- General Solid Waste (non-putrescible) (GSW)
- GSW – Special Waste (Asbestos)

Waste materials were disposed from the site between March 2023 and January 2024. DP included supporting documentation from JH including waste disposal dockets, asbestos documentation and a summary disposal register.

The Auditor has reviewed the documentation provided and is of the opinion that it was consistent with the remedial works described. Further assessment of the waste classifications and disposal quantities is provided in **Section 13.5**.

10.3.4 Imported Material

The Validation Report documents that approximately 474.55 t and 21.5 m^3 of materials were imported to the site for backfilling of local excavations to remove geotechnically unsuitable soils (B4-B5 Area) or contaminated soils (Area B6) and for landscaping purposes in garden beds (planter boxes).

The Validation Report notes that DP were provided with an import register maintained by JH that covered all soil, aggregate and landscaping materials imported onto the site. The register reported that all materials were inspected upon receipt, with no signs of concern observed.

The Auditor has summarised the materials imported to the site, including DP validation results, in **Table 10.1** below. DP concluded that *"…the imported materials meet the adopted SAC and were compatible with their use on site. The available results and statements from the providers (where provided) are consistent with the materials being produced and imported in general accordance with the relevant resource recovery orders (RRO)/ resource recovery exemptions (RRE) (where applicable) with the exception of the MDR – Recycled DGB20…".*

Table 10.1: Summary of Imported Fill

Source	Volume Imported	Material Type	Site Use	Supporting Documentation	Summary of Validation Data	Auditor Comments
Concrete Recyclers (Group) Pty Ltd	176.39 t	Recycled DGB20	[redacted]	Delivery dockets provided in the Validation Report note compliance with the EPA recovered aggregate order 2014. Material was imported between 27 and 29 March 2023. Two Envirolab laboratory certificates of analysis were provided in the validation report for samples obtained in October to December 2022 and October to December 2023.	Six samples analysed for metals, PAHs, TRH/BTEX, OCP, OPP, PCBs and asbestos (% w/w). No asbestos detected and all results were below the validation criteria.	Supplier data does not cover the period leading up to import. Based on the validation data obtained by DP and the site use, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use within hardstand areas.
Metropolitan Demolitions & Recycling Pty Ltd (MDR)	177.92 t	Recycled DGB20	[redacted]	A letter from the supplier (dated 13 February 2024) was appended to the Validation Report stating MDR have held an Environmental Protection Licence (EPL) 11483 since 9 October 2001 and are the holders of Metropolitan Demolitions Recovered Aggregate Exemption Order 2014. An Aggregate Sampling Plan and laboratory certificates for five samples from the period 9 November 2023 to 6 February 2024 were also appended to the Validation Report.	Fourteen samples analysed for asbestos (% w/w) and five samples analysed for PCBs. Asbestos (AF/FA) was detected in one sample, however, at a concentration below the adopted HSL. PCBs were not detected above the PQL. DP reported that an additional eight samples were obtained from the surface where materials had been placed by Sydney Environmental Group Pty Ltd (SEG), who were engaged in an occupational hygiene capacity and analysed for asbestos (% w/w). Asbestos was not detected. Based on the supplier documentation, field observations, laboratory results and reviewed investigation data from others, DP concluded that "*The asbestos in the DGB20 has been adequately characterised, and meets the SAC. Based on this, and that the material is to be covered by a concrete slab it is considered that the*	Based on the supporting documentation provided by the supplier and the validation data obtained by DP and others, and in consideration of the site use, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use within hardstand areas.

Source	Volume Imported	Material Type	Site Use	Supporting Documentation	Summary of Validation Data	Auditor Comments
					material is compatible with use on site with respect to the CLM Act with no ongoing management requirements.".	
Rock and Dirt Recycling Pty Ltd	53.8 t	Turf Underlay	[redacted]	A letter provided in the Validation Report from the supplier states that *"Rock & Dirt Recycling confirms that the Turf underlay product is in accordance with the NSW EPA "Continuous process" recovered fines order 2014. Rock & Dirt has a strict inspection & receival protocol in place for incoming materials. The protocol implemented by Rock & Dirt Recycling also includes a Testing Plan to comply with the testing requirements and frequencies of the "continuous process" recovered fines order 2014. VENM/ENM certified material is screened to produce our Turf underlay product and then tested weekly to ensure that our product is free from any hazardous/contaminated material".* Material was imported on 10 January 2024. Two laboratory test reports were provided in the validation report for samples obtained in August and September 2023 and January 2024.	Four samples analysed for metals, PAHs, TRH/BTEX, OCP, OPP, PCBs and asbestos (% w/w). Three samples analysed for foreign materials. No asbestos was detected. Remaining results were below the validation criteria.	Based on the supporting documentation provided by the supplier and the validation data obtained by DP, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use in garden beds.
Australian Native Landscapes Pty Ltd (ANL)	6 m^3	Commercial mixture - S1 Organic Garden Mix	[redacted]	A product specification was appended to the Validation Report which noted that the material consisted of a mixture of quarried sand, mulch and compost, which complies with the NSW EPA Pasteurised Garden Organics RRO.	Eight samples analysed for metals, PAHs, TRH/BTEX, OCP, OPP, PCBs, asbestos (% w/w) and foreign materials. No asbestos was detected. An elevated concentration of TRH was identified in one sample above the adopted ecological criteria. Following subsequent silica gel clean up	Based on the validation data obtained by DP, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use in garden beds.

Source	Volume Imported	Material Type	Site Use	Supporting Documentation	Summary of Validation Data	Auditor Comments
					analysis, the result was below the adopted ecological criteria. Remaining results were below the validation criteria.	
ANL	13.5 m³	Eucy Mulch	[redacted]	A product specification was appended to the Validation Report which noted that it is a 100% recycled mulch product derived from plantation and mixed species wood waste. Email correspondence from ANL appended to the validation report stated "*Australian Native Landscapes and our trademark Greenlife® have no association with Greenlife Resources Recovery. ANLs conforming risk management protocol in line with the NSW EPA RRO The Mulch Order 2016 is directly linked with our SOPs inclusive of our Raw Material Standard (R.M.S) that is within our SOP. We do not accept general waste, hazardous waste or engineered timber. We do not accept these materials. Our Eucy Mulch complies with the NSW EPA Resource Recovery Mulch Order 2016 and NSW EPA Resource Recovery Mulch Exemption 2016 and conforms with the AS4454 standard.*".	DP reported that no foreign materials were observed in stockpiled mulch during sampling. Some foreign materials were observed following placement, however, these could have been from site construction activities. Six samples analysed for metals, PAHs, TRH/BTEX, OCP, OPP, PCBs, asbestos (% w/w) and foreign materials. No asbestos was detected. Concentration of TRH were identified in all samples above the adopted ecological criteria. Following subsequent silica gel clean up analysis, the results were still above the adopted ecological criteria. Remaining results were below the validation criteria. DP reported that there are no limits for TRH under the EPA mulch order 2016 and, based on laboratory chromatograms, the detections are considered to be from organic matter in the mulch.	Based on the supporting documentation provided by the supplier and the validation data obtained by DP, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use in garden beds.
ANL	2 m³	Commercial mixture – 80:20 Quarried sand	[redacted]	A product specification was appended to the Validation Report which noted that the material consisted of a mixture of quarried sand and sandy loam.	Three samples analysed for metals, PAHs, TRH/BTEX, OCP, OPP, PCBs and asbestos (% w/w). No asbestos was detected. Remaining results were below the validation criteria.	Based on the validation data obtained by DP, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use in garden beds.

Source	Volume Imported	Material Type	Site Use	Supporting Documentation	Summary of Validation Data	Auditor Comments
PF Formation Pty Ltd Maroota quarries	63.44 t	Quarried Superfine sand		An undated letter was appended to the Validation Report which noted that PF Formation Pty Ltd are suppliers of natural quarry products. The product was quarried from naturally occurring, tertiary-aged alluvial sand and Triassic-aged friable Hawkesbury sandstone deposits. Natural quarry products are produced by screening and wet processing the naturally occurring reserves. No chemicals are used during the screening and washing process and the material is free from any process residues from industrial, chemical or agricultural activities and does not contain any sulfidic ores or soils or any other waste. The letter stated that "*Our natural quarry products cannot be classified as VENM by definition provided in Part 3, Schedule 1 of the Protection of the Environment Operations Act 1997 as the material is processed and stockpiled on site.*".	None obtained. DP also reported that they did not observe/inspect this material. JH inspected the material and did not identify signs of concern.	Based on the supporting documentation provided by the supplier indicating the material comprises quarried materials, the JH observations, and the suitability conclusions made by DP, the Auditor considers that the material is suitable (from a contamination perspective) for its intended use in construction and around services.

10.4 Auditor's Opinion

The remediation and validation activities were undertaken generally in accordance with the RAP and RAP Addendum and were adequate to demonstrate successful remediation. Remediation of the site included excavation and offsite disposal of the asbestos impacted fill.

Imported materials were generally assessed in accordance with the RAP and RAP Addendum and are considered suitable (from a contamination perspective) for their intended use.

Construction of the designed waterproofing and ventilation has been verified which supports the conclusions of the HHRA regarding risks posed from potentially contaminated offsite groundwater via vapour intrusion. The Auditor also notes that most of Area B9 of the MQD which contained secondary source material had been excavated to approximately 6 mbgl at the time of the site inspection on 23 February 2024. Details of the remediation and validation of Area B9 were not available, however, it is anticipated that the excavation works would have removed most or all of the VOC impact present within soil and groundwater in this offsite area, thereby further reducing the potential for migration of contamination.

11. CONTAMINATION MIGRATION POTENTIAL

11.1 Auditor's Opinion

Based on the remediation/excavation works outlined in the Validation Report and documented in TO-024-1, it is considered that all on-site sources of contamination have been removed during remediation/excavation works. There is therefore considered to be no potential for contamination to migrate from the site.

Offsite sources with the potential to impact future site users were identified, namely VOC contamination associated with a former offsite dry-cleaner located adjacent to the station box (within the MQD site immediately to the west of the site). Previous investigations audited in TO-024-1 identified VOC contamination in soil, groundwater and soil vapour at the site and MQD site.

The potential for migration of VOC impacted groundwater and soil vapour on to the site has been limited by the secant pile wall and tanking/waterproofing construction of the station. In addition, it is likely that most or all of the VOC impact present within soil and groundwater in this offsite MQD site area has been removed, thereby further reducing the potential for migration of contamination.

12. ASSESSMENT OF RISK

12.1 Post-Remediation CSM

DP included a post-remediation CSM in the Validation Report which noted that all identified soil contamination had been removed from the site. Bulk excavation of the MQD property immediately to the west of the site also reduces the risk of contamination migrating onto the site. The potential for vapour ingress from offsite sources is considered to be appropriately mitigated by the station structure, waterproofing and ventilation systems.

DP concluded that "*As such any residual contamination at the site is not considered to pose an unacceptable risk under the proposed land use.*".

12.2 Auditor's Opinion

Based on assessment of results against relevant guidelines and consideration of the overall investigations and remediation performed, the Auditor considers that contaminant concentrations remaining onsite do not pose a risk to site users or the environment under the proposed land use scenario.

The HHRA assessed the human health risk issues associated with groundwater contamination in the context of the proposed station development. The station was constructed as an undrained, tanked structure, the majority of which was designed for *"the complete absence of any leakage, seepage and damp patches"*. The design includes continuous concrete slabs (1.1-1.43 m thick) with an external waterproof membrane (100-year design life and resilient to hydrocarbons). The HHRA concluded that the exposure pathway to contamination in groundwater is incomplete and there are no health risks. Where minor failure of the waterproofing occurs, the station design and ventilation system, which was expected to result in 6 to 10 air exchanges per hour in publicly accessible areas, would result in a low and acceptable risk. The HHRA concluded that *"…health risks to future users of Waterloo Station, including members of the public and workers, are low and acceptable"*.

During the Auditor's site inspection, the offsite sources were observed to have been partially or entirely removed during basement excavation works. The Auditor agrees that the risks to site users from offsite sources are low and acceptable given that bulk excavation of the site and MQD site has removed most or all of the contamination and the station design (waterproofing) has eliminated the migration pathway onto the site.

Beneficial re-use of groundwater is not proposed at the site and therefore the risks to human health are low (i.e. no direct contact with seepage and no groundwater abstraction). However, any future use of groundwater would require appropriate regulatory approvals from the NSW Office of Water.

13. COMPLIANCE WITH REGULATORY GUIDELINES AND DIRECTIONS

13.1 General

The Auditor has used guidelines currently made and approved by the EPA under section 105 of the NSW *Contaminated Land Management Act 1997*.

The reporting was also generally conducted in accordance with NSW EPA (2020) *Consultants Reporting on Contaminated Land*.

13.2 Resilience and Hazards State Environment Planning Policy (SEPP) (2021)

The investigation was generally conducted in accordance with Chapter 4 Remediation of Land in SEPP R&H (formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (1998) 'Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land'. Documents that may be required by SEPP R&H and the status of these are summarise in **Table 13.1**.

Table 13.1: Reports Anticipated by SEPP R&H

Item	Auditor's Opinion
Assessment of site contamination which may include a – Preliminary Site Investigation	Addressed by reports reviewed during TO-024-1
– Detailed Site Investigation	Addressed by reports reviewed during TO-024-1
Remediation Action Plan	Addressed by reports reviewed during TO-024-1 and the RAP Addendum
Validation Report	Addressed by reports reviewed during TO-024-1 and the Validation Report
Environmental Management Plan	Not required

13.3 Development Approvals

A statutory site audit is required for the proposed Waterloo Station development, part of the Sydney Metro rail project between Chatswood and Sydenham, to address the requirements of Condition E67 of Infrastructure Approval, application SSI 15_7400, approved by the NSW Minister for Planning on 9 January 2017. Condition E67 relates to contamination and requires a site audit as follows:

> *"If a Site Contamination Report prepared under Condition E66 finds such land contains contamination, a site audit is required to determine the suitability of a site for a specified use. If a site audit is required, a Site Audit Statement and Site Audit Report must be prepared by a NSW EPA Accredited Site Auditor. Contaminated land must not be used for the purpose approved under the terms of this approval until a Site Audit Statement is obtained that declares the land is suitable for that purpose and any conditions on the Site Audit Statement have been complied with.".*

This SAR and accompanying SAS has been completed to comply with this condition.

13.4 Duty to Report

Consideration has been given to the requirements of the EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*. Based on the findings of this SAR, the Auditor considers that the site is not required to be notified under the Duty to Report requirements.

13.5 Waste Management

In accordance with Section 4.3.7 of the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition),* the Auditor has checked the following aspects relating to waste disposal.

13.5.1 Waste Classification

Three waste classification letters were prepared for the site by DP and EDP which were appended to the validation report. It was reported that wastes were classified in accordance with the NSW EPA (2014) *Waste Classification Guidelines, Part 1: Classifying Waste*. The adopted waste classification strategy included sampling from stockpiles of excavated soils and in-situ material.

The following waste classification letter reports were prepared for soils at the site and have been reviewed by the Auditor:

- 'In Situ Waste Classification – Waterloo Integrated Station Development, Waterloo NSW', dated 20 June 2022, EDP (**EDP 2022**). GSW classification for soils within 'deep lift asphalt' area and additional areas in footpaths and streets surrounding the site. The 'deep lift asphalt' area was located closest to Area B4-B5 of the site.
- 'In Situ Waste Classification - Area B6, SMC & SW Waterloo Station Proposed Waterloo Metro Station, Cope Street, Waterloo', dated 27 June 2023, DP (**DP 2023**). GSW – Special Waste (Asbestos) for fill materials excavated from Area B6.
- 'Waste Classification Certificate – Waterloo ISD Area B6, Waterloo NSW', dated 17 July 2023, EDP (**EDP 2023**). GSW for a portion of fill material within Area B6. DP reported in the Validation Report that this waste classification certificate did not consider the presence of asbestos identified in DP (2023), however DP noted that the asbestos impacted materials were removed before EDP (2023) was prepared.

13.5.2 Waste Volumes, Disposal Receipts and Disposal Facilities

Thirty-six waste dockets were provided in the validation report for the offsite disposal of GSW and GSW – Special Waste (Asbestos) occurring between 31 March 2023 and 10 January 2024.

DP report that a total of 450 t was removed offsite. The Auditor has assessed the volumes in the dockets provided and calculated 449.90 t was disposed offsite.

Table 13.2 summarises the waste disposal information for material disposed offsite to several waste management facilities that are licensed to receive the specified waste under their EPL.

Table 13.2: Summary of Waste Disposal

Waste Classification	Source	Tonnage (t)	Disposal Facility	EPL No.
GSW	[redacted]	130.69	MET Recycling	20948
GSW	[redacted]	23.79	Bingo Waste Service Paton Lane	20814
GSW – Special Waste (Asbestos)	[redacted]	20.66	Bingo Waste Service Eastern Creek Ecology Park	13426
GSW – Special Waste (Asbestos)	[redacted]	207.68	Glenfield Waste Services	4614

Based on information provided by JH, DP reported that the spoil from Area B4/B5 left site on 25 and 27 March 2023 and was taken to the subcontractors depot (Ferrycarrig Construction) at 20 Dasea Street, Chullora 2190. Date specific transport documentation from Ferrycarrig Construction documented the removal of the waste from site for these dates, however, the

documentation did not record the destination/disposal facility. JH advised DP that Ferrycarrig Construction subsequently disposed of the material to Met Recycling on 31 March 2023 and corresponding waste disposal dockets were included in the Validation Report.

The Met Recycling EPL includes concentration limits for a range of contaminants. The total PAHs concentrations of 192.5 and 347.1 mg/kg in the EDP (2022) waste classification for two samples within the 'deep lift asphalt' area exceeded the specified 'Other Limits' concentration of 80 mg/kg in the EPL. In addition, the benzo(a)pyrene concentrations reported for four samples within the 'deep lift asphalt' area exceeded the CT1 thresholds of General Solid Waste in Table 1 of the Waste Classification Guidelines.

DP report in the Validation Report that an EPL (21108) has been issued to Pacific National Services Pty Ltd (licensee) for 20 Dasea Street, Chullora (the Ferrycarrig Construction depot location). The EPL allows for the storage of some wastes however not GSW.

13.5.3 Auditor's Opinion

Based on the results presented in EDP (2022), waste in the 'deep lift asphalt' area included results for benzo(a)pyrene above the CT1 thresholds and PAHs above the 'Other Limits' threshold in the Met Recycling EPL. In addition, the temporary storage of GSW at the Ferrycarrig Construction depot was not in accordance with the premise EPL. As a result, these potential waste compliance issues were notified to the EPA on 29 May 2024 (**Appendix D**).

13.6 VENM and Other Imported Materials

Based on the information in **Section 10.3.4** and the site visit on 23 February 2024, the Auditor is of the opinion that the imported materials were suitable for use at the site from a contamination perspective. The Validation Report documents that asbestos was identified in one sample of the recycled DGB20 imported from Metropolitan Demolitions & Recycling Pty Ltd. DP provided advice on the detection relative to the POEO Act and the Validation Report documents that JH notified the EPA based on this advice (EPA Reference No. 27727).

Imported materials were generally assessed in accordance with the RAP and RAP Addendum.

13.7 Licenses

DP reported that asbestos removal work was completed by Ferrycarrig Construction Pty Ltd (Licence Number AD212915) and Ward Asbestos Remediation Services Pty Ltd (Licence Number AD204404). Copies of the appropriate licences were not provided in the Validation Report, however, the Auditor checked the Service NSW 'Verify a Licence' register (https://verify.licence.nsw.gov.au/home) on 17 May 2024 and confirmed the license were held.

13.8 Conflict of Interest

The Auditor has considered the potential for a conflict of interest in accordance with the requirements of Section 3.2.3 of the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*.

The Auditor considers that there are no conflicts of interest, given that:

1. The Auditor is not related to a person by whom any part of the land is owned or occupied.
2. The Auditor does not have a pecuniary interest in any part of the land or any activity carried out on any part of the land.
3. The Auditor has not reviewed any aspect of work carried out by, or a report written by, the site auditor or a person to whom the site auditor is related.

14. CONCLUSIONS AND RECOMMENDATIONS

DP concluded in the Validation Report that "*JH has conducted remediation on the site, including measures which mitigate potential unacceptable exposure of site users to soil vapour and remediation of asbestos contaminated fill. Potential non-compliances with the POEO Act relating to imported materials and disposal of soil have been raised and discussed in the report. Based on the information presented in this report, including information provided by JH, and the relevant regulations, it is considered that the site is suitable for the proposed Waterloo Station land use from a contaminated land perspective.*".

Based on the information presented in the consultants reports, observations made on site, and following the Decision-making process for assessing urban redevelopment sites in NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd Edition)*, the Auditor concludes that the site is suitable for the proposed commercial/industrial use (underground train station).

Groundwater has not been assessed for any beneficial re-use. Any future use of groundwater would require appropriate assessment and regulatory approvals from the NSW Office of Water.

15. OTHER RELEVANT INFORMATION

This Audit was conducted on behalf of John Holland Pty Ltd for the purpose of assessing whether the land is suitable for the proposed commercial/industrial use, i.e. a "Site Audit" as defined in Section 4 (definition of a 'site audit' (b)(iii)) of the CLM Act.

This summary report may not be suitable for other uses. The consultants included limitations in their reports. The Audit must also be subject to those limitations. The Auditor has prepared this document in good faith, but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check.

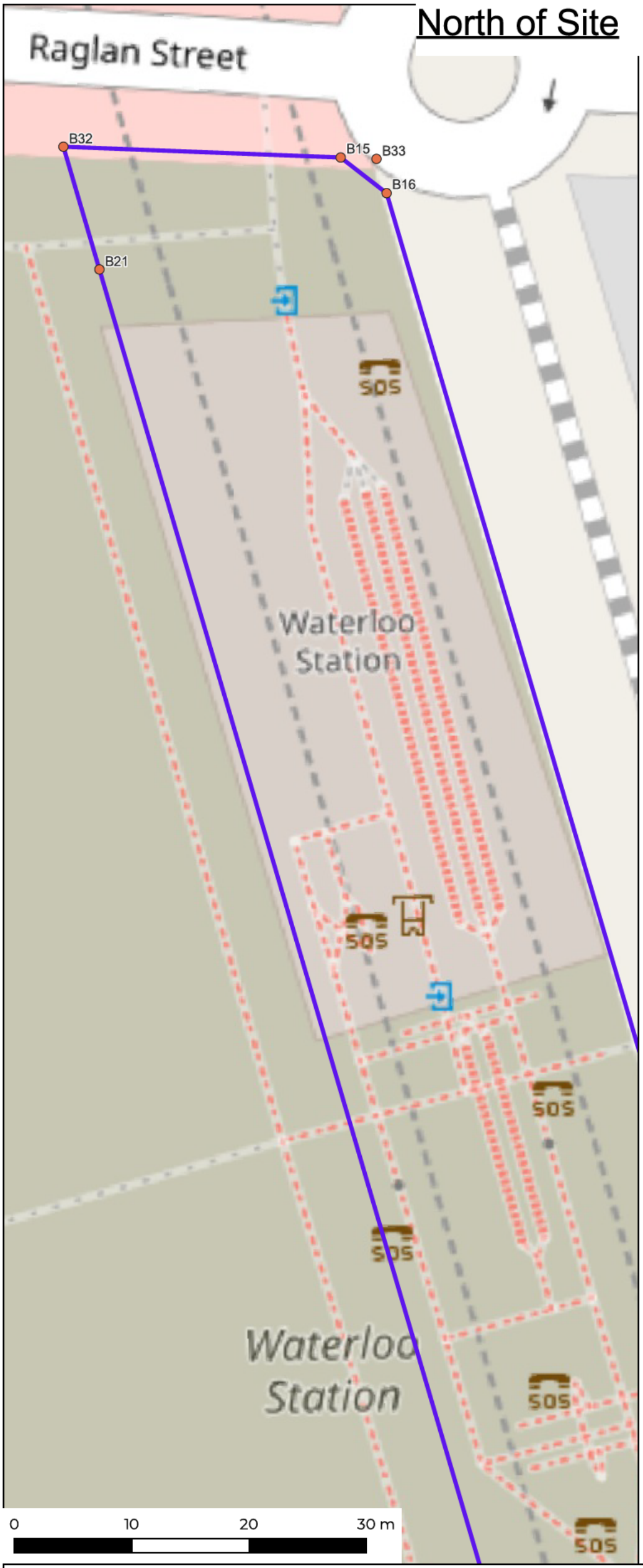
The Auditor has relied on the documents referenced in Section 1 of the Site Audit Report in preparing the Auditor's opinion. If the Auditor is unable to rely on any of those documents, the conclusions of the audit could change.

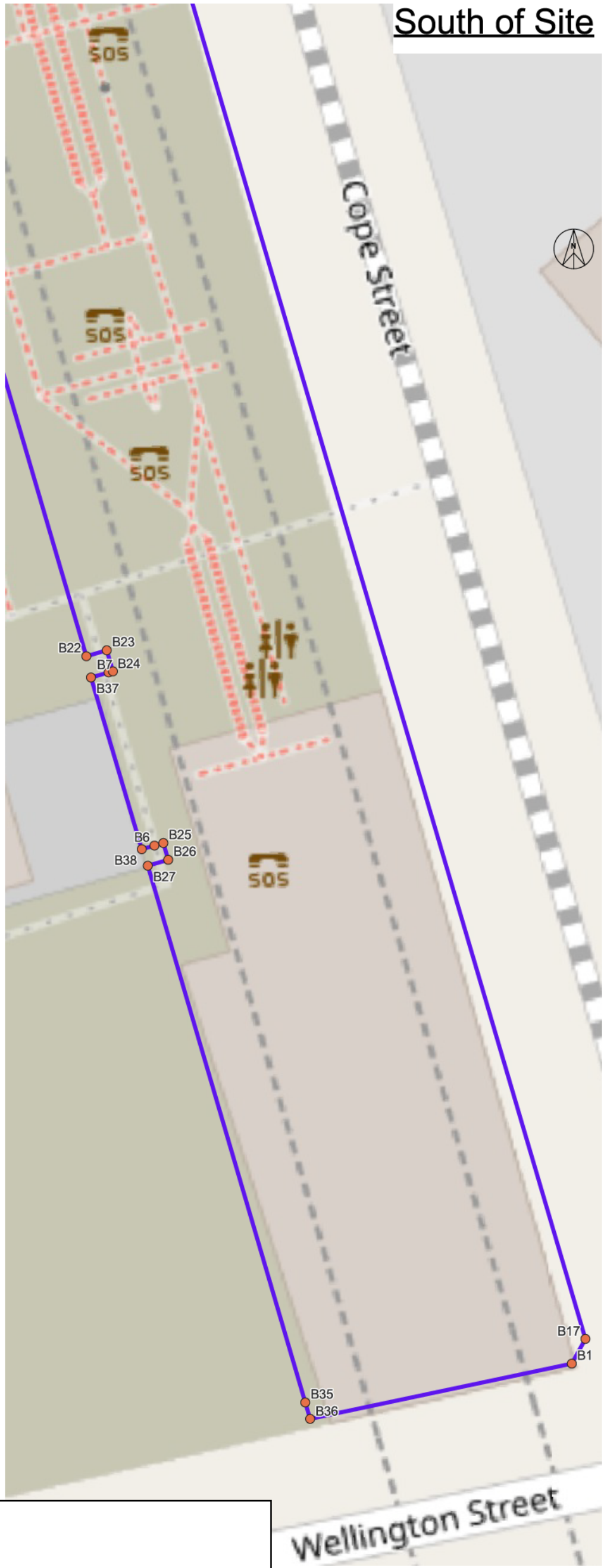
It is not possible in a Site Audit Report to present all data which could be of interest to all readers of this report. Readers are referred to the referenced reports for further data. Users of this document should satisfy themselves concerning its application to, and where necessary seek expert advice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

APPENDIX A
ATTACHMENTS

Attachment 1: Site Location
Attachment 2: Site Area Layout
Attachment 3: Area B4-B5 Investigation Sample Locations
Attachment 4: Area B6 Investigation Sample Locations
Attachment 5: Area B6 Validation Sample Locations
Attachment 6: Pre-Remediation CSM
Attachment 7: Area B6 Remedial Excavation Areas

Attachment 1: Site Location





LEGEND

- Site boundary
- Vertices from NWRLSRT-RPS-SWS-SR-DWG-000024-C-Waterloo Station Fig 2.1.dwg, approved October 2018

Base map from Open Street Map

Douglas PARTNERS	TITLE: **Site Location** **Waterloo Integrated Station Development** **Cope Street, Waterloo NSW**		N	OFFICE: Sydney DRAWN BY: NLE DATE: 25.February.2024
CLIENT: John Holland Pty Ltd	PROJECT No: 85608.17	DRAWING No: R.009.D.01	REVISION: 0	SCALE: 1:400 @A3

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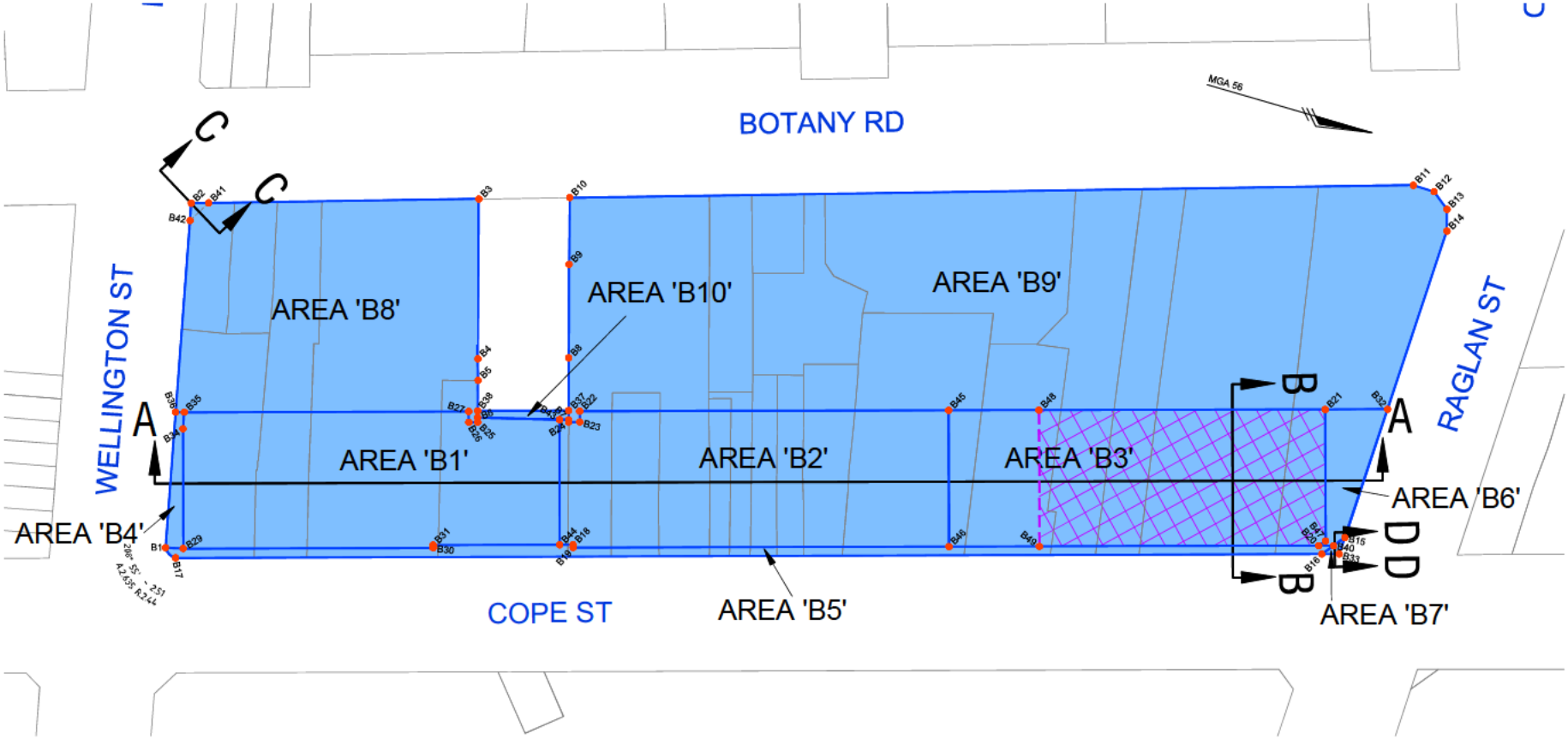
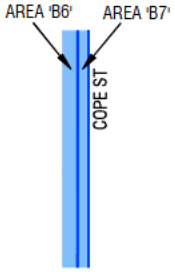
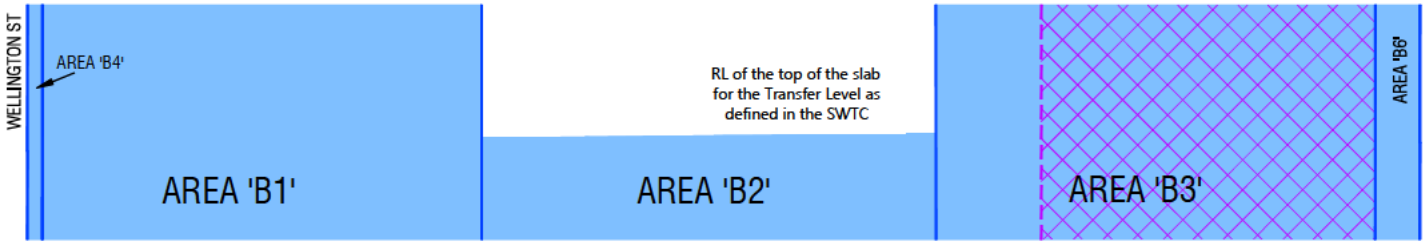




SECTION D-D



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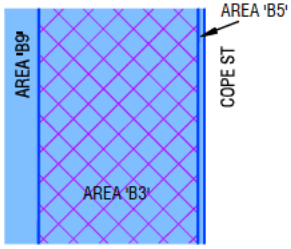

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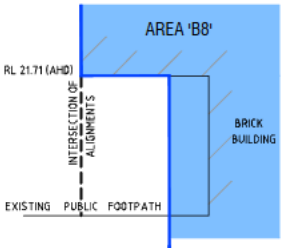

SECTION C-C
NOT TO SCALE

NOTES:
Boundaries and coordinates have been compiled from a combination of PPN DP1257150 (subject to Registration), deposited plans, design files, sketches and digitised aerial photography. Dimensions, and any derived CAD model and coordinates are subject to verification by field survey and design progression.

No.	DATE	REVISION DETAILS	DRAWN	CHK	APP
C	25.10.2019	UPDATE PLAN	NEC	SMG	SMG
B	16.10.2019	ADD AREA B3A	HY	HY	MGL
A	17.10.2018	INITIAL VERSION	HY	HY	MGL

HORIZ. SCALE: NOT TO SCALE
COORDINATES: MGA | DATUM:
ORIGIN: | ORIGIN:

LEGEND
Coordinate identifier
Area boundary
Area
AREA 'B3A'

CLIENT: NSW Government — Transport for NSW
SURVEY: | DATE OF SURVEY:
DRAWN: HY | DATE OF PLAN: OCT 2018
CHECKED: HY | DATE LAST SAVED: 25/10/2019
APPROVED: MGL | DATE APPROVED: 17.10.2018

TITLE: SMC & SW WATERLOO STATION AND METRO QUARTER DEVELOPMENT SITE ACCESS PLAN
DRAWING No: NWRLSRT-RPS-SWS-SR-DWG-000024-C-Waterloo Station Fig 2.1.dwg
JOB No: PR124856 | ISSUE: C
SHEET 1 OF 2 SHEETS | SIZE: A1

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
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Attachment 3: Area B4-B5 Investigation Sample Locations

LOCATION

LEGEND

- B4-B5 Investigation area
- Area B4 and south of Area B5
- Test pits
- Boundary vertices

NOTE:
1. Drawing projection in GDA94 / MGA zone 56, adapted from aerial imagery from Metromap.com dated 26/07/2023
2. Boundaries and test locations are approximate only

0 2 4 6 8 10 12 14 16 18 20 m

Douglas PARTNERS

CLIENT: John Holland Pty Ltd		
OFFICE: Sydney	DRAWN BY: NLE	
SCALE: 1:100 @A3	DATE: 25.February.2024	

TITLE: **Test Location Plan - Area B4-5 Investigation**
Waterloo Integrated Station Development
Cope Street, Waterloo NSW

N

PROJECT:	85608.17
DRAWING No:	R.009.D.03
REVISION:	0

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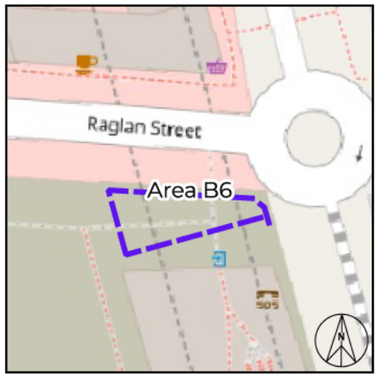
Attachment 4: Area B6 Investigation Sample Locations



LOCATION

LEGEND

- Area B6 Boundary
- Test Pit

NOTE:
1. Drawing projection in GDA94 / MGA zone 56, adapted from aerial imagery from Metromap.com dated 26/07/2023
2. Boundaries and test locations are approximate only

0 2 4 6 8 10 12 14 16 18 20 m

Douglas PARTNERS

CLIENT: John Holland Pty Ltd		TITLE: **Test Location Plan - Area B6 Investigation**	PROJECT: 85608.17
OFFICE: Sydney	DRAWN BY: NLE	**Waterloo Integrated Station Development**	DRAWING No: R.009.D.04
SCALE: 1:100 @A3	DATE: 25.February.2024	**Cope Street, Waterloo NSW**	REVISION: 0

N

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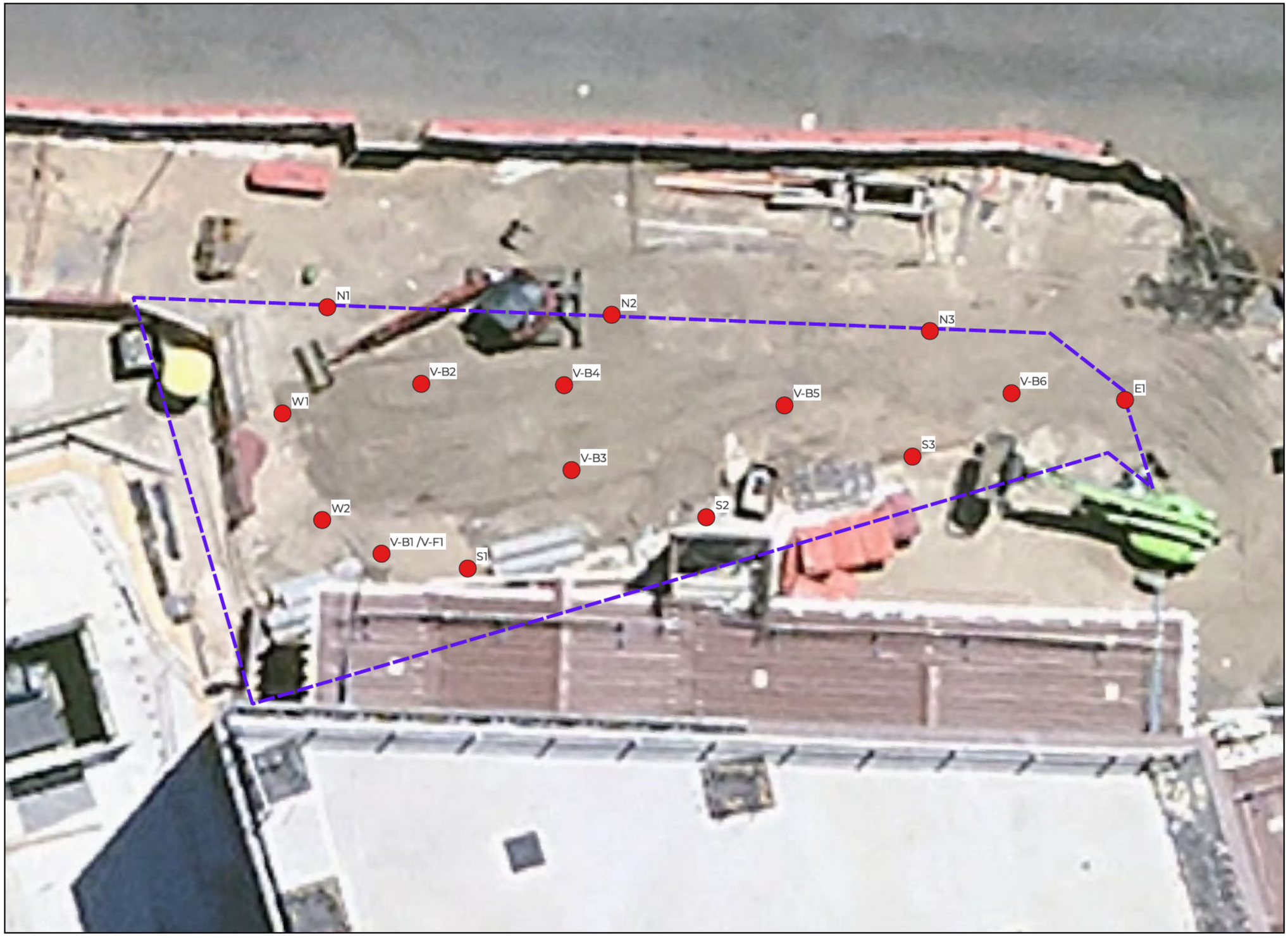
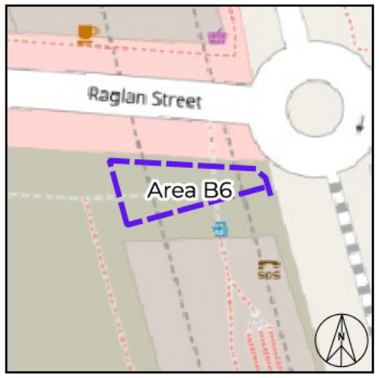
Attachment 5: Area B6 Validation Sample Locations





LOCATION

LEGEND

- Area B6 Boundary
- Area B6 Validation Sample

NOTE:
1. Drawing projection in GDA94 / MGA zone 56, adapted from aerial imagery from Metromap.com dated 19/11/2023
2. Boundaries and test locations are approximate only

0 2 4 6 8 10 12 14 16 18 20 m

Douglas PARTNERS	CLIENT: John Holland Pty Ltd	TITLE: **Test Location Plan - Area B6 Validation** **Waterloo Integrated Station Development** **Cope Street, Waterloo NSW**	PROJECT: 85608.17
	OFFICE: Sydney / DRAWN BY: NLE		DRAWING No: R.009.D.05
	SCALE: 1:100 @A3 / DATE: 26.February.2024		REVISION: 0

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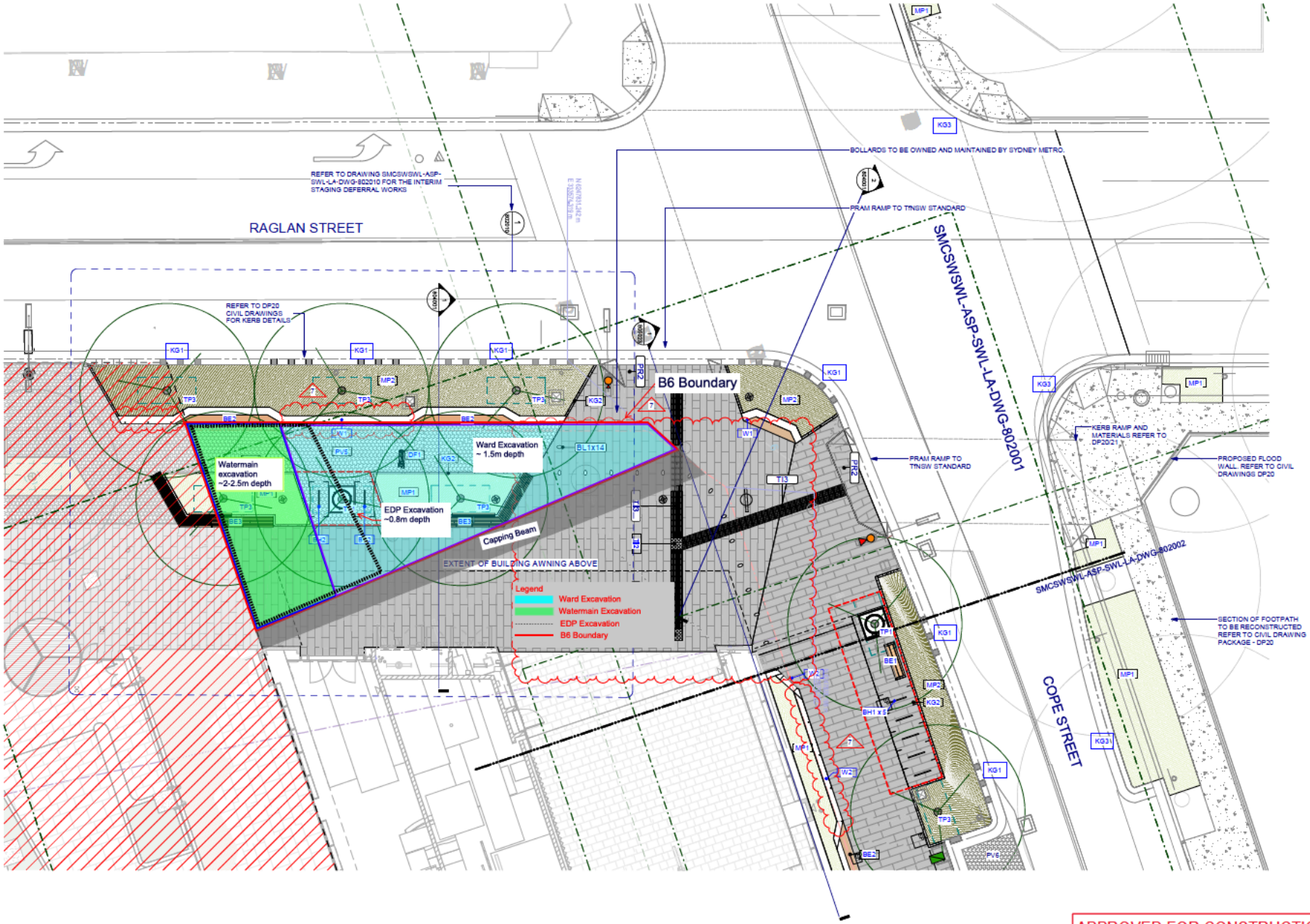
5.4 Summary of CSM

Table 1: Pre-Remediation Conceptual Site Model

Source	Transport Pathway	Receptor	Remediation Approach
S1 – Fill of unknown origin and contaminant levels	P1 – Ingestion and dermal contact with soil P2 – Inhalation of dust	R1 – Future site users	Test fill for COPC. If contamination identified, dispose of impacted soils off-site.
		R2 – Construction workers	Test fill for COPC. If contamination identified, manage risks during remediation/ excavation.
		R3 – Adjacent land users	Test fill for COPC. If contamination identified: – manage potential for off-site migration during remediation/ excavation. – dispose of impacted soils off-site.
	P5 – Leaching of contaminants and vertical migration into groundwater	R5 – Groundwater	Assess results of soil testing for potential leaching to groundwater.
S2 – VOC in groundwater (offsite source)	P3 – Inhalation of vapours	R1 – Future site users	Human health risk assessment, validation of assumptions in human health risk assessment.
		R2 – Construction workers	Management during remediation/ excavation.

John Holland Indicative Drawing of Area B6 Excavation



APPROVED FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPD
7	HM	22/01/24	AFD-ASP-000007	TD
6	HM	18/10/23	AFD-ASP-000005	TD
5	HM	25/08/23	AFD-ASP-000004	TD
4	HM	13/12/22	AFC UPDATE TO CoS COMMENTS	TD
3	HM	11/10/22	AFC UPDATE TO CoS COMMENTS	TD
2	GK	25/08/22	AFC UPDATE TO CoS COMMENTS	TD

SCALE 1:100 @ A1

KEY PLAN

PRINCIPAL AEO JOHN HOLLAND

CLIENT NSW GOVERNMENT / sydney METRO

SERVICE PROVIDER ASPECT Studios™

DRAWN C.KENDALL / S.ESPEJO
DESIGNED C.KENDALL
DRG CHECK J.KEMP
DESIGN CHECK D.HOLMES
APPROVED K.LUCKRAFT

SYDNEY METRO
STATION WATERLOO LEVEL
LANDSCAPE AND PUBLIC DOMAIN DESIGN
MATERIALS AND FINISHES PLAN - RAGLAN STREET

STATUS: APPROVED FOR CONSTRUCTION | SHEET 1 OF 9

DRG No. SMCSWSWL- ASP- SWL- LA- DWG- 802001 | REV. 7

A1 Original | Co-ordinate System: MGA Zone 56 | Height Datum: A.H.D. | This sheet may be prepared using colour and may be incomplete if copied | NOTE: Do not scale from this drawing. | ALT. DRG No.

APPENDIX B
SITE AUDIT STATEMENT

NSW Site Auditor Scheme

Site Audit Statement

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

Part I: Site audit identification

Site audit statement no. TO-079

This site audit is a:

☒ statutory audit

☐ non-statutory audit

within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

Name: [redacted]

Company: Ramboll Australia Pty Ltd

Address: Level 3, 100 Pacific Highway, North Sydney

Postcode: 2060

[redacted]

[redacted]

Site details

Address: [redacted]

Postcode: 2017

Property description

(Attach a separate list if several properties are included in the site audit.)

[redacted]

The site comprises Areas B1 to B7 as shown at the end of Part I.

Local government area: City of Sydney

Area of site (include units, e.g. hectares): Approximately 0.55 hectares (ha)

Current zoning: MU1 Mixed Use under Sydney Local Environment Plan (LEP) 2012, State Environmental Planning Policy Amendment (Land Use Zones) 2023

Regulation and notification

To the best of my knowledge:

☐ **the site is** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985,* as follows: (provide the no. if applicable)

- ☐ Declaration no.
- ☐ Order no.
- ☐ Proposal no.
- ☐ Notice no.

☒ **the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.

To the best of my knowledge:

☐ the site **has** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*

☒ the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.

Site audit commissioned by

Name: [redacted]

Company: John Holland Pty Ltd

Address: [redacted]

Postcode: 2009

[redacted]

[redacted]

Contact details for contact person (if different from above)

Name: N/A

Phone:

Email:

Nature of statutory requirements (not applicable for non-statutory audits)

☐ Requirements under the *Contaminated Land Management Act* 1997 (e.g. management order; please specify, including date of issue)

☐ Requirements imposed by an environmental planning instrument (please specify, including date of issue)

☒ Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)

Condition E67 of State Significant Infrastructure (SSI) development application (SSI 15_7400), approved by the NSW Minister for Planning on 9 January 2017

☐ Requirements under other legislation (please specify, including date of issue)

Purpose of site audit

☒ **A1** To determine land use suitability

Intended uses of the land: Commercial/Industrial (Metro Train Station)

OR

☐ **A2** To determine land use suitability subject to compliance with either an active or passive environmental management plan

Intended uses of the land:

OR

(Tick all that apply)

☐ **B1** To determine the nature and extent of contamination

☐ **B2** To determine the appropriateness of:

- ☐ an investigation plan
- ☐ a remediation plan
- ☐ a management plan

☐ **B3** To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

☐ **B4** To determine the compliance with an approved:

- ☐ **voluntary management proposal** or
- ☐ **management order** under the *Contaminated Land Management Act 1997*

☐ **B5** To determine if the land can be made suitable for a particular use (or uses) if the site is remediated or managed in accordance with a specified plan.

Intended uses of the land:

Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Environmental Risk Sciences Pty Ltd (EnRiskS)

Douglas Partners Pty Ltd (DP)

Titles of reports reviewed:

'Human Health Risk Assessment: Sydney Metro Waterloo Station Development', 15 June 2021, EnRiskS.

'Contaminated Land Management Strategy, Sydney Metro City & South West - Waterloo Station Development Cope Street, Waterloo', 3 June 2022, DP

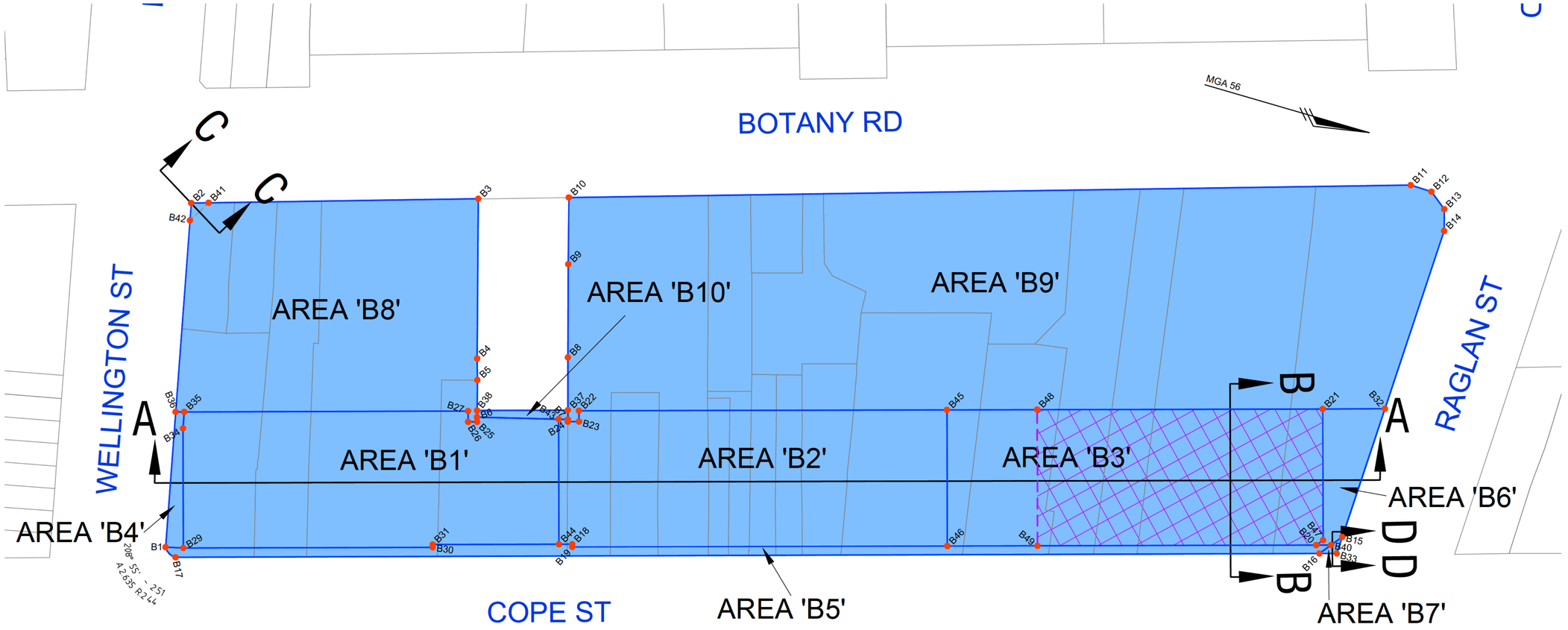
'Addendum to Remediation Action Plan, Sydney Metro City & South West - Waterloo Integrated Station Development, Cope Street, Waterloo', 3 June 2022, DP
'Validation Assessment of Remediation, Sydney Metro City & South West - Waterloo Integrated Station Development, Cope Street, Waterloo NSW', 24 May 2024, DP

Other information reviewed, including previous site audit reports and statements relating to the site:

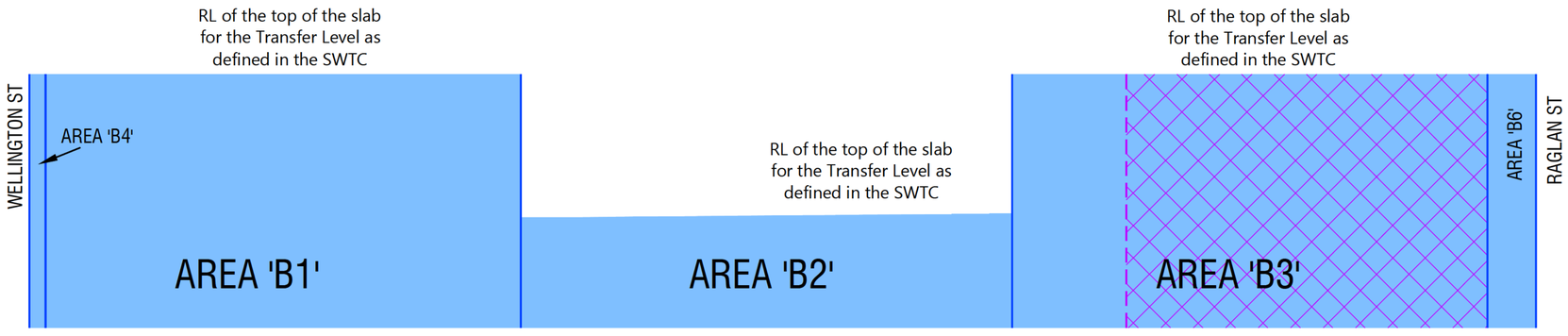
'Site Audit Report Waterloo Station Box Excavation and Validation, [redacted]

Site audit report details

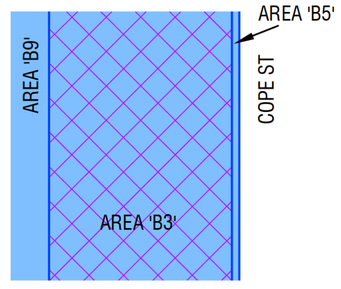
Title:	Site Audit Report – Waterloo Station, [redacted]	
Report no.:	TO-079 (Ramboll Ref: 318001049)	Date: 14 June 2024



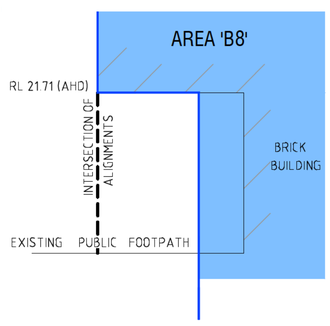
SECTION D-D



SECTION 'A' - 'A'



SECTION 'B' - 'B'



SECTION C-C
NOT TO SCALE

NOTES:
Boundaries and coordinates have been compiled from a combination of PPN DP1257150 (subject to Registration), deposited plans, design files, sketches and digitised aerial photography. Dimensions, and any derived CAD model and coordinates are subject to verification by field survey and design progression.

REVISIONS No.	DATE	REVISION DETAILS	DRAWN	CHK	APP
C	25.10.2019	UPDATE PLAN	NEC	SFG	SFG
B	16.10.2019	ADD AREA 'B3A'	HY	HY	MGL
A	17.10.2018	INITIAL VERSION	HY	HY	MGL

HORIZ. SCALE: NOT TO SCALE
COORDINATES: MGA DATUM:
ORIGIN: ORIGIN:

LEGEND
Coordinate identifier
Area boundary
Area
AREA 'B3A'

CLIENT: NSW GOVERNMENT Transport for NSW
SURVEY: DATE OF SURVEY:
DRAWN: HY DATE OF PLAN: OCT 2018
CHECKED: HY DATE LAST SAVED: 28.10.2019
APPROVED: MGL DATE APPROVED: 17.10.2018

TITLE: SMC & SW WATERLOO STATION AND METRO QUARTER DEVELOPMENT SITE ACCESS PLAN
DRAWING No: NWRLSRT-RPS-SWS-SR-DWG-000024-C-Waterloo Station Fig 2.1.dwg
JOB No: PR124856
ISSUE: C
SHEET 1 OF 2 SHEETS
SIZE: A1

RPS AUSTRALIA EAST PTY LTD (ABN 44 140 292 762)
LEVEL 9 17 YORK STREET SYDNEY NSW 2000 GPO BOX 4401 SYDNEY NSW 2001
T: 02 9248 9800 F: 02 9248 9810 www.rpsgroup.com.au

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RPS

P:\PR124856 - SRT\48_TSE plans\04_ACAD\NWRLSRT-RPS-SWS-SR-DWG-000024-C-Waterloo Station Fig 2.1.dwg 28.10.2019 9:07 AM

Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section. (Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
  - (B1) the nature and extent of contamination, and/or
  - (B2) the appropriateness of an investigation, remediation or management plan[1], and/or
  - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
  - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
  - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

Section A1

I certify that, in my opinion:

The **site is suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ ~~Residential, including substantial vegetable garden and poultry~~

☐ ~~Residential, including substantial vegetable garden, excluding poultry~~

☐ ~~Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~

☐ ~~Day care centre, preschool, primary school~~

☐ ~~Residential with minimal opportunity for soil access, including units~~

☐ ~~Secondary school~~

☐ ~~Park, recreational open space, playing field~~

☒ Commercial/industrial

☐ ~~Other (please specify):~~

~~OR~~

☐ ~~I certify that, in my opinion, the **site is not suitable** for any use due to the risk of harm from contamination.~~

Overall comments:

Historical investigations at the site identified lead, volatile organic compounds (VOCs) and asbestos contamination in soils and VOCs in groundwater and soil vapour. The contamination sources were historic commercial/industrial onsite and offsite land uses including an offsite former dry cleaner. The development (station box) required excavation depths of approximately 28 m. Excavated soils and rock were classified and disposed offsite. The excavation works successfully removed the onsite sources of contamination, however, contamination associated with the former dry cleaner remained offsite and could present a risk to site users. A review of the remediation and validation undertaken for the station box excavation was documented by the Auditor in a previous site audit report (SAR) and Section B site audit statement (SAS) (TO-024-1) dated 2 June 2020.

The station development required specific design details relating to waterproofing of the station box and an Environmental Control System comprising critical and non-critical mechanical ventilation systems, critical and non-critical chilled water systems, non-critical water cooled variable refrigerant flow systems, retail provisions and life safety mechanical systems.

A human health risk assessment (HHRA) was prepared to evaluate the potential risks to human health associated with contamination in offsite groundwater. Based on the station design (structure, waterproofing and ventilation) and use, along with the available data, the HHRA concluded that health risks to future users of Waterloo Station were low and acceptable.

Ancillary areas for station access and landscaping surrounding the station box were not part of the previous audit. Investigations of these areas identified fill material impacted by asbestos. Remediation of fill material was undertaken by excavation and offsite disposal. Validation of these areas has been considered in the current audit.
Groundwater has not been assessed for any beneficial re-use. Any future use of groundwater would require appropriate assessment and regulatory approvals from the NSW Office of Water.

Section A2

I certify that, in my opinion:

Subject to compliance with the **attached** environmental management plan[2] (EMP), the site is suitable for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

☐ Day care centre, preschool, primary school

☐ Residential with minimal opportunity for soil access, including units

☐ Secondary school

☐ Park, recreational open space, playing field

☐ Commercial/industrial

☐ Other (please specify):

EMP details

Title:

Author:

Date: No. of pages:

EMP summary

This EMP (attached) is required to be implemented to address residual contamination on the site.

The EMP: (Tick appropriate box and strike out the other option.)

☐ requires operation and/or maintenance of **active** control systems[3]

☐ requires maintenance of **passive** control systems only[3].

[2] Refer to Part IV for an explanation of an environmental management plan.
[3] Refer to Part IV for definitions of active and passive control systems.

~~Purpose of the EMP:~~

~~Description of the nature of the residual contamination:~~

~~Summary of the actions required by the EMP:~~

~~How the EMP can reasonably be made to be legally enforceable:~~

~~How there will be appropriate public notification:~~

~~Overall comments:~~

Section B

Purpose of the plan[4] which is the subject of this audit:

_____

_____

_____

I certify that, in my opinion:

(B1)

☐ The nature and extent of the contamination **has** been appropriately determined

☐ The nature and extent of the contamination **has not** been appropriately determined

AND/OR (B2)

☐ The investigation, remediation or management plan **is** appropriate for the purpose stated above

☐ The investigation, remediation or management plan **is not** appropriate for the purpose stated above

AND/OR (B3)

☐ The site testing plan:

☐ **is** appropriate to determine

☐ **is not** appropriate to determine

if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

AND/OR (B4)

☐ The terms of the approved voluntary management proposal* or management order** (strike out as appropriate):

☐ **have** been complied with

☐ **have not** been complied with.

*voluntary management proposal no. _____

**management order no. _____

AND/OR (B5)

☐ The site **can be made suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

[4] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

- ☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry
- ☐ Day care centre, preschool, primary school
- ☐ Residential with minimal opportunity for soil access, including units
- ☐ Secondary school
- ☐ Park, recreational open space, playing field
- ☐ Commercial/industrial
- ☐ Other (please specify):

IF the site is remediated/managed* in accordance with the following plan (**attached**):

*Strike out as appropriate

Plan title

Plan author

Plan date No. of pages

SUBJECT to compliance with the following condition(s):

Overall comments:

Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997.*

Accreditation no. 1505

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Signed 

Date 14 June 2024

Part IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remediation plan or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use or uses of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

Environmental management plan

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997*

(CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the CLM Act or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of *the Environmental Planning and Assessment Act 1979*.

Active or passive control systems

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

Auditor's comments

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section B

In Section B the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement. The condition must not specify an individual auditor, only that further audits are required.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

Part III

In **Part III** the auditor certifies their standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to

- the **NSW Environment Protection Authority**: nswauditors@epa.nsw.gov.au or as specified by the EPA

  AND

- the **local council** for the land which is the subject of the audit.

APPENDIX C
INTERIM AUDIT ADVICE

22 May 2018

[redacted]

Dear [redacted]

[redacted]

RE: INTERIM AUDIT ADVICE LETTER NO. 5 - REMEDIATION ACTION PLAN, WATERLOO STATION, BOTANY ROAD AND COPE STREET, WATERLOO, NSW

1. INTRODUCTION

As a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor, I am conducting an Audit in relation to the subject site. This initial review has been undertaken to provide an independent review of the suitability and appropriateness of a Remediation Action Plan (RAP).

A statutory site audit is required for the proposed Waterloo Station development, part of the Sydney Metro rail project between Chatswood and Sydenham, to address the requirements of *Condition E67 of Infrastructure Approval, application SSI 15_7400, approved by the Minister for Planning on 9 January 2017*. This Interim Audit Advice (IAA) letter was also prepared to satisfy conditions of the deed agreed between Transport for NSW and John Holland CPB Ghella Joint Venture (JHCPBG JV).

This IAA letter is based on a review of the documents listed below and observations made on a site visit on 6 March 2018, as well as discussions with JHCPBGJV and Douglas Partners Pty Ltd (DP) who undertook the investigations.

The reports reviewed were:

- *'Report on Preliminary Site Investigation, Sydney Metro City and South West, Tunnel and Station Excavation Works Package, Proposed Waterloo Station, Botany Road and Cope Street, Waterloo, prepared for John Holland CPB Ghella JV, Project 85608.14, March 2018'*, report reference: Revision 0, dated 8 March 2018, prepared by DP (the PSI).
- *'Report on Detailed Site Investigation, Sydney Metro City and South West, Tunnel and Station Excavation Works Package, Proposed Waterloo*

Station, Botany Road and Cope Street, Waterloo, prepared for John Holland CPB Ghella JV, Project 85608.14, March 2018', report reference: Revision 1, dated 13 March 2018, prepared by DP (the DSI).

- *'Remediation Action Plan, Sydney Metro City and South West, Tunnel and Station Excavation Works Package, Proposed Waterloo Station, Botany Road and Cope Street, Waterloo, prepared for John Holland CPB Ghella JV, Project 85608.14, April 2018'*, report reference: Revision 0, dated 13 April 2018 prepared by DP (the RAP).

Draft versions of the PSI, DSI and RAP reports were issued for audit review. Review comments (issued by the Auditor by email) were incorporated into the final DP reports (listed above). The PSI makes reference to three previous reports by Environmental Investigations Australia Pty Ltd (EI) prepared for 59-63 Botany Road (north part of the site). The reports included a RAP which was reviewed by Mr Mike Nash (NSW EPA Auditor) of DP. The PSI stated that the audit was terminated and remediation was not undertaken. The reports were not provided to the Auditor for review, however a summary of relevant information from these reports was included in the DP reports.

The RAP summarised a hydrogeological interpretive report prepared by Pells Sullivan Meynink Pty Ltd (PSM) (dated 19 March 2018), which was prepared to model the groundwater inflows into the Sydney Metro excavations. This report was not reviewed by the Auditor.

2. SITE DETAILS

2.1 Location

The site is identified as the '*excavation footprint'* (the site) for the station shown on Attachment 1. The '*Worksite Area*' shown on Attachment 1 surrounding the '*excavation footprint'* has been excluded from the DP investigations and is not part of the site audit area.

The site details are as follows:

[redacted]

Local Government:	City of Sydney
Owner:	Transport for New South Wales
Site Area:	Approximately 0.5 ha
Zoning:	B4 – Mixed Use

2.2 Site Condition

DP inspected the site for the PSI on 22 September 2017 and noted the following:

- The site was occupied by various commercial properties including an automotive centre and smash repairers. A sump and bund were located in the automotive centre used for the collection of fuels and oil. DP noted some staining on the concrete slab.
- Demolition of buildings was underway in some sections. Former basements were observed on Lot 31 DP805384 and SP75492.
- A former laundry/dry cleaner was located on 87 Botany Road (Lot 2 DP27454). At the time of the inspection, the majority of the building had been demolished. An old washers/dryers store and paper works were noted adjacent to the west of the site.
- The site was surrounded by Raglan Street (north), Wellington Street (south), Cope Street (east) and Botany Road (west). The landuse beyond the site was mainly commercial/high-density residential.

During the Auditors site visit on 6 March 2018, the site was an active construction site, with the following features noted:

- The majority of the site surface had been cleared of slabs and pavements. Exposed soil was visible over the majority of the site. Localised excavations associated with an ongoing archaeological survey were evident.
- Imported material (DGB and ENM) had been placed on the surface in the south section for the construction of temporary piling platforms. Some of the material had been stockpiled in the south section. A relatively long trench pit was being excavated along the southeast boundary for piling preparation works.
- A church was located offsite in the Worksite Area (Attachment 1). Sewer line diversions were being undertaken along the church boundary.
- Temporary/demountable sheds were located offsite in the Worksite Area. The area surrounding the sheds had been filled with recycled aggregate (crushed concrete, terracotta and brick).
- A building associated with the former site use remained in the Worksite Area to the southwest of the site. The building was being used as an office during redevelopment of the site.
- A former sump was exposed at the location of the former dry cleaner, located to the west of the site within the Worksite Area (Attachment 1). The sump contained waste water, with inlets and outlets at the eastern and western sides of the sump.
- A large stockpile of fill soil was located in the north section awaiting disposal.

2.3 Adjacent Uses

The site is located within an area of mixed landuse including commercial and high density residential. The surrounding site use includes:

North: Raglan Street and high rise mixed-use building beyond.

East: Cope Street and multi-level residential buildings beyond.

South: Wellington Street, commercial and residential buildings located further to the south.

West: the Worksite Area, Botany Road and commercial buildings located further to the west.

The site is in a relatively flat area of Waterloo with slopes to the west. DP identified the closest sensitive ecological receptor for groundwater as Sheas Creek located approximately 530 m to the southwest which drains into Alexandra Canal and Cooks River. Cooks River drains into Botany Bay located approximately 6 km further to the south of the site. The site is located in the Botany Sand Aquifer

Embargo zone where the abstraction of groundwater for domestic use is banned due to historical regional contamination of the aquifer from industry.

The PSI identified a number of commercial/industrial landuses within close proximity (100 m) including former battery manufacturers, metal workers, coppersmith, printers, blacksmiths, steam engineers, service stations, dry cleaners, electrical equipment manufacturing, boiler makers, and motor garages. The business directory search identified that the majority of these facilities were operational in the 1950's to 1970's. A former dry cleaner was located within the Worksite Area to the west of the subject site.

A search of the NSW EPA public records did not have any sites listed as contaminated in the immediate vicinity of the subject site.

2.4 Proposed Development

The proposed development comprises a new below ground station building, access road, substation and upgrades to pedestrian access. The depth of excavation is approximately 28 metres below ground level (mbgl) (Attachment 2) with localised deeper excavation for a stormwater sump. The base of the structure will comprise an approximately 125 mm thick concrete slab. The walls will comprise secant pile walls with shotcrete (200 mm) between the piles to a depth of approximately 17 mbgl. The RAP reports that the proposed station will be tanked to minimise groundwater inflow.

For the purposes of this audit, the 'commercial/industrial' land use scenario will be assumed.

3. SITE HISTORY

The PSI site history assessment included a review of historical business listings, historical title deeds, aerial photographs, NSW EPA records, Section 149 (2&5) certificates (now known as Section 10.7 certificates) and NSW Safe Work records. The site history is summarised in Table 3.1.

Table 3.1: Site History

Date	Activity
1900s – 1950	The site was developed and used mainly for residential purposes with some commercial landuse. Cope Street, Raglan Street, Wellington Street and Botany Road were established prior to 1930.
1950s – 2016	The majority of the site was occupied by commercial buildings. The commercial uses included manufacturing of batteries, forging, chemical, mirrors, glass, hospital equipment, plastic, tiles and electrical equipment, metal workers and merchants, motor electricians, motor painters, panel beaters, welders, coppersmith, printers, blacksmiths, steam engineers and boilermakers. DP note that the rooves of many buildings were replaced around 2005.
2016 to date	The site is currently owned and occupied by Transport for NSW. The demolition of previous site structures commenced in 2017.

A review of the SafeWork NSW information did not identify any records for the storage of hazardous chemicals at the site.

DP noted that previous assessments by EI (2015) identified residual contamination on 59-63 Botany Road (Lot 5 DP215751) and recommended site remediation. A RAP was prepared by EI in 2015. It is not known if remediation was undertaken, however is considered unlikely.

A laundry/dry cleaner was located to the west of the site within the Worksite Area.

A review of the NSW EPA public records did not find any notices for the site. Two sites in the immediate vicinity were listed as contaminated to the EPA. They include the former Gas-N-Go service station at 10-20 Botany Road located approximately 141 m northwest and Lawrence Dry Cleaners at 887-893 Bourke Street located approximately 780 m to the east. The former service station has the potential to impact the site, however the dry cleaners is considered to be across gradient of the site and unlikely to be a potential source of impact.

Based on the site location and history, potential contamination could have impacted the site from on-site and/or off-site sources.

3.1 Auditor's Opinion

In the Auditor's opinion, the site history indicates past activities have a high potential for significant contamination. Sources of contamination appear to be associated with commercial/ industrial landuse (including an automotive centre and smash repairer), fill and surface soil imported to achieve site levels, hazardous building materials from demolition of former buildings, and off-site landuse including dry cleaners, motor garages and service stations.

The Auditor considers that the site history is broadly understood and adequate for identification of contaminants of concern (Section 4) and remedial planning (Section 10).

4. CONTAMINANTS OF CONCERN

The PSI and DSI provided a list of the contaminants of concern and potentially contaminating activities. These have been tabulated in Table 4.1.

Table 4.1: Contaminants of Concern

Area (DP Source ID)	Activity	Potential Contaminants
Entire Site	Fill and surface soil imported from unknown sources. Demolition of former buildings containing hazardous materials. Spills and leakage of chemicals associated with historical commercial/ industrial landuse.	Metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, xylenes & naphthalene (BTEXN), volatile organic compounds (VOCs), volatile chlorinated hydrocarbons (VCH), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs), phenols, lead (from paint) and asbestos.
Off-Site Sources	Migration of potential contaminants from off-site sources including the former laundry/dry cleaner (within the Worksite Area), motor garage and service station.	Metals, petroleum hydrocarbons (BTEXN, TPH), PAHs, VCH and phenols.

The RAP stated that based on the DSI results, the main contaminants of concern for remediation include asbestos, VOC, lead and OCP. OCP was detected in groundwater and DP concluded that the potential source was unknown.

4.1 Auditor's Opinion

The Auditor considers that the analyte list used by DP adequately reflects the site history and condition.

5. STRATIGRAPHY AND HYDROGEOLOGY

Following a review of the DP reports, a summary of the site stratigraphy and hydrogeology conditions at the site are compiled below.

5.1 Topography, Geology and Stratigraphy

The PSI states that the site is located in a relatively flat area at approximately 16 m Australian Height Datum (AHD) with slopes to the west and southwest. The site is located within the Aeolian soil landscape underlain by Quaternary age transgressive dunes comprising of marine sand with podsols. DP stated that, considering the depth of excavation for the proposed development, there is a low to moderate risk of encountering acid sulfate soils (ASS) at the site.

The sub-surface profile detailed by DP in the DSI is summarised in Table 5.1.

Table 5.1: Stratigraphy

Depth (mbgl)	Subsurface Profile
0.0 – 0.35 (maximum)	Concrete pavements/slab.
0.15 – 1.0	Fill material comprising sand, gravel and clay with inclusions of demolition rubble, brick, glass, tile, ash, fly ash, charcoal, coal, wood, concrete and metal. Ash/coal was detected in 3 sampling locations. Potential ACM was detected in test pit WLTP10 between 0.2 mbgl and 0.3 mbgl.
1 – 5.5	Natural sand, clayey sand and silty sand.
5.5 to 7.5	Natural clay (possible residual).

mbgl – metres below ground level

The subsurface profile comprised relatively shallow fill underlain by natural sand and clay soil.

DP report that Hibbs & Associates identified ACM in the north section of the site during demolition works. Hibbs concluded that ACM could have impacted the fill over the entire site.

5.2 Hydrogeology

The PSI undertook a search of the groundwater information database maintained by the NSW Government and identified eight registered groundwater bores within a 0.5 km radius of the site. The majority of the bores were registered for monitoring or recreational use. One bore (GW106192) located approximately 150 m southwest of the site is registered for domestic use. The depth of standing water in the bores ranged from 3.49 m to 11.6 mbgl.

The PSI concluded that based on the topography, groundwater is anticipated to flow to the southwest. DP identified the closest sensitive ecological receptor for groundwater to be Sheas Creek located approximately 530 m to the southwest. The creek drains into Alexandra Canal then to Cooks River and Botany Bay located approximately 6 km to the south of the site. Excess surface water run-off is anticipated to flow into the local stormwater network.

The site is located in the Botany Sand Aquifer Embargo zone where the abstraction of groundwater for domestic use is banned due to historical regional contamination of the aquifer.

As part of the DSI, four groundwater monitoring wells were installed on the site (Attachment 2). Groundwater observations and sampling was undertaken as part of the DSI on 19 December 2017. Depth to groundwater in the monitoring wells was recorded between 3.3 mbgl to 3.7 mbgl. DP did not assess the groundwater flow direction based on measured groundwater elevation. DP assumed that regional groundwater flow was to the southwest based on the topography and closest surface water receptor.

The DSI included field records of groundwater parameters recorded during sampling. They indicated that the pH was 6.51 to 6.68, dissolved oxygen (DO) was 0.48 to 1.08 mg/L, redox was 94 to 108 mV, and electrical conductivity (EC) was 337 to 438 µS/cm.

The RAP includes a summary of the PSM (2018) Hydrogeological Interpretive Report, which modelled the groundwater seepage rates expected during and post construction. Details of the modelling and the results are included in the Hydrogeological Interpretive Report. DP summarised the findings as follows:

- Draw down will occur in the immediate vicinity of the excavation due to vertical leakage through the residual soil of the Botany Sands Aquifer. Considering the high transmissivity of the sand aquifer, drawdown will be relatively flat with a large zone of influence;
- Contaminants are likely to be transmitted rapidly through the Botany Sands Aquifer. Considering that the structure will be tanked (constructed to limit groundwater inflow), the potential for inflow will be minimised.
- Maximum modelled seepage rate during construction (with inflows from faults) was 185 kL/day;
- Modelled steady state seepage rate prior to tanking the station structure was 147 kL/day;
- Water table in the Botany Sands Aquifer was at depths of 3 to 5 m;
- The modelled zone of capture for the first 10 years would extend to approximately 670 m from the site. The actual capture zone will depend on the time lapse between construction and tanking of the final structure; and
- Historical land use (existing and former commercial/ industrial premises in the vicinity, former Gas-N-Go service station, dry cleaners) may have an impact on groundwater quality and potential for contamination migration (TRH, BTEXN, heavy metals and VOCs).

The Auditor has not reviewed the PSM (2018) Hydrogeological Interpretive Report, however considers that the primary long term source of seepage/ inflows is likely to be sandy soil and seepage from Botany Sands Aquifer. This is based on the stratigraphy and hydrogeology encountered during the DSI.

5.3 Auditor's Opinion

The Auditor considers that the site stratigraphy and hydrogeology conditions detailed by DP adequately reflect the site conditions and are sufficient for remediation planning.

6. EVALUATION OF QUALITY ASSURANCE AND QUALITY CONTROL

The Auditor has assessed the overall quality of the data by review of the information presented in the referenced reports, supplemented by field observations. The Auditor's assessment follows in Tables 6.1 and 6.2.

Table 6.1: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Plan and Sampling Methodology	**Auditor's Opinion**
Data Quality Objectives (DQO) The PSI and DSI defined specific DQOs in accordance with the seven step process outlined in Schedule B2 of NEPM (2013).	These were considered appropriate for the investigations conducted.
Sampling pattern and locations *Soil:* The DSI adopted a general grid pattern or systematic sampling plan. Investigation locations were spaced to gain coverage of the majority of the site. The various fill materials at the site were also targeted for sampling. *Groundwater:* Four monitoring wells (WLMW03, WLMW04, WLMW05 and WLMW06) were distributed across the site. WLMW05 was installed along the west excavation boundary close to the former laundry/dry cleaning facility. The DSI stated that WLMW03 was destroyed during demolition works.	In the Auditor's opinion these investigation locations provide adequate site coverage and target the main known areas of concern.
Sampling density *Soil:* The DSI included a sampling density of 12 locations (Attachment 2) over approximately 0.5 ha, which does not meet the minimum density of 13 recommended by EPA (1995) *Sampling Design Guidelines*. The coverage provides a 95% confidence of detecting a residual hot spot of approximately 24 m diameter. Samples analysed for asbestos were not collected in accordance with the density outlined in NEPM (2013). *Groundwater:* Three groundwater samples were obtained from the monitoring wells at the site.	In the Auditor's opinion the sampling density was appropriate to inform the remediation planning process. Considering that the fill from the entire site would be excavated and disposed off-site as part of the development, the sampling adopted by DP is acceptable to give a general indication of the presence/absence of asbestos in soil. The density of groundwater monitoring wells is not adequate to assess the extent and magnitude of groundwater contamination associated with the former dry cleaner. Further investigation is proposed by DP prior to remediation of the site.
Sample depths *Soil:* Samples were collected and analysed from a range of depths targeting the fill and natural sand/clay. The depth intervals ranged from 0.1 m to 7.45 mbgl. *Groundwater*: Groundwater samples were obtained from the standing water level (SWL) depths observed in the monitoring wells during sampling. The depth ranged from approximately 3.3 mbgl to 3.7 mbgl.	In the Auditor's opinion, this sampling strategy was appropriate and adequate to characterise the primary material types present on site. DP RAP recommends additional groundwater testing for VOCs. Groundwater samples should be obtained from depth to assess the potential for dissolved non-aqueous phase liquids (DNAPL) associated with the former dry cleaners.

Table 6.1: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Plan and Sampling Methodology	**Auditor's Opinion**
Well construction The wells were installed from the surface to depths of approximately 6 mbgl to 7 mbgl, and were constructed of 50 mm diameter acid washed, class 18, PVC casing and machine slotted well screen intervals. The top of the screened interval was up to 1.5 mbgl, and therefore the screens of the wells extended above the groundwater table. The wells were completed to assess shallow perched groundwater present in sand.	The Auditor notes that, whilst it is preferable for monitoring wells to be screened over a discrete short vertical interval, the wells are adequate to provide an indication of the shallow groundwater conditions in sand. Deeper groundwater, which is likely to be present in underlying clay, was not assessed. The proposed excavation will extend to a depth of 28 mbgl and is therefore likely to intercept deeper groundwater.
Sample collection method *Soil*: Sample collection was by test pit (6 locations) and solid stem auger drilling (6 locations). Test pit samples were obtained directly from the excavator bucket. Drilling samples were collected from the auger flights, with external material removed prior to collecting the sample or via a SPT split spoon. *Groundwater*: Wells were installed by solid flight augers, developed with a pump and samples were collected by low flow peristaltic pump with dedicated sample tubing.	Sample collection from the auger flights is not ideal as it can result in loss of volatiles and sample cross contamination, although cross contamination was minimised by removing external material. Results for samples collected from solid flight augers may underestimate concentrations of volatile contaminants. Considering that a large portion of samples were from SPT spoon, the overall sample collection method was found to be acceptable. The groundwater sample collection methodology is considered acceptable.
Decontamination procedures *Soil:* Sampling equipment was cleaned with detergent (3% Decon 90 solution), tap water and then de-ionised water prior to sampling and between sampling events to prevent cross contamination. New gloves were reportedly used for each new sample. *Groundwater*: Dedicated sampling equipment was used for each well.	Acceptable.
Sample handling and containers Soil samples were placed into prepared and preserved sampling jars/bottles provided by the laboratory and chilled during storage and subsequent transport to the laboratories. DP report that replicate samples were placed in plastic zip-locked bags for screening for volatile compounds using a PID.	Overall, the field screening protocols were acceptable to assess site contamination in the context of the proposed development.

Table 6.1: QA/QC – Sampling and Analysis Methodology Assessment	
Sampling and Analysis Plan and Sampling Methodology	**Auditor's Opinion**
The DSI does not mention sampling procedure for asbestos in soil. However, the laboratory reports indicate that asbestos analysis was undertaken on sub-samples from soil jars. Groundwater samples to be analysed for heavy metals were field filtered.	
Chain of Custody (COC) Completed chain of custody forms were provided in the report.	Acceptable.
Detailed description of field screening protocols Field screening for volatiles was undertaken using a calibrated hand held PID unit. The PID screening procedure was provided and involved placing the samples in ziplock plastic bags and measuring VOCs in the headspace after allowing time for equilibration. PID readings are provided on selected borehole logs. PID screening was not undertaken on samples collected by test pit. The DSI reported groundwater quality parameters measured during well sampling in field logs for each well.	Overall, the field screening protocols were acceptable to assess site contamination in the context of the proposed development.
Calibration of field equipment DP report that the PID was calibrated prior to use in the field. Calibration information for the field equipment (PID and groundwater meters) was included in the DSI.	Acceptable.
Sampling logs Soil logs were provided within the DSI, indicating sample depth, PID readings and lithology. The logs reported inclusions in fill (asbestos, ash, fly ash, coal and charcoal) which could pose a contamination risk. Groundwater field sampling records were included in the DSI with well development and sampling details.	Acceptable.

Table 6.2: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor's Opinion**
Field quality control samples Field quality control samples including trip blanks (1 per field batch), trip spikes (1 per field batch), rinsate blanks (1 per day), field intra-laboratory and inter-laboratory duplicates (5% of primary samples) were undertaken by DP during the DSI.	Acceptable.

Table 6.2: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor's Opinion**
Field quality control results The results of field quality control samples were generally within appropriate limits. The trip blank results were below the laboratory PQL. The trip spike recovery was acceptable. The rinsate blanks reported an elevated TRH C_6-C_{10} concentration (51 µg/L), which DP report was from the demineralised water used. RPDs for the intra-laboratory soil and groundwater duplicate samples for four metals (soil) ranged from 54% to 115% and for two PAHs ranged from 140% to 144%. RPDs for the inter-laboratory soil and groundwater duplicate samples for two metals (soil) ranged from 54% to 57%. The DSI has assessed field duplicate results along with the primary sample results against the site acceptance criteria.	Overall, the field quality control results were found to be acceptable. RPD exceedances were infrequent and minor and do not impact the overall dataset. DP assessed the results for primary samples and field duplicates against the site acceptance criteria which is considered appropriate. The Auditor has adopted the highest concentration from field duplicate and triplicate results. The detections of TRH in the rinsate samples were minor and close to the laboratory detection limits. Evidence that the TRH was from the demineralised water was not provided as not field blanks were analysed. DP assessed the results for primary samples and field duplicates against the site acceptance criteria.
NATA registered laboratory and NATA endorsed methods Laboratories used included: Envirolab Services Pty Ltd (primary) and Eurofins Scientific (secondary). Laboratory certificates were NATA stamped.	Acceptable.
Analytical methods Analytical methods were included in the laboratory test certificates. Both Envirolab and Eurofins provided brief method summaries of in-house NATA accredited methods used based on USEPA and/or APHA methods (excluding asbestos) for extraction and analysis in accordance with the NEPM (2013). Asbestos analysis was based on AS4964-2004.	The analytical methods are considered acceptable for the purposes of the site audit, noting that the AS4964-2004 is currently the only available method in Australia for analysing asbestos. DOH (2009) and enHealth (2005) state that *"until an alternative analytical technique is developed and validated the AS4964-2004 is recommended for use"*.
Holding times Review of the COCs and laboratory certificates indicate that the holding times had been met. DP also reported that holding times have been met.	Acceptable.

Table 6.2: QA/QC – Field and Lab Quality Assurance and Quality Control	
Field and Lab QA/QC	**Auditor's Opinion**
Practical Quantitation Limits (PQLs) *Soil:* PQLs for individual PCBs were slightly raised in one soil sample due to interference from analytes other than those being tested. The raised PQLs were below the quality criteria. *Groundwater:* PQLs were within acceptable range.	Overall the PQLs are acceptable. The PQL for asbestos analysis is considered acceptable in the absence of any other validated analytical method.
Laboratory quality control samples Laboratory quality control samples including laboratory control samples, matrix spikes, surrogate spikes, blanks, internal standards and duplicates were undertaken by the laboratory.	Acceptable.
Laboratory quality control results The results of laboratory quality control samples were generally within appropriate limits, with the following exceptions: • Percentage matrix spike recovery was not possible for individual metals due to high concentrations, the inhomogeneous nature of the compound in the sample and/or interference from analytes. Low recovery was noted for some metals due to matrix interferences. This was considered acceptable as acceptable recovery was reported for the laboratory control samples (LCS). • Some samples sent for asbestos analysis had to be sub-sampled by the laboratory due to the weight of the sample exceeding the recommended 40-50 g (presence/absence) or samples not provided in zip-lock bags. • The laboratory RPD acceptance criteria were exceeded for individual metals. Triplicate result was issued by the laboratory to confirm the metal results exceeding the RPD criteria.	In the context of the dataset reported, the laboratory quality control results are acceptable for remediation planning purposes.
Data Quality Indicators (DQI) and Data Evaluation (completeness, comparability, representativeness, precision, accuracy) The DSI assessed the field and laboratory results against predetermined data quality indicators (DQIs) and internal standards. These were discussed with regard to the five category areas. There was limited discussion regarding actions required if data do not meet the expected objectives.	An assessment of the data quality with respect to the five category areas has been undertaken by the Auditor and is summarised below.

In considering the data as a whole the Auditor concludes that:

- The laboratories provided adequate information to conclude that the data are of sufficient precision.
- There is a high degree of confidence that the data are accurate.

- The data are likely to be representative of the overall site conditions, including fill, natural soil and shallow groundwater. Results for volatile organics in soil samples collected by solid stem auger may underestimate actual concentrations. Deep groundwater and soil vapour have not been assessed. Assessment of deep groundwater, and further assessment of shallow groundwater is proposed in the RAP prior to remediation commencing.
- The investigation data are considered to be largely complete. One groundwater monitoring well was destroyed during demolition work, however further groundwater investigation is proposed prior to remediation of the site.
- There is a high degree of confidence that the data are comparable for each sampling and analytical event.

7. ENVIRONMENTAL QUALITY CRITERIA

The Auditor has assessed **soil** data provided with reference to criteria from National Environmental Protection Council (NEPC) *National Environmental Protection (Assessment of Site Contamination) Measure 1999*, as Amended 2013 (NEPM, 2013). Based on the proposed development (excavation and construction of a station), the Tier 1 (screening) criteria for a 'commercial/industrial' setting were referred to.

- Human Health Assessment:
  - Health Based Investigation Levels (HIL D).
  - Soil Health Screening Levels (HSL D) for Vapour Intrusion. The most conservative criteria were adopted i.e. assumed depth to source <1 m and sand.
  - Asbestos presence/absence.
  - USEPA Regional Screening Level (RSL) (November 2017) Composite Worker Soil Criteria for use where HILs are not applicable or where local guidelines are not available for individual VOC contaminants.
- Terrestrial Ecological Assessment (TEA): The soil data has not been assessed against the TEA as soil from the site will be excavated to a maximum depth of 29 mbgl and disposed off-site during development of the site. The TEA is applicable to depths of 2 mbgl and is therefore not applicable for the remaining natural soil.
- Management Limits (ML commercial/industrial) assuming coarse soil.
- Aesthetics
  - The Auditor has considered the need for remediation based on 'aesthetic' contamination as outlined in the NEPM (2013).

The Auditor has assessed the **groundwater** data provided with reference to Tier 1 (screening) criteria for 'commercial/industrial' from the following:

- Human Health Assessment: HSLs are not appropriate for assessing risks from groundwater to human health due to the potential for direct contact. Therefore risk from direct contact, inhalation and incidental ingestion were assessed using:
  - NHMRC and NRMMC (2011) *Australian Drinking Water Guidelines* (ADWG).
  - USEPA RSL (on-line) Residential Tap Water Criteria for use where local guidelines are not available for individual contaminants.

  - WHO (2008) Petroleum Products in Drinking-water guidelines.
  - ADWG (2011) criteria with a factor of 10 for incidental direct contact (for non-volatiles).
- Ecological Assessment:
  - Groundwater Investigation Levels (GILs) listed in NEPM (2013) for protection of aquatic ecosystems referenced in ANZECC (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Trigger values (TVs) provided are concentrations that, if exceeded, indicate a potential environmental problem at the point of use and 'trigger' further investigation. The 95% fresh water level of protection was adopted.

Groundwater monitoring wells were screened across different soil profiles (fill, sand and clay), however are considered to target perched groundwater in sand. The extraction and use of groundwater as a resource at the site is unlikely as the site is within the Botany Sand Aquifer Embargo zone where the abstraction of groundwater for domestic use is banned due to historical regional contamination of the aquifer. The site is in an area which has reticulated water supply from Sydney Water. Therefore assessment of direct contact and consumption of groundwater by nearby residents is not considered to be required.

7.1 Auditor's Opinion

The environmental quality criteria referenced by the Auditor are consistent with those adopted by DP, with the exception of the following:

- The DSI does not mention assessment of 'aesthetic' contamination as outlined in the NEPM (2013). However, the report results discuss potential aesthetic issues detected during sampling.
- The DSI had adopted 'hardness modified trigger values' (HMTV) for the assessment of individual metals in GILs. The hardness conditions of the receiving water body has not been assessed to justify the use of HMTV.

8. EVALUATION OF SOIL ANALYTICAL RESULTS

Soil samples were analysed for a variety of contaminants detailed in Tables 8.1 (fill) and 8.2 (natural). The results have been assessed against the environmental quality criteria and summarised below. Soil sampling locations are presented in Attachment 2.

Table 8.1: Evaluation of Fill Soil Analytical Results – Summary Table (mg/kg)

Analyte	N	Detections	Maximum	n > Human Health Screening Criteria
Asbestos in soil (presence/absence)	10	0	<PQL	-
Arsenic	11	5	8	0 above HIL D 3,000
Cadmium	11	3	1	0 above HIL D 900
Total Chromium	11	10	12	0 above HIL D 3,600
Copper	11	11	460	0 above HIL D 240,000
Lead	11	11	1,200	0 above HIL D 1,500
Manganese	11	11	170	0 above HIL D 60,000
Mercury (inorganic)	11	9	1	0 above HIL D 730

Table 8.1: Evaluation of Fill Soil Analytical Results – Summary Table (mg/kg)				
Analyte	**N**	**Detections**	**Maximum**	**n > Human Health Screening Criteria**
Nickel	11	9	23	0 above HIL D 6,000
Zinc	11	11	710	0 above HIL D 400,000
TRH (C_6-C_{10} minus BTEX)	11	1	39	0 above HSL D (sand 0-1 m) 260 0 above ML 700
TRH (>C_{10}-C_{16} minus naphthalene)	11	0	<PQL	0 above HSL D (sand 0-1 m) NL 0 above ML 1,000
TRH (>C_{16}-C_{34})	11	0	<PQL	0 above ML 3,500
TRH (>C_{34}-C_{40})	11	0	<PQL	0 above ML 10,000
Benzene	11	0	<PQL	0 above HSL D (sand 0-1 m) 3
Toluene	11	0	<PQL	0 above HSL D (sand 0-1 m) NL
Ethylbenzene	11	0	<PQL	0 above HSL D (sand 0-1 m) NL
Xylene	11	0	<PQL	0 above HSL D (sand 0-1 m) 230
Tetrachloroethene (PCE)	11	1	32[a]	0 above RSL 1,000[b]
Other VOCs	11	0	<PQL	-
Total PAHs	11	9	22	0 above HIL D 4,000
Carcinogenic PAHs (BaP TEQ)	11	8	2	0 above HIL D 40
Benzo(a)pyrene	11	8	1	-
Naphthalene	11	0	<PQL	0 above HSL D (sand 0-1 m) NL
Total Phenols	10	0	<PQL	0 above HIL D 240,000
PCBs	10	0	<PQL	0 above HIL D 7
OPPs	10	0	<PQL	0 above HIL D
OCPs	10	0	<PQL	0 above HIL D

n number of samples
- No criteria available/used
NL Non limiting
a PCE was detected in fill sample WLBH01 (0.5-0.95). PCE is a VOC compound historically used in dry-cleaning and as a metal degreasing solvent (NEMP, 2013).
b USEPA Carcinogenic Screening Level (SL) has been adjusted by a factor of 10 to address cancer risk acceptance rates (1:100,000) in Australia.

Table 8.2: Evaluation of Natural Soil Analytical Results – Summary Table (mg/kg)				
Analyte	**N**	**Detections**	**Maximum**	**n > Human Health Screening Criteria**
Asbestos in soil (presence/absence)	1	0	<PQL	-
Arsenic	9	3	12	0 above HIL D 3,000
Cadmium	9	1	1	0 above HIL D 900
Total Chromium	9	6	31	0 above HIL D 3,600
Copper	9	7	44	0 above HIL D 240,000
Lead	9	6	330	0 above HIL D 1,500
Manganese	9	8	190	0 above HIL D 60,000
Mercury (inorganic)	9	1	1	0 above HIL D 730
Nickel	9	5	9	0 above HIL D 6,000
Zinc	9	8	350	0 above HIL D 400,000
TRH (C_6-C_{40})	9	0	<PQL	0 above HIL D and ML
BTEXN	9	0	<PQL	0 above HSL D (sand 0-1 m)
PCE	7	1	19[a]	0 above RSL 1,000[b]
Other VOCs	7	0	<PQL	-
Total PAHs	9	1	19	0 above HIL D 4,000
Carcinogenic PAHs (BaP TEQ)	9	1	3	0 above HIL D 40
Benzo(a)pyrene	9	1	2	-
Total Phenols	6	0	<PQL	0 above HIL D 240,000
PCBs	6	0	<PQL	0 above HIL D 7
OPPs	6	0	<PQL	0 above HIL D
OCPs	6	0	<PQL	0 above HIL D

n number of samples
- No criteria available/used
NL Non limiting
a PCE was detected in natural sample WLBH01 (1-1.45).
b USEPA Carcinogenic Screening Level (SL) has been adjusted by a factor of 10 to address cancer risk acceptance rates (1:100,000) in Australia.

In assessing the results, the Auditor makes the following observations:

- Metals, light fraction TRH, individual PAHs and PCE were detected in the fill samples at concentrations below the screening criteria. The fill appears to have been impacted by the historical activities undertaken at the site (Section 4). PCE was also detected in the underlying natural soil at WLBH01. The source of PCE is likely to be the former laundry/dry cleaner at 87 Botany Road (Lot 2 DP27454), which is located immediately to the west of the site in the Worksite Area.

- Fill samples detected high lead concentrations with a maximum value of 1,200 mg/kg. Previous investigation by EI detected elevated lead of 2,100 mg/kg above the screening criteria at the site. The source of lead could be attributed to inclusions of ash, fly ash, charcoal and coal detected in the fill.
- Asbestos was not detected in the soil samples analysed by DP. However, DP noted the presence of fragments potentially containing asbestos in the fill at WLTP10.
- Marginal detections of metals, PAHs and PCE below the screening criteria were detected in some natural soil samples. The source of these contaminants can be attributed to the following:
  - Detections of PAHs in the natural soil in WLBH01 could be attributed to cross contamination from the overlying fill soil as the samples was obtained directly beneath the fill.
  - Detections of PCE in the natural soil in WLBH01 could be attributed to the former laundry/dry cleaner at 87 Botany Road. PCE was also detected in the overlying fill at this location, and groundwater in a nearby well.
  - The majority of the metal results are consistent with background concentrations except for lead in WLBH01 which was above typical background levels (10-40 mg/kg). The source of lead could be attributed to cross contamination from the overlying fill soil as the samples was obtained directly beneath the fill.

8.1 Auditor's Opinion

In the Auditor's opinion, the soil analytical results are consistent with the site history and field observations. The results indicate the fill to be locally impacted by lead, PCE and ACM, however more widespread contamination from ACM is possible and considered likely. Low level contamination of fill and underlying natural soil was identified, however this was at concentrations less than the assessment criteria.

Remediation of fill material is required. Off-site disposal of impacted fill and natural soil will require careful management during remediation. The remedial strategy outlined in the RAP is reviewed and summarised in Section 10.

9. EVALUATION OF GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected from monitoring wells WLMW04, WLMW05 and WLMW06 by DP as part of the DSI (WLMW03 was destroyed). The analytical results are summarised below in Table 9.1. Sampling locations are presented in Attachment 2.

Table 9.1: Evaluation of Groundwater Analytical Results – Summary Table (µg/L)

Analyte	n	Detections	Maximum	n >ANZECC Fresh (2000)	n > ADWG/RSL
Arsenic	3	0	<PQL	0 above criteria of 24	0 above criteria of 10
Cadmium	3	2	**0.2**	**1 above criteria of 0.06**	0 above criteria of 2
Total Chromium	3	0	<PQL	0 above criteria of 1	0 above criteria of 50
Copper	3	3	**3**	**2 above criteria of 1.4**	0 above criteria of 2,000

Table 9.1: Evaluation of Groundwater Analytical Results – Summary Table (µg/L)					
Analyte	**n**	**Detections**	**Maximum**	**n >ANZECC Fresh (2000)**	**n > ADWG/RSL**
Lead	3	0	<PQL	0 above criteria of 3.4	0 above criteria of 10
Manganese	3	4	**570**	0 above criteria of 1,900	**1 above criteria of 500**
Mercury	3	0	<PQL	0 above criteria of 0.06	0 above criteria of 1
Nickel	3	0	<PQL	0 above criteria of 8	0 above criteria of 20
Zinc	3	3	**34**	**4 above criteria of 8**	-
TRH (C_6-C_{10} minus BTEX)	3	1	210	-	0 above criteria of 15,000[a]
TRH (>C_{10}-C_{16} minus naphthalene)	3	0	<PQL	-	-
TRH (>C_{16}-C_{34})	3	0	<PQL	-	-
TRH (>C_{34}-C_{40})	3	0	<PQL	-	-
Chlorodibromomethane	3	1	3	-	0 above criteria of 8.7
Chloroform (Trichloromethane)	3	2	**18**	0 above criteria of 370	**1 above criteria of 3**
PCE	3	1	**150**	**1 above criteria of 70[b]**	**1 above criteria of 50**
BTEX	3	0	<PQL	0 above criteria	0 above criteria
Naphthalene	3	0	<PQL	0 above criteria of 16	-
Total PAHs	3	0	<PQL	-	-
Aldrin+Dieldrin	3	1	0.006	-	0 above criteria of 0.3
Chlordane	3	1	0.02	0 above criteria of 0.03	0 above criteria of 2
Dieldrin	3	1	0.006	0 above criteria of 0.01[c]	-
Heptachlor epoxide	3	1	0.012	-	0 above criteria of 0.3
Total OPPs	3	0	<PQL	-	-
Total PCBs	3	0	<PQL	-	-
Total Phenols	3	0	<PQL	0 above criteria of 320	-

n number of samples
- No criteria available/used

Bold Values exceed criteria
a WHO (2008) assessment criteria for TPH aliphatic fraction adjusted by x10 in accordance with NHMRC (2008) recommendations for incidental ingestion of groundwater.
b In the absence of high reliability guidelines, the low reliability interim working level has been adopted.
c In the absence of high reliability guidelines, the moderate or low reliability guideline concentration has been adopted.

In assessing the results, the Auditor makes the following observations:

- The groundwater analytical results for the majority of the analytes were below the health and ecological screening criteria.
- Elevated cadmium, copper, manganese and zinc concentrations were detected in the groundwater samples. The DSI concluded that the heavy metals can be attributed to diffuse urban-sourced background levels and is not from a site specific source.
- Low concentrations of OCPs, less than the ecological screening criteria, were detected in groundwater sample WLMW06. DP stated that OCPs were not detected in the soil samples tested from the site and no other sources of pesticides were identified.
- An elevated concentration of PCE was detected in groundwater sample WLMW05 located close to the western site boundary, near the former laundry/dry cleaner at 87 Botany Road. PCE was also detected in the fill and natural soil in the vicinity of this monitoring well. Groundwater from this well also contained a chloroform concentration above the ADWG screening criteria.
- The DSI concluded that the source of VOCs was from the former use of 87 Botany Road as a laundry/dry cleaner. VOCs in soil and groundwater may pose a risk to site receptors and will require further assessment.
- The DSI concluded that the potential on-site sources will be removed during site works and that groundwater treatment requirements should be considered for groundwater disposal.

9.1 Auditor's Opinion

In the Auditor's opinion, the groundwater analytical results indicate that groundwater at the site has been impacted from the historical on-site and off-site landuse. The VOCs and OCP concentrations detected in groundwater could pose a potential risk to site receptors. DP has recommended further investigation to adequately characterise the extent and magnitude of PCE contamination. Based on the results of the additional investigation, an assessment of risk or additional remediation may be required. Other contaminants detected in groundwater are not considered to be present at concentrations presenting a risk to site receptors.

10. EVALUATION OF PROPOSED REMEDIATION

10.1 Conceptual Site Model

A conceptual site model (CSM) is a representation of the source, pathway and receptor linkages at a site. DP has developed a CSM based on the PSI and DSI. Table 10.1 provides the Auditors review of the CSM used by DP to inform remediation of the site.

Table 10.1: Review of the Conceptual Site Model		
Element of CSM	**Consultant**	**Auditor Opinion**
Contaminant source and mechanism	Soil contamination from former industrial land use and imported fill material containing lead, VOC and asbestos. Detections of OCPs in groundwater. The source of OCPs has not been identified. VOC contamination migrating onto the site from offsite source, 87 Botany Road formerly used as a laundry/dry cleaner. Unexpected contamination finds during excavation.	Source and mechanism for soil considered appropriate. The source of OCPs in groundwater has not been identified, however is likely to be related to historical use of the site and the wider Worksite Area.
Affected media	Fill material, vapour and groundwater.	Affected media have been identified.
Receptor identification	Future site users, construction workers, adjacent land users, surface water and groundwater.	The receptors have been appropriately identified. The closest surface water receptor is Sheas Creek located 530 m to the southwest and is therefore unlikely to be impacted by site contamination.
Exposure pathways	Inhalation of dust and vapours, lateral migration of groundwater, direct contact.	Incidental ingestion is also considered a potential exposure pathway.
Presence of preferential pathways for contaminant movement	Trenches for buried services may act as potential migratory pathways.	Preferential pathways for groundwater and vapour migration are likely to be present on the site, including current and planned subsurface services The sump and associated pipes identified in the Worksite Area are likely to be a source and preferential pathway for VOC contamination. Excavation of the site may create preferential pathways for groundwater flow towards the site. The locations of preferential pathways have not been identified.

Table 10.1: Review of the Conceptual Site Model		
Element of CSM	**Consultant**	**Auditor Opinion**
Evaluation of data gaps	The RAP recommends additional on-site and off-site testing for VOCs. Proposed dewatering of the excavation may draw contaminated water onto the site. The RAP states that the contaminants in groundwater will require treatment prior to disposal. However, treatment options have not been addressed in the RAP.	Presence of VOCs in soil and groundwater could pose a vapour risk, which has not been adequately assessed. Data gaps can be addressed prior to or during remediation of the site.

10.2 Remediation Required

The Auditor has assessed the RAP by comparison with the checklist included in OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*. The RAP was found to address the required information, as detailed in Table 10.2, below.

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
Remedial Goal The RAP stated four remediation goals as outlined below: *'render the site suitable for the proposed land use; maintain records of the remediation and earthworks undertaken including validation as required; mitigate adverse impacts on surrounding land and waterways during the remediation by the management of dust, water and noise emissions; and maximise the protection of workers involved with remediation and earthworks'.*	In the Auditor's opinion, the goals are appropriate considering the proposed redevelopment of the site.
Discussion of the extent of remediation required DP identified the entire excavation footprint (Attachment 2) as the horizontal remediation extent and the vertical extent to be the depth of contaminated soil or the base of the excavation. Due to the nature of the development, bulk excavation will require removal of site soil to the desired levels (28 mbgl). The base and walls of the excavation will be validated.	The proposed extent of soil remediation is considered adequate. Further excavation would be undertaken in the event of validation failure. The RAP recommends additional testing of groundwater and vapour for contamination.
Remedial Options The RAP stated that due to the bulk excavation requirement for the proposed development, excavation and off-site disposal was the only viable option to address contaminated fill material.	Acceptable for soil. A range of options to address groundwater and soil vapour contamination were not presented. This will require consideration following the additional testing.

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
Selected Preferred Option Excavation and off-site disposal of contaminated soil.	Acceptable for soil. A preferred option to address groundwater and soil vapour contamination was not presented.
Rationale Development of the site will involve bulk excavation from the surface to a depth of up to 28 mbgl. The majority of the impacted soil will be excavated and disposed off-site.	Acceptable.
Waste Characterisation and Disposal The DSI has identified the following waste streams based on *in situ* testing of fill material (Attachment 3): special waste – asbestos – hazardous waste (HW); special waste – asbestos – restricted solid waste (RSW); special waste – asbestos – general solid waste (GSW); GSW; Acid Sulfate Soil (ASS); and VENM. DP are to provide documented waste classifications based on an inspection of the material and available analytical data. Further *ex situ* waste characterisation will be undertaken if considered necessary. Waste material is to be removed by a licensed contractor. Each load will be documented, including weighbridge slips, trip tickets and consignment disposal confirmation. Waste will be disposed of at a facility legally able to accept the material.	Acceptable.
Containment No requirement at this stage.	Acceptable.
Proposed Validation Testing Validation samples are to be collected following removal of waste with different classifications and fill material, as well as the footprint of stockpile areas. *Excavations (base <500 m^2):* Base – one sample per 25-50 m^2. With a minimum of 3 samples. Walls – one sample per 10 m length exposed with additional samples collected at depths based on observations. *Excavations (base ≥500 m^2):* Base – grid based sampling to meet the density recommended in the NSW EPA *Sampling Design Guidelines* (minimum of 10 samples). Walls – one sample per 20 m length exposed with additional samples collected at depths based on observations. *Stockpiles:* In accordance with NEPM (2013). The RAP states that samples collected will be analysed for the contaminants of concern. However, it does not list the contaminants.	The Auditor considers the validation sampling densities acceptable. Samples should be analysed for the contaminants of concern, which are considered to include asbestos, metals, TRH, PAHs, VOCs and OCPs. The density of testing for imported material would need to be commensurate with the documentation provided, source, observations and the consistency of the results. VENM certificates based on the template available on the NSW EPA website should be provided.

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
Imported material is expected for temporary works such as construction of piling platforms. The RAP includes a material importation protocol and criteria for implementation. The protocol requires review and approval of documentation by the environmental consultant, inspection of the material at the source site, inspection during importation and additional testing (details not provided in the RAP).	
Interim Site Management Plan (before remediation) The RAP recommends a surface clearance for asbestos by an asbestos assessor prior to the commencement of excavation. Further investigation for VOC contamination has been recommended prior to remediation.	Acceptable. No other interim management is considered necessary given the site is sealed with concrete and asphalt, fenced and occupied by JHCPBGJV.
Unexpected Finds The RAP includes a contingency plan for unexpected finds, UST removal, stopping work and assessment of the find by an occupation hygienist, asbestos consultant or environmental consultant. The RAP includes contingencies in the event contaminated groundwater and/ or hazardous ground gas (HGG) are detected during site works. Validation of unexpected finds should be undertaken in accordance with the procedures in the RAP.	The unexpected finds procedure (UFP) is considered acceptable.
Site Management Plan (operation phase) including stormwater, soil, noise, dust, odour and OH&S The RAP includes a site management plan for implementation during remediation and validation that covers specific requirements for asbestos (including notification, air monitoring), specific requirements for chemical contaminants, fencing and signage, security and restriction of access, PPE, decontamination, disposal of water, clearance inspection and certificates.	The site management plan is considered acceptable for remedial planning.
Contingency Plan if Selected Remedial Strategy Fails The RAP states that in the event of validation failure, the remediation contractor will undertake further 'chase out' excavation and disposal, followed by validation sampling.	The remedial strategy to address fill material has a low risk of failure, as validation failure would lead to further excavation which is required for the dive structure.
Contingency Plans to Respond to Site Incidents The RAP includes a soil contingency plan for the handling and disposal of material.	Acceptable.
Remediation Schedule and Hours of Operation Not provided in the RAP.	The hours of operation are to be governed by consent conditions.

Table 10.2: Evaluation of Remedial Action Plan	
Remedial Action Plan	**Auditor Comments**
Licence and Approvals The RAP notes that the development is approved as critical State significant infrastructure under the *Environmental Planning and Assessment Act 1997* (EP&A Act). SEPP55 does not apply to the development. Waste disposal is to be tracked, and the receiving facility is to be licensed to accept the material. Council approval will be required for disposal of groundwater in to the stormwater system if required during works. The RAP notes that an EPL will be in place for the disposal of water. Asbestos removal contractors are to be appropriately licensed. Air monitoring for asbestos to be conducted during remediation.	Acceptable.
Contacts/Community Relations Contacts were provided for the consultant and Auditor. The details of the project manager and remediation contractor are to be included following appointment. The emergency procedures and contact details are to be displayed at the site entrance. Direct community consultation is not proposed.	Acceptable
Long-term environmental management plan No requirement at this stage.	Acceptable.
Validation Reporting The RAP included a validation plan which addresses the validation DQOs, QA/QC and DQIs in accordance with NEPM (2013). The validation requirements include: site inspections, sampling, documentation and reporting.	Acceptable.

It is considered that the remediation approach recommended by DP is largely appropriate. Staged remediation of the different waste streams would be feasible and considered appropriate for this site. The presence of volatile contaminants in groundwater above the screening criteria may require additional remedial measures to be considered and implemented. Further investigation of groundwater and soil vapour conditions are proposed to inform the need for additional remediation. The scope of the additional investigation should been provided to the Auditor for review.

10.3 Auditor's Opinion

In the Auditors' opinion, the proposed remediation works are adequate to address contaminated fill material during redevelopment of the site through: excavation and off-site disposal of contaminated fill material and natural soil; implementation of the UFP; and successful validation.

VOC contamination identified in soil and groundwater requires further investigation to delineate the vertical and lateral extent of contamination. The investigation should adequately characterise groundwater and soil vapour contamination in order to assess the risk to human health and the environment. Based on the assessment, additional remedial strategies may be required in order to make the site suitable for the proposed use. The results of the investigations and any additional remediation proposed should be documented and provided to the Auditor for review.

11. CONCLUSIONS AND RECOMMENDATIONS

The RAP concluded *"... that the site can be rendered suitable for the proposed development subject to implementation of this RAP"*.

Based on the information presented in the referenced reports and observations made on site, the Auditor concludes that the proposed process for remediation of fill material is practical and that the site can be made suitable for the proposed land use if remediated in accordance with the following RAP:

> *'Remediation Action Plan, Sydney Metro City and South West, Tunnel and Station Excavation Works Package, Proposed Waterloo Station, Botany Road and Cope Street, Waterloo, prepared for John Holland CPB Ghella JV, Project 85608.14, April 2018',* report reference: Revision 0, dated 13 April 2018, prepared by Douglas Partners.

Further investigation to determine the extent and magnitude of VOC concentrations in soil vapour and groundwater is proposed. The scope and results of the investigation should be provided to the Auditor for review. Should the results of the investigation indicate a need for additional remediation to address groundwater and soil vapour contamination, an addendum to the RAP should be prepared and provided to the Auditor for review.

At the completion of remediation of the site, a Section A Site Audit Statement and supporting Site Audit Report certifying suitability for the proposed use should be prepared.

Remediation and reporting can be conducted in stages provided suitable provisions are made to avoid cross-contamination of remediated areas.

* * *

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

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

Yours faithfully
Ramboll Australia Pty Ltd

[redacted]

[redacted]

Attachments: 1 Site Locality

2 The DSI Sampling Location Plan

3 Waste Classification and Soil Disposal Plan

Douglas Partners
Geotechnics | Environment | Groundwater

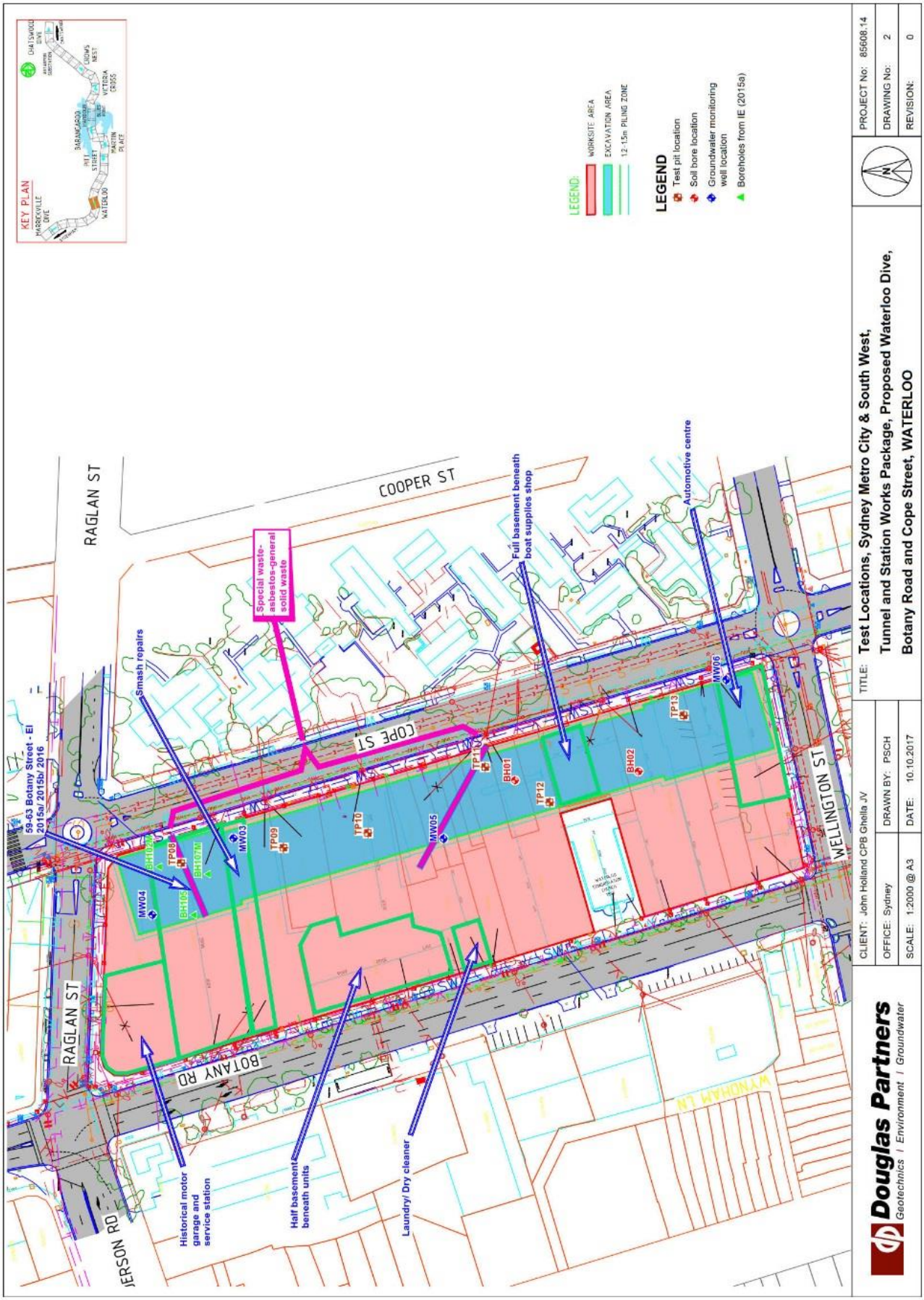
CLIENT: John Holland CPB Ghella JV	
OFFICE: Sydney	DRAWN BY: PSCH
SCALE: 1:2000 @ A3	DATE: 10.10.2017

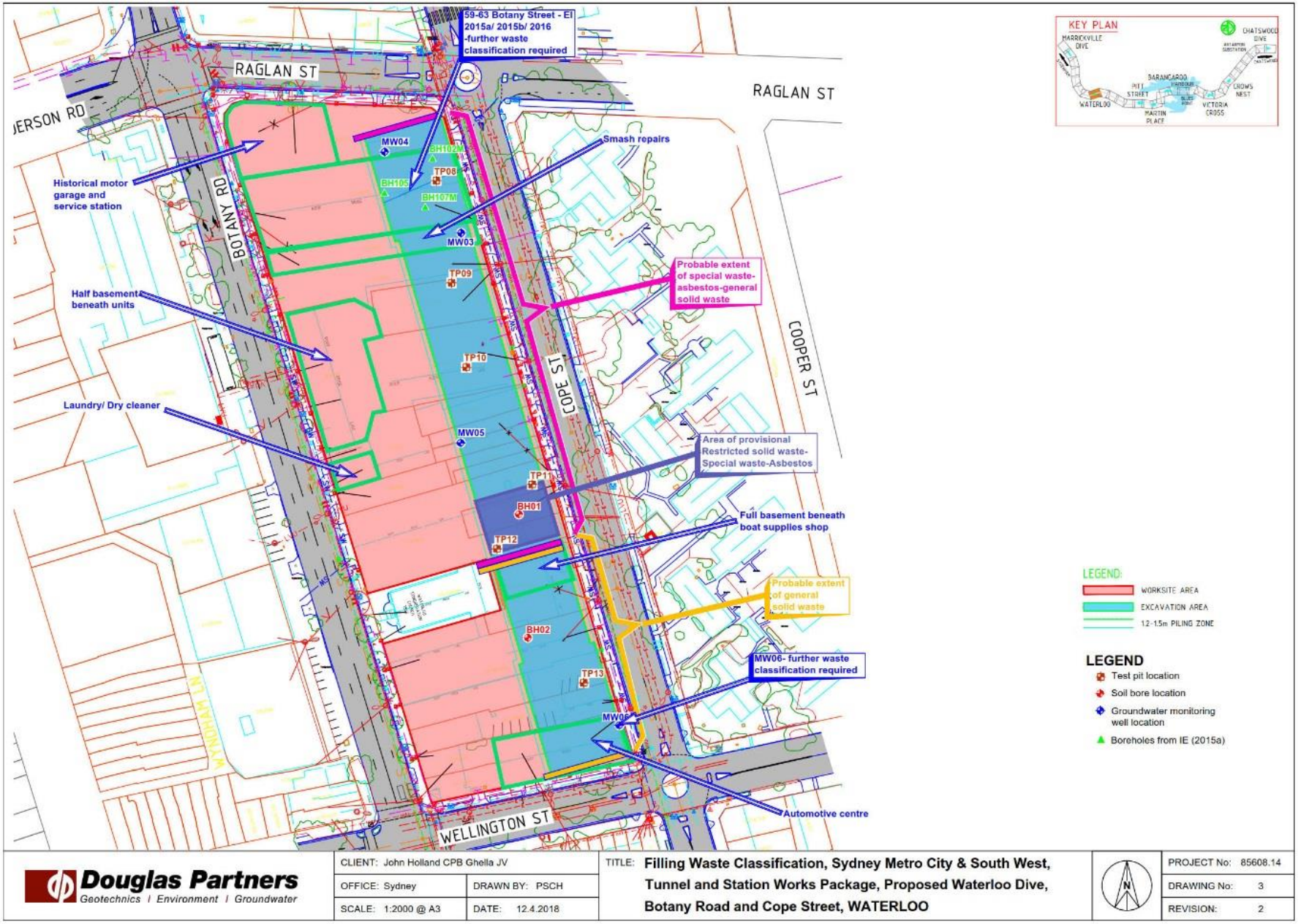
TITLE: **Site Locations and Features, Sydney Metro City & South West, Tunnel and Station Works Package, Proposed Waterloo Dive, Botany Rad and Cope Street, WATERLOO**

PROJECT No:	85608.14
DRAWING No:	1
REVISION:	0

Attachment 1: Site Locality Plan

Attachment 2: The DSI Sampling Location Plan





Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: John Holland CPB Ghella JV		
OFFICE: Sydney	DRAWN BY: PSCH	
SCALE: 1:2000 @ A3	DATE: 12.4.2018	

TITLE: **Filling Waste Classification, Sydney Metro City & South West, Tunnel and Station Works Package, Proposed Waterloo Dive, Botany Road and Cope Street, WATERLOO**

PROJECT No:	85608.14
DRAWING No:	3
REVISION:	2

Attachment 3: Waste Classification and Soil Disposal Plan

APPENDIX D
CORRESPONDENCE

[redacted]

Attn Director of Waste Compliance

I am undertaking a contaminated land audit (TO-079) of the Waterloo Metro Station located at 150 and Part 140 Cope Street, Waterloo. I provide the following notification to NSW EPA in accordance with Section 4.3.7 of the NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme (3rd edition)*.

The validation report reviewed during preparation of my Site Audit Report included a summary of the waste disposed offsite to landfill. The validation report noted that approximately 130.69 tonnes of waste soil left site on 25 and 27 March 2023, and was taken to a subcontractors depot (Ferrycarrig Construction) at 20 Dasea Street, Chullora 2190. The validation report documents that Ferrycarrig Construction subsequently disposed of the material to Met Recycling on 31 March 2023. Based on the waste classification documentation appended to the validation report, the concentrations of benzo(a)pyrene were above the CT1 thresholds and polycyclic aromatic hydrocarbons (PAHs) were above the 'Other Limits' threshold in the Met Recycling EPL (EPL 20948).

In addition, the validation report documents that an EPL (21108) for 20 Dasea Street, Chullora is held by Pacific National Services Pty Ltd. This EPL allows for the storage of some wastes, however, not general solid waste (GSW).

Feel free to contact me should you require any further information.

[redacted]

[redacted]