Parramatta City Council

Remedial Action Plan

‘Parramatta Civic Link – Block 3’, Horwood Place, Parramatta, NSW, 2150

10 October 2025

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10 October 2025

Our Ref: 30286862_PCC-Parra-Block3_RAP_R02

Briony Mowbray

Environmental Consultant

Simon Spyrdz

Associate Technical Director

Suzanne Geerdink

Senior Project Manager

Prepared By:
Arcadis Australia Pacific Pty Ltd
On the Lands of the Gadigal
Level 16
580 George Street
Sydney, NSW 2000
Phone: +61 2 8907 9000
www.arcadis.com

Prepared For:
Parramatta City Council
9 Wentworth Street,
Parramatta NSW 2150
Tel: (02) 9806 8347

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Acronyms and Abbreviations

Acronym / Abbreviation	Definition
ACM	Asbestos containing material
AF / FA	Asbestos fines / fibrous asbestos
Arcadis	Arcadis Australia Pacific Pty Ltd
ASS	Acid sulfate soils
BTEX	Benzene, toluene, ethylbenzene and xylene
CoPC	Contaminant of potential concern
CSM	Conceptual Site Model
DP	Douglas Partners Pty Ltd
DSI	Detailed Site Investigation
DQO	Data quality objective
DSI	Detailed Site Investigation
EHO	EHO Consulting
EMP	Environmental Management Plan
ENM	Excavated Natural Material
EPA	Environment Protection Authority
FCF	Fibre cement fragment
HDPE	Heavy duty polyethylene sheeting
L-CEMP	Limited Construction Environmental Management Plan
mbgl	metres below ground level
Metals (8)	Arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), nickel (Ni), lead (Pb), zinc (Zn) and mercury (Hg)
NEPC	National Environment Protection Council
NEPM	National Environment Protection (Assessment of Site Contamination) Measure
NSW	New South Wales
OCP	Organochlorine pesticides
OPP	Organophosphate pesticides
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PFAS	Per- and poly-fluoroalkyl substances
POEO Act	*Protection of the Environment Operations Act 1997*

Acronym / Abbreviation	Definition
RAP	Remediation Action Plan
SCC	Specific Contaminant Concentration
SOP	Standard Operating Procedures
SPR	Source-pathway-receptor
TBD	To be determined
TCLP	Toxicity characteristic leaching procedure
TRH	Total recoverable hydrocarbons
UEF	Unexpected Find
VENM	Virgin excavated natural material
WA DOH	Western Australia Department of Health
w/w	Weight / weight

Executive Summary

Arcadis Australia Pacific Pty Ltd (Arcadis) was engaged by Parramatta City Council (PCC or the Client) to prepare a Remediation Action Plan (RAP) for the project identified as 'Parramatta Civic Link – Block 3'; located at Horwood Place, Parramatta, NSW, 2150 (the Site). The Site location is shown in *Figure 1*.

This RAP should be read in conjunction with the Arcadis (2025) *Limited Construction Environmental Management Plan, 'Parramatta Civic Link – Block 3', Horwood Place, Parramatta, NSW, 2150 (L-CEMP)* which provides procedures and controls to be implemented during construction to manage human health and environmental risks from potential asbestos.

Arcadis understands the Site is proposed to be redeveloped into a planned green pedestrian and cycle-friendly corridor designed to connect Parramatta Square and the Parramatta River. The proposed works are to include upgrades to the pavements, services (power, sewer, water, irrigation, communications) (< 1.0mbgl), and tree planting (up to 2mbgl), refer to the plans in *Appendix B*.

The purpose of preparing this RAP is to provide the Client, key stakeholders, and remediation contractors with sufficient information to facilitate the remediation and validation of potential bonded ACM if identified onsite during construction works.

The objectives of the RAP are as follows:

- Identify the remediation objectives, criteria and extent.
- Detail the remediation and validation strategy to be implemented to address potential unacceptable exposure risks from residual bonded ACM (if identified) at the Site, based on the future public open space land use scenario.

Arcadis undertook the following scope of work to meet the objectives:

- Reviewed previous environmental investigations to identify potential risks to human health and/or the environment from the identified contamination.
- Set remediation objectives to allow for the proposed use of the Site, with no unacceptable risks to human health and/or the environment.
- Defined the remediation extent required to achieve the remediation objectives.
- Documented the process required to remediate and validate the Site, based on the future public open space land use scenario.
- Advised on waste classification, handling, and tracking requirements in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act).
- Prepared this RAP in accordance with the requirements described in the New South Wales Environment Protection Authority (NSW EPA) (2020) *Consultants reporting on contaminated land: Contaminated Land Guidelines.*

This RAP provides a remedial and validation strategy to be implemented during proposed construction works, to address contamination risks which may otherwise remain onsite in the event that residual in-situ bonded asbestos containing material (ACM) is identified.

The objective of the proposed remedial work is to manage potential asbestos at the Site so that it does not present an unacceptable risk to human health. The remediation extent is defined by the lateral and vertical limits of potential bonded ACM impacted fill material within the Site boundary, as well as the lengths of electrical conduits being decommissioned.

In consideration of the assessment above and the Clients planning requirements, the preferred remediation strategy is a combination of:

- Onsite treatment of bonded ACM that is confined to surface soil and/or localised areas of low asbestos concentrations; and
- Offsite disposal of bonded ACM that is confined to localised areas of high asbestos concentration and electrical asbestos conduits.

If bonded ACM is observed to be widespread across the site and at depth and/or if potentially friable asbestos is identified, then this will be considered an unexpected find (UEF) and the contingencies detailed in *Section 6.4.10* should consulted for suitable action.

This RAP is limited to the procedures and requirements for the remediation of potential bonded ACM at the Site. Other findings of contamination encountered during redevelopment, including non-bonded asbestos or large volumes of asbestos, constitute UEFs in the context of this RAP and will require further assessment and management outside the scope of this RAP.

Arcadis considers that the remedial objectives can be achieved, and the Site made suitable for the proposed land use, subject to the implementation of the strategies and methodologies set out in this RAP.

1 Introduction

Arcadis Australia Pacific Pty Ltd (Arcadis) was engaged by Parramatta City Council (PCC or the Client) to prepare a Remediation Action Plan (RAP) for the project identified as 'Parramatta Civic Link – Block 3'; located at Horwood Place, Parramatta, NSW, 2150 (the Site). The Site location is shown in *Figure 1*.

This RAP provides a remedial and validation strategy to be implemented during proposed construction works, to address contamination risks which may otherwise remain onsite in the event that residual in-situ bonded asbestos containing material (ACM) is identified.

This RAP should be read in conjunction with the Arcadis (2025) *Limited Construction Environmental Management Plan, 'Parramatta Civic Link – Block 3', Horwood Place, Parramatta, NSW, 2150 (L-CEMP)* which provides procedures and controls to be implemented during construction to manage human health and environmental risks from potential asbestos.

1.1 Project Understanding

The Site is currently a publicly accessible open space area, comprising of Horwood Place and a portion of George Street (south), Phillip Street (north) and Auctioneer Lane at the entry into the Eat-Street carpark, adjacent to Horwood Place in the central west of the Site. The Site is predominantly covered in hardstand with localised exposed soils in garden beds with well-established trees. The Site is a vehicle and pedestrian accessible thoroughfare for the public, with commercial shops and carparks in the immediate surrounds.

Arcadis understands the Site is proposed to be redeveloped into a planned green pedestrian and cycle-friendly corridor designed to connect Parramatta Square and the Parramatta River. The proposed works are to include upgrades to the pavements, services (power, sewer, water, irrigation, communications) (< 1.0mbgl), and tree planting (up to 2mbgl), refer to the plans in *Appendix B*.

The Client requires a Remediation Action Plan to be developed to provide guidance of remediation actions to address onsite contamination to make the Site suitable for future development.

1.2 Purpose and Objectives

The purpose of preparing this RAP is to provide the Client, key stakeholders, and remediation contractors with sufficient information to facilitate the remediation and validation of potential bonded ACM if identified onsite during construction works.

The objectives of the RAP are as follows:

- Identify the remediation objectives, criteria and extent.
- Detail the remediation and validation strategy to be implemented to address potential unacceptable exposure risks from residual bonded ACM (if identified) at the Site, based on the future public open space land use scenario.

1.3 Scope of Work

Arcadis undertook the following scope of work to meet the objectives:

- Reviewed previous environmental investigations to identify potential risks to human health and/or the environment from the identified contamination.

- Set remediation objectives to allow for the proposed use of the Site, with no unacceptable risks to human health and/or the environment.
- Defined the remediation extent required to achieve the remediation objectives.
- Documented the process required to remediate and validate the Site, based on the future public open space land use scenario.
- Advised on waste classification, handling, and tracking requirements in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act).
- Prepared this RAP in accordance with the requirements described in the New South Wales Environment Protection Authority (NSW EPA) (2020) *Consultants reporting on contaminated land: Contaminated Land Guidelines.*

1.4 Stakeholders and Responsibilities

A register of key stakeholders and associated responsibilities is presented in *Table 1-1*.

Table 1-1 Key Stakeholders and Responsibilities

Role	Organisation	Contact	Responsibility
Site Owner	PCC	+612 9806 5050	Overall ownership of the RAP and subsequent Validation Report.
Planning Authority	PCC	+612 9806 5050	Consent for Category 2 remediation works
Environmental Regulatory Authority	NSW EPA	131 500	Regulatory authority
Workplace Health and Safety Regulatory Authority	SafeWork NSW	131 050	Retain copies of destruction certificate
Principal Contractor	Arcadis	Courtney Rheault	Development of the RAP and appropriate implementation and oversight as required by PCC.
Remediation Contractor	Luke Slechta	Ross Mitchell & Associates (RMA Group)	Ensure that all remediation activities are undertaken in accordance with this RAP and any other management plans required and approved by regulatory bodies for the works. Induct all employees, subcontractors and authorised visitors to the site, with respect to work procedures, the requirements of this RAP and other approved management plans (if any). Report any environmental issues to the Site Owner. Maintain site induction, site visitor and complaint registers, material tracking registers and disposal documents as required.

RMA Group Remediation Consultants	Nerilee Edwards	Douglas Partners	(02) 9809 0666
Contamination Advisor	Arcadis	+612 8907 9000	Complete soil validation and validation reporting activities in accordance with this RAP.

1.5 Relevant Legislation and Regulatory Guidelines

This RAP was prepared with reference to the following legislative documents, regulatory guidelines and codes of practice:

- *Contaminated Land Management Act 1997* (CLM Act 1997).
- *Environmental Planning and Assessment Regulation 2021*
- National Environment Protection Council (NEPC) (2013) *National Environment Protection (Assessment of Site Contamination) Measure 1999* (the NEPM).
- NSW EPA (2014a) *Waste Classification Guidelines.*
- NSW EPA (2014b) *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014: The excavated natural material order 2014 (ENM Order).*
- NSW EPA (2014c) *Resource Recovery Exemption under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014: The excavated natural material exemption 2014 (ENM Exemption)*
- NSW EPA (2017) *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd edition).*
- NSW EPA (2020) *Consultants reporting on contaminated land: Contaminated Land Guidelines.*
- NSW EPA (2022) *Contaminated Land Guidelines: Sampling Design Part 1, Application Guidelines*
- NSW EPA (2024) *Asbestos and Waste Tyres Guidelines, Version 3*
- *Protection of the Environment Operations Act 1997 (POEO Act 1997).*
- *Protection of the Environment Operations (Waste) Regulation 2014*
- SafeWork NSW (2022) *Code of Practice: How to Safely Remove Asbestos.*
- *State Environmental Planning Policy (Resilience and Hazards) 2021*
- Western Australia Department of Health (WA DOH) (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites.*

2 Site Setting

2.1 Site Identification

The Site is situated in the central Parramatta building district, between Parramatta Station, approximately 320 m to the south and Parramatta River, approximately 300 m to the north.

The Site identification details are summarised in *Table 2-1* with the current site layout shown in *Figure 2*.

Table 2-1 Site Identification Summary

Item	Details
Project Name	Parramatta Civic Link – Block 3
Site Address	Horwood Place, Parramatta, NSW, 2150
Title Information	The Site includes a portion of Phillip Street, Horwood Place, Auctioneer Lane and George Street Road Corridors (no registered lot or deposited plan) and Lot 102, in Deposited Plan 241030.
Site Area	~5,000 m^2
Site Coordinates (Universal Transverse Mercator coordinates – MGA Zone 56)	The approximate coordinates for the centre of the Site are: Easting: 315393.12 mE Northing: 6256755.92 mS
Local Government Authority	PCC
Owner	PCC
Zoning	A review of the NSW Planning Portal Spatial Viewer indicates the Site is currently zoned E2 – Commercial Centre under the *Parramatta Local Environmental Plan 2023*
Land Use (Current/Proposed)	The Site is currently open space publicly accessible paved land with vehicle accessible roadway which is to be redeveloped into a pedestrian access only open space area. The Site is proposed for 'Open Space/Recreational C' land use, as defined in the NEPM (NEPC, 2013)
Surrounding Land Use	Based on a review of the most recent aerial image of the Site retrieved from Nearmap (dated 28 May 2025), the following land uses were observed immediately surrounding the Site: North – High density residential apartments with commercial premises on the ground floor, then Parramatta River and low density residential beyond. South – A mix of commercial and high density residential, including properties under construction, then Macquarie Street, high density residential/commercial and Parramatta Station beyond. East – A mix of commercial and high density residential, then Smith Street, high density residential/commercial properties and Parramatta Wharf beyond.

Item	Details
	West – Commercial properties and E-Street carpark, then Church Street and a mix of commercial and high density residential properties beyond.

2.2 Site Environmental Setting

Arcadis conducted a desktop review of relevant publicly available records and information provided in the DP (2025) *DSI* to describe the Site environmental Setting, with details presented in *Table 2-2* below.

Table 2-2 Site Environmental Setting

Item	Description
Topography and Elevation	The surface of the Site is relatively flat, located at an elevation of approximately 9 m Australian Height Datum (AHD), with a general slope to 8m AHD in the north, towards Parramatta River.
Geology and Soils	A review of the Sydney 1:100,000 Geological Map indicates the geology below the Site is likely to be dominated by silt and clay sized alluvial materials underlain by black to dark-grey Ashfield shale and laminite derived from the Wianamatta Group, formed in the middle Triassic Epoch in the Mesozoic Era. A review of the Soil Landscapes of the Penrith 1:100,000 Sheet report indicates the Site lies within the Birrong Fluvial soil landscape. The soils are likely to comprise of deep (>250 cm) yellow Podzolic soils and yellow Solodic soils on older alluvial terraces; deep (>250 cm) Solodic soils and yellow Solonetz soils on current floodplain.
Hydrology and Hydrogeology	DP reported no surface bodies are located onsite, with the nearest surface water body to the Site being Parramatta River, located approximately 140m north of the Site, which generally flows to the east into Sydney Harbour. Surface water is likely to flow across the paved surfaces into stormwater drains or infiltrate into exposed permeable soils. Based on site surface topography and elevation, the inferred general surface water flow direction on the Site is considered likely to be towards the north. A search of the WaterNSW real-time maps (https://realtimedata.waternsw.com.au/water.stm) for registered groundwater bores within 500m buffer of the Site indicates there are no registered groundwater bores located onsite. The search reported one registered groundwater bore (GW108611) located approximately 400m to the north-west of the Site, on the northern side of the Parramatta River. The groundwater bore report indicates the following: • The bore is located within the Roman Catholic Church property located at 1 Marist Place, Parramatta, NSW. • The bore was extended to approximately 60m below ground level (mbgl) and completed in April 2005. The geology was described as FILL up to 1mbgl overlying natural comprising of clay, shale then Sandstone. • The bore is authorised for 'Domestic Use' with standing water level reported at 6.2mbgl, 5L/s yield and salinity concentrations ranging

Item	Description
	between 4,650 – 5300 mg/L indicating brackish water, not suitable for drinking but may be suitable for irrigation. Given the location of the bore, north of the Parramatta River, Arcadis generally agrees with DP's assessment that the groundwater bore is unlikely to be a potential receptor of groundwater beneath the Site. Based on the location of the identified nearest surface water course, Parramatta River which flows east, and site topography, the inferred groundwater flow direction at the Site is considered likely to be towards the north/northeast. In consideration of approximate elevations at the surface of the Site when compared to the Parramatta River, it is considered unlikely regional groundwater is likely to be encountered up to 5mbgl.
Acid Sulfate Soils	A review of the Acid Sulfate Soil (ASS) Risk Map available on the NSW Government's Department of Planning Industry and Environment (DPIE) eSpade spatial map indicates the Site lies within an area classed as X4: Disturbed terrain, elevation >4 m AHD. A further search of the ASS Risk Maps detailed in the *Parramatta Local Environmental Plan 2023* indicates the Site is in an area classified as 'Class 4' ASS risk. For Class 4 land, works exceeding 2 meters below the natural ground surface, or those lowering the watertable more than 2 meters, require development consent. Given the following: • Ground disturbance is expected to be predominantly shallow (<0.3m) and localised deeper disturbance including upgrades to drainage lines (< 1mbgl) and tree planting (<2mbgl). • The Site is located at an elevation of greater than 5mAHD. • Geology beneath the Site is not identified as sediments from Holocene Geological age. The potential for ASS to be encountered during the proposed ground disturbance works is considered unlikely. However, if potential indicators of ASS is encountered during intrusive investigation works further investigation may be considered warranted.

3 Previous Investigations and Data

Arcadis reviewed the following previous contamination assessment reports applicable to the Site:

- DP (2025a) *Report on Detailed Site (Contamination) Investigation, Parramatta Civic Link – Block 3, Horwood Place, Parramatta, NSW*.
- DP (2025b) *Stockpile Waste Classification, Parramatta Civil Link - Block 3, George Khattar Lane, Parramatta NSW. Ref: 231981.00.R.002.Rev0, dated 10 February 2025*.
- EHO Consulting (EHO) (2025a) *Waste Classification Certificate,* RMA Contracting Pty Ltd. Ref: JN05778-WCC-RN18685, dated 24 January 2025.
- EHO (2025b) *Waste Classification Certificate,* RMA Contracting Pty Ltd. Ref: JN05778-WCC-RN18702, dated 29 January 2025.
- *Arcadis (2025) Contamination Interpretive Report Parramatta Civil Link - Block 3, Horwood Place, Parramatta, NSW. Ref:* 30286862_PCC-Parra-Block3_CIR_R00

The following section provides a brief summary of relevant information from each of these reports.

3.1 Detailed Site Investigation (DP, 2025)

The stated objective of the *DSI* (DP, 2025a) was to assess the suitability of the Site for the proposed recreational development and whether further investigation and/or management was required.

The *DSI* included the following scope of works:

- A desktop review of site history and background information including a review of Council and NSW EPA database records.
- A site walkover to identify potential sources of contamination.
- Development of a conceptual site model (CSM).
- Soil sampling at 13 locations as shown in *Figure 3* including:
  - Nine test pit locations (TL01-TL06; TL09-TL11) to a maximum depth of 2.1 metres below ground level (mbgl). Three of these locations (TL01, TL05, TL06) were backfilled and re-drilled (for geotechnical purposes), with soil samples collected to a maximum depth of 10 mbgl.
  - Four borehole locations (TL07-TL08; TL12-TL13) to a maximum depth of 2.7 mbgl.
- Four asphaltic material samples (ASP1-ASP4) were collected for coal tar testing.
- Field screening for volatile organic compounds.
- Laboratory analysis of representative and quality assurance/quality control samples for a range of contaminants including heavy metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphorus pesticides (OPPs), polychlorinated biphenyls (PCBs), phenols, per- and poly-fluoroalkyl substances (PFAS), cyanide, asbestos fines / fibrous asbestos (AF / FA), coal tar, and toxicity characteristic leaching procedure (TCLP) for selected analytes.
- Screening of results against the adopted site assessment criteria for public open space and recreational use to assess risks to human and ecological health.

The following observations and conclusions were presented in the *DSI*:

- The geological profile comprised hardstand (asphalt/concrete/pavement) underlain by road base fill to a maximum depth of 0.45 mbgl, further underlain by sandy and/or clayey fill to depths between 0.6 and 2.1 mbgl, with natural sandy and/or clayey material below.
- Building debris (brick, ceramic, tile, concrete and/or glass) were observed in fill material in test pits TL01 and TL13.

- Concentrations of all contaminants were within the adopted site assessment criteria.[1]
- Asbestos was detected in a representative fibre cement fragment (FCF) analysed from among a number of FCFs in stockpiled material sourced from the excavation of the upper 0.3 m of road base from TL01-TL06 and TL09-TL11 (also see DP, 2025b). The particular source location of the ACM was not able to be determined.
- Management of acid sulfate soils (ASS) was not required to the depth of the investigation.
- The Site could be made suitable for the proposed development subject to the preparation and implementation of a RAP to address potential asbestos contamination at the site and the preparation and implementation of an Environmental Management Plan (EMP) to work in conjunction with the RAP during the redevelopment.

3.2 DP (2025b) Stockpile Waste Classification

DP (2025b) prepared a waste classification report for an approximately 20 m^3 stockpile of fill material located at George Khattar Lane, Parramatta. The stockpiled material originated from the excavation of the upper 0.3 m of material from test pits located at the Site (TL01-TL06 and TL09-TL11) as described in the *DSI* (DP, 2025a). Stockpiled material was described as pale grey to dark grey gravelly sand with igneous and sandstone gravel, concrete and asphalt, and trace clay.

Three samples of stockpiled material were analysed for heavy metals, PAH, BTEX, TRH, OCC/OPP, phenols, PCB, PFAS, FA/AF and TCLP (nickel and PFAS). One representative FCF was collected from among a number of observed FCFs and analysed for asbestos.

The laboratory reported that the FCF had tested positive for asbestos. Based on the chemical analytical results, the stockpile was classified as *General Solid Waste (non-putrescible) – Special Waste (Asbestos)*.

3.3 EHO (2025a) *Waste Classification Certificate*

EHO (2025a) prepared a waste classification certificate for an approximately 10 m^3 stockpile of fill material located at 40 Smith Street, Parramatta. The stockpiled material originated from six aboriginal archaeological test pits excavated along Horwood Place, Parramatta. Stockpiled material was described as reddish to pale grey gravelly clay of low to medium plasticity, soft to firm, with sandstone, shale, bitumen and road base fragments. No staining, odours or potential ACM were observed on or within the stockpile.

Three primary samples of stockpiled material were analysed for heavy metals, PAH, BTEX, TRH, OCC/OPP, phenols, PCB, asbestos ID and TCLP (nickel). Based on the results of the field observations and laboratory analytical results, the stockpile was classified as *General Solid Waste (non-putrescible)*.

3.4 EHO (2025b) *Waste Classification Certificate*

EHO prepared a waste classification certificate for an approximately 10 m^3 stockpile of fill material located at 40 Smith Street, Parramatta. The stockpiled material originated from five aboriginal archaeological test pits excavated along Horwood Place, Parramatta. Stockpiled material was described as reddish to pale brown clay of low to medium plasticity, soft to firm. No staining, odours or potential ACM were observed on or within the stockpile.

[1] Arcadis notes that isolated exceedances of nickel and PFOS were reported but not considered to be a risk on the basis of further statistical analysis and site context.

Three primary samples of stockpiled material were analysed for heavy metals, PAH, BTEX, TRH, OCC/OPP, phenols, PCB, asbestos ID and TCLP (nickel). Based on the results of the field observations and laboratory analytical results, the stockpile was classified as *General Solid Waste (non-putrescible)*.

3.5 Arcadis (2025) *Contamination Interpretive Report*

Arcadis was engaged to prepare a Contamination Interpretive Report (CIR) to provide an interpretation of the results of the desktop review, site walkover and intrusive soil sampling conducted at the Site between 29 January and 17 February 2025, documented in Douglas Partners Pty Ltd (DP) DSI. The CIR was prepared to inform the Client on any potential land contamination risks in soil to future receptors, based on a future Open Space land use scenario.

The purpose of the CIR is to provide the Client with a detailed interpretation of the contamination data provided by DP to inform on site suitability and potential contamination risks associated with the proposed redevelopment of the Site.

The key findings included:

- The detected concentrations of the relevant chemical contaminants of potential concern in the soil samples analysed for the DSI were less than the adopted human health Site Assessment Criteria.
- Asbestos was not observed in the field nor detected in the insitu samples analysed by DP. However, bonded ACM was detected within a stockpile of spoil generated from onsite test pitting. Further, an asbestos expansion joint was identified by RMA Group during excavation of test pit location TL02 during the archaeological investigation in January / February 2025, prior to DP's investigation. DP reported the asbestos was identified in expansion joints within the concrete slab and appeared to extend into the underlying road base layer. The asbestos joint was excavated by RMA as far as practicable within the test pit, and DP confirmed residual ACM was not identified in the walls of the excavation during DP's investigation.
- Review of Endeavour Energy asset plans and BYD plans identified the electrical conduits onsite are constructed of asbestos. Hence, an SPR linkage is considered 'Possible' for human health exposure risk to residual asbestos in fill, with a moderate risk rating.
- The detected concentrations of the relevant contaminants of potential concern in the soil samples analysed for the DSI were less than the adopted terrestrial ecosystems statistical Site Assessment Criteria.
- Based on the laboratory analytical data and field observations, the natural soils assessed were not considered AASS. The results indicate PASS may be present with sulfides detected in samples TL05 at 9-9.2mbgl and TL08 at 2.5 – 2.7mbgl and have the potential to oxidize, if disturbed. However, the net acidity results indicate the soils are below the action criteria, provided less than 1,000T of soils are disturbed.
- The insitu soils are generally consistent with GSW (non-putrescible) as defined in the NSW EPA (2014a) *Waste Classification Guidelines*. However, the potential for residual asbestos contamination in fill should be considered for further waste classification purposes.
- The coal tar samples indicate the asphalt is free of coal tar and consistent with reclaimed asphalt as defined in the NSW EPA (2014b) *The Reclaimed Asphalt Pavement Exemption 2014*.

4 Conceptual Site Model

A CSM assesses potential sources, pathways and receptors at a site and the connections between these. In order for a potential risk to exist to human health and/or ecological receptors there must be a clear or suspected source-pathway-receptor (SPR) linkage between the known or potential source(s) and receptor(s) in relation to the site. The following sections provide a summary of the identified (or potential) sources, pathways and receptors at the Site, based on the available site information at the commencement of this RAP.

4.1 Adopted Land Use Scenario and Assumptions

Based on the information provided, Arcadis has assumed the Site will be developed into an open space, landscaped pedestrian area comprising a mix of hardstand and landscaped areas consistent with 'Open Space/Recreational C' land use, as defined in the NEPM (NEPC, 2013). It is assumed that site users will have some direct access to underlying soil in grassed areas and/or gardens.

4.2 Sources of Contamination

A preliminary CSM for the Site and has been developed based on the reported findings of investigations undertaken at the Site as detailed in *Section 3* with CoPC and potentially affected media presented in *Table 4-1*.

Table 4-1 Potential Sources of Contamination, Potentially Affected Media and CoPC

Source	Media	CoPC
Bonded ACM impacted fill material	Fill	Bonded ACM
Bonded ACM conduit for electrical services	Conduit	Bonded ACM

4.3 Receptors

Based on the sources of contamination identified, the receptors are:

- Future Site users / visitors to the proposed development.
- Construction and maintenance workers.

4.4 Exposure Pathways

The identified (or potential) exposure pathway for the identified receptors to be exposed to asbestos includes inhalation of asbestos fibres.

4.5 Potential Source, Pathway and Receptor Linkages

The sources of contamination and associated potential exposure pathways to future receptors under the proposed land use scenario is provided in *Table 4-2*.

Table 4-2 Summary of Potentially Complete SPR Linkages

Source	Exposure Pathway	Receptor	Exposure Risk
Asbestos impacted fill material	Fibre inhalation	• Future site users, visitors • Construction / maintenance workers	**Low to Moderate** Asbestos was not identified during intrusive investigations (DP, 2025a). However, bonded ACM was identified in stockpiled material sourced from the Site (DP, 2025b). The proposed development will require disturbance of onsite soils which may expose bonded ACM potentially present in fill at the Site. Bonded ACM in sound condition is not considered a source of asbestos fibres, however, there is the potential to generate asbestos fibres if bonded ACM is inappropriately managed during site works by crushing and/or if bonded ACM is allowed to deteriorate over time. Hence the exposure risk is considered to be low to moderate.
Redundant electrical asbestos conduit	Fibre inhalation	• Construction / maintenance workers	**Low to Moderate** Asbestos has been identified to be present in the form of asbestos conduit associated with electrical services. This has been derived from Endeavour Energy field plans and BYD services search, where asbestos conduit has been marked on plans in the works area. Decommissioning of existing electrical services within the works area is required and will therefore require conduit to be exposed to various extents. A potential to generate asbestos fibres if bonded ACM is inappropriately managed during site works by crushing and/or incorrect handling is present. Hence the exposure risk is considered to be low to moderate.

5 Remediation Options Assessment

5.1 Hierarchy of Management or Remediation

The NSW EPA preferred hierarchy of options for site remediation and management is detailed in Section 6(16) of the Assessment of Site Contamination Policy Framework of Schedules A and B of the *NEPM* (NEPC, 2013) (NSW EPA, 2017). According to this document, the order of preference for soil remediation or management is:

1. Onsite treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level,
2. Offsite treatment of excavated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which residual soil is returned to the Site,
3. Removal of contaminated material to an approved site or facility, followed by replacement with clean fill where necessary,
4. Consolidation and isolation onsite by containment within a properly designed barrier,
5. No remediation, which involves no remedial or management response to contamination identified at the Site. This approach is based on the principle that remediation should not proceed in the event that it is likely to cause a greater adverse effect or no beneficial outcome on human health or the environment compared to leaving the Site undisturbed.

5.2 Remediation Options Comparison

A review of potential remediation methods and technologies suitable for the Site is presented in *Table 5-1*. The remedial options have been assessed against the following criteria:

- Technical Feasibility:
  - Overall protection of human health and the environment,
  - Ability of the technology to meet applicable regulations and permitting requirements; and
  - Effectiveness, performance, and reliability of the technology to reduce the contamination concentrations, mobility, mass, or volume of contaminants to an acceptable level.
- Logistical Feasibility:
  - Space limitations, equipment and resource availability, stakeholder input, utility requirements, monitoring concerns, operation and maintenance,
  - Time required to meet and achieve the project end points, and
  - Assessment of negative attributes (cons) of implementing the technology and how they might affect the remedial effort.
- Economic Feasibility: Cost effectiveness of the remedial technology.

Additional considerations include:

- The potential exposure scenario that will result with respect to workers during remediation and the proposed future development,
- Compliance with regulatory and stakeholder expectations,
- The overall net benefit of the project with respect to sustainability (e.g. greenhouse gases, energy consumption and waste generation) safety of workers, and effects on neighbours.

Table 5-1 Remediation Options Assessment

Criteria	Onsite Treatment	Excavate and dispose	Containment
Technical Feasibility	• Reduces asbestos impacts to an acceptable level for the protection of human health by treating contamination onsite. • Feasible for the remediation of surface soil impacted by bonded ACM and/or localised, low-level impacts. • Exposure risks for future site users and intrusive maintenance workers are low. • Soil disturbance has the potential to generate dust increasing the exposure risk for workers and nearby receptors.	• Eliminates asbestos by removing to an offsite facility. • Feasible for asbestos contamination that is not combined with other onsite contamination requiring alternative management, not buried deeply and/or is relatively confined and delineated. • Exposure risks for future site users and intrusive maintenance workers are eliminated. • Soil disturbance has the potential to generate dust increasing the exposure risk for workers and nearby receptors.	• Contains asbestos onsite below a cap, preventing access to contamination. • Feasible for asbestos contamination that is not combined with other onsite contamination requiring alternative management. • Exposure risks for future site users are removed. • Exposure risks for future intrusive maintenance workers remain present. • Minimal disturbance of asbestos contaminated soil reduces the exposure risk for workers during remediation.
Logistical Feasibility	• Time consuming for large volumes of impacted material. • Sampling and validation can occur concurrently with remediation. • Not suitable for soil containing crushed building and demolition debris. • Contamination risk is eliminated, and no restrictions are placed on future site use and there are no ongoing management requirements.	• Minimises time delays for other work associated with site redevelopment. • Sampling and validation of exposed surfaces is required. • Contamination risk is eliminated, and no restrictions are placed on future site use and there are no ongoing management requirements. • Material must be transported and disposed of to a suitably licensed landfill in accordance with NSW EPA requirements.	• Minimises time delays for other work associated with site redevelopment. • Capping must be installed in accordance with the requirements of the NSW EPA (2017) *Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd edition).* • The level of the Site may need to be raised to accommodate the capping requirements. • Asbestos remains onsite and will need to be properly managed in perpetuity under a long-term EMP and recorded on title (or similar) which may impact future sales.
Economic Feasibility	• Typically, a moderate cost option but less cost-effective for high levels of contamination. • Cost considerations include manual labour, air quality monitoring, dust suppression measures, validation sampling and assessment.	• Typically, the highest cost option. • Cost considerations include transport and landfill disposal costs, air quality monitoring, dust suppression measures, validation sampling and assessment of residual onsite soil, as well as costs for backfilling.	• Typically, the lowest cost option. • Cost considerations include the cap and containment system to be installed, ongoing cap integrity assessments and preparation and implementation of a long-term EMP.

Criteria	Onsite Treatment	Excavate and dispose	Containment
Stakeholder Acceptance	• No ongoing management. • No requirement for notation on title (or similar). • No restrictions on future site use.	• No ongoing management. • No requirement for notation on title (or similar). • No restrictions on future site use.	• Consent for onsite capping and containment must be approved by the appropriate regulatory authority (Council). • Residual onsite contamination must be recorded on title (or similar).
Sustainability	• Most sustainable option.	• Least sustainable option.	• More sustainable than the excavate and dispose methodology. • Less sustainable than onsite treatment.

5.3 Preferred Remediation Option

In consideration of the assessment above and the Clients planning requirements, the preferred remediation strategy is a combination of:

- Onsite treatment of bonded ACM that is confined to surface soil and/or localised areas of low asbestos concentrations; and
- Offsite disposal of bonded ACM that is confined to localised areas of high asbestos concentration and electrical asbestos conduits.

If bonded ACM is observed to be widespread across the site and at depth and/or if potentially friable asbestos is identified, then this will be considered an unexpected find (UEF) and the contingencies detailed in *Section 6.4.10* should consulted for suitable action.

6 Remedial Strategy

6.1 Remediation Category

Arcadis undertook a review of the classification of remediation categories described in *State Environmental Planning Policy (Resilience and Hazards) 2021*. A summary of this assessment is provided in *Table 6-1* and indicates that the proposed remediation comprises 'Category 2 remediation work: work not needing consent', noting that the proposed remedial activities are ancillary to designated development that does require consent.

Table 6-1 State Environmental Planning Policy (Resilience and Hazards) 2021 criteria for remediation

Remediation work is:	Discussion
Designated development	The proposed remediation is not defined as designated development under Schedule 3, Part 2 of the *Environmental Planning and Assessment Regulation 2021*.
Carried out or to be carried out on land declared to be a critical habitat	The Site is not located within an area considered to be a critical habitat (DCCEEW, 2022).
Likely to have a significant effect on a critical habitat or a threatened species, population or ecological community	Remedial activities will be conducted in areas which have undergone significant modification from natural or background habitats, and no critical habitat, threatened species, population, or ecological community has been identified as present at the Site.
Development for which another state environmental planning policy or a regional environmental plan requires development consent	The *Parramatta Local Environmental Plan 2023* indicates the Site is within an area mapped as Class 4 ASS and requires development consent for works more than 2 m below the natural ground surface, or where the water table is likely to be lowered more than 2 m below the ground surface. As the proposed remediation activities do not comprise excavation of material beyond what is required for the redevelopment of the Site (which does require development consent), this is not considered applicable to the proposed remediation.
Carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument: a. Coastal protection b. Conservation or heritage conservation c. Habitat area, habitat protection area, habitat, or wildlife corridor d. Environment protection e. Escarpment, escarpment protection or escarpment preservation f. Floodway	A review of the *Parramatta Local Environmental Plan 2023* and associated maps did not identify any environmental planning instruments requiring development consent for the proposed remediation.

Remediation work is:	Discussion
g. Littoral rainforest h. Nature reserve i. Scenic area or scenic protection j. Wetland	
Carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Minister).	Arcadis considers that the proposed remediation complies with the PCC *Contaminated Land Policy* made under the *Parramatta Local Environmental Plan 2023*, in compliance with the State *Environmental Planning Policy (Resilience and Hazards) 2021.*

6.2 Remediation Objectives

The objective of the proposed remedial work is to manage potential asbestos at the Site so that it does not present an unacceptable risk to human health.

6.3 Remediation Extent

The remediation extent is defined by the lateral and vertical limits of potential bonded ACM impacted fill material within the Site boundary, as well as the lengths of electrical conduits being decommissioned.

6.4 Remediation Plan

6.4.1 Stakeholder Engagement

Stakeholder engagement must be conducted prior to commencement of remediation works. This will include informing stakeholders of the nature and duration of the work, as well as providing contact details and providing a complaints procedure if issues associated with the remediation activities are encountered.

6.4.2 Notification

In accordance with *State Environmental Planning Policy (Resilience and Hazards) 2021*, Parramatta City Council must be notified of the remedial activities at least 30 days prior to commencement of the work, with the following information provided:

- Name, address, and telephone of the notifier
- Description of the remedial activities
- Rationale of why it is considered Category 2 remediation work
- Site identification details and Site map
- Estimated commencement and completion dates

Parramatta City Council must also be notified within 30 days of completion of the remedial activities. Notice must be given in writing and include the following (as detailed in the *State Environmental Planning Policy (Resilience and Hazards) 2021*):

- Person's name, address and business telephone number
- Details of the person's qualifications to carry out the work

- Property description and street address for the Site
- Provide a map of the location of the land
- State when the work was completed
- Specify the uses of the land and the substances that contaminated it in such a way as to present a risk of harm to human health and/or some other aspect of the environment
- Specify the uses of the land immediately before the work started
- Describe the method of remediation used in the work
- Specify the guidelines applicable to the work
- Specify the standard of remediation achieved
- Show what manner the work complied with the conditions of the relevant development consent
- State what actions must be maintained in relation to the land after the completion of the remediation work if the standard of remediation achieved is to be maintained.

6.4.3 Licensing

The proposed remediation/validation activities are not required to be licensed under the *POEO Act 1997* since the works do not:

- treat, otherwise than by incineration, and store more than 30 000 cubic metres of contaminated soil originating exclusively from the site, or
- disturb more than an aggregate area of 3 hectares of contaminated soil originating exclusively from the Site.

6.4.4 Site establishment

Prior to commencement of remediation works, site establishment activities will be completed. These include establishment of boundary fences, and implementation of environmental controls as detailed in the Arcadis (2025) *L-CEMP*.

6.4.5 Visual Inspection

Following the removal of hardstand pavement and exposure of underlying fill material, surfaces are to be systematically visually inspected for the presence of asbestos by an appropriately competent person. For the purpose of these inspections, a competent person is defined as a person who has acquired through training or experience the knowledge and skills of relevant asbestos removal industry practice and holds:

- A certification in relation to the specified Vocational Education and Training course for asbestos assessor work, or
- A tertiary qualification in occupational health and safety, occupational hygiene, science, building, construction or environmental health.

Inspections are to comprise walking a maximum of 1.5 m wide transects using a systematic grid to thoroughly inspect surface soil for the presence of visible asbestos.

If visible asbestos is not identified during the inspections, then no remediation is required, and a Clearance Certificate is to be issued as per *Section 7.3*.

If asbestos is identified and appears to be in sound condition, then a Class B asbestos Remediation Contractor is to be engaged in accordance with SafeWork NSW (2022) *How to safely remove asbestos: Code of Practice*. If the asbestos comprises bonded ACM in sound condition, then remediation is to proceed using onsite treatment in combination with excavation and offsite disposal for 'hotspots' as required.

If the asbestos comprises bonded ACM in degraded condition and/or the potential for friable asbestos is suspected by the presence of very small fragments of ACM, then work is to cease immediately and the UEF Protocol detailed in *Section 6.4.9* followed.

To date, no positive identification of the electrical asbestos conduit has been completed and is based on plan notes provided in Endeavour Energy plans and BYD searches. Prior to works commencing for decommissioning of the redundant services, conduits are to be positively identified to contain or not contain asbestos by a competent person via non-destructive means.

6.4.6 Onsite Treatment

If visual inspection identifies localised areas of bonded ACM impact, then remediation is to proceed by onsite treatment using a hand-picking methodology consistent with the WA DOH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites*.

The following steps are to be undertaken by a Class B asbestos Remediation Contractor:

1. Establish a manageable grid pattern across the impacted surface based on the level of contamination and soil characteristics.
2. Inspect and rake soil within each grid section to a depth of 100 mm to uncover material in the accessible surface layer and capture ACM present within the rake tines. The design of the rake (tine length and spacing) must be small enough that the ACM cannot pass through.
3. Remove ACM encountered by hand picking during the raking and inspection process. A minimum of two passes over each grid section are to be completed, made with a 90º direction change between each pass.
4. Calculate asbestos % weight/weight (w/w) in accordance with WA DOH (2009) guidelines.
5. Wrap ACM in a double layer of heavy duty polyethylene sheeting (HDPE) (minimum 200 µm thickness) or double-bagged for offsite disposal.
6. Repeat Steps 1-5 as required until a final pass results in no visible bonded ACM being identified.
7. Validation of the site surface is to be undertaken by an Environmental Consultant as described in *Section 7* of this RAP.

In the event that the concentration of asbestos found with successive passes is high (>0.1 % w/w asbestos) and does not show a substantial sequential reduction, then alternative remediation method may be required. If the impact to soil is localised, then remediation should proceed using excavation and offsite disposal as described in *Section 6.4.7*. If the impact to soil is widespread, then this is to be managed under the UEF Protocol detailed in *Section 6.4.9*.

6.4.7 Excavation and Offsite Disposal

6.4.7.1 Asbestos in Soil

If localised 'hotspots' of asbestos contaminated soil are identified, then remediation is to proceed using an excavation and offsite disposal methodology consistent with the WA DOH (2009) guidelines.

The following steps are to be undertaken by a Class B asbestos Remediation Contractor:

1. Excavate asbestos contaminated soil from the 'hotspot' based on visual observations of bonded ACM.
2. Excavate additional material beyond the observed vertical and lateral boundaries of the contamination. The additional amount to be removed should be informed by visual observations of site conditions.
3. Relocate impacted material to a temporary, lined stockpile staging area for waste classification in accordance with *Section 8* of this RAP.

4. Dispose of impacted material to a suitable licensed landfill facility, with tracking in accordance with *Section 9* of this RAP.
5. Validation of the excavation is to be undertaken by an Environmental Consultant as described in *Section 7* of this RAP.

6.4.7.2 Electrical asbestos conduit

Should asbestos conduit be positively identified to be present associated with the electrical services, along with associated infrastructure (pits, pit lids, and inspection points) the following methodology can be applied for removal:

6. Using an excavator, expose conduit/pit from the surface without making contact with the service– final exposure will likely be undertaken using hand tools.
7. A second trench can be excavated beside the service without contacting the asbestos material to expose the sides.
8. Using a modified bag method, or plastic lining for the works area, disconnect the conduit from the collared joiners by hand and placed the conduit onto prepared plastic, or in the case of a pit, remove whole.
9. Wrap and secure removed material in manageable lengths for onsite storage prior to disposal.
10. Undertake walkover and remove any residual identified asbestos by scraping and removal of soil.
11. Relocate wrapped material to a temporary staging area for waste classification in accordance with *Section 8* of this RAP.
12. Dispose of impacted material to a suitable licensed landfill facility, with tracking in accordance with *Section 9* of this RAP.
13. Validation of the excavation is to be undertaken by an Environmental Consultant as described in *Section 7* of this RAP.

6.4.8 Backfilling of Remedial Excavations

Should backfilling of remedial excavations be required, then backfill material will be limited to:

- Virgin excavated natural material (VENM), as defined in the *POEO Act* and summarised at NSW EPA (2023) *Virgin excavated natural material*
- Excavated natural material (ENM), as defined in NSW EPA (2014b; 2014c)
- Material subject to a relevant NSW EPA Resource Recovery Order and Exemption - ensuring the placement is within the constraints of the Resource Recovery Exemption and does not present an unacceptable human health or ecological exposure risk, in the context of the proposed land use scenario.

Material proposed for importing is to be compatible with existing soil characteristics for site drainage purposes. Nominating engineering properties (compaction, density, moisture content) is not within the scope of this RAP and will be specified by others.

Compliance documents relating to the VENM, ENM or other resource recovery material are to be reviewed by the Environmental Consultant, before the Remediation Contractor commences importation.

The Remediation Contractor will be responsible for:

- Inspecting every load of imported material for consistency with the material described in the relevant certification, including that the material is free of anthropogenic materials, odours or staining;
- Maintaining a record of inspection of each load.
- Maintaining detailed records of all material imported to site, including details of the supplier/s, source of the material, quantity of the material, importing vehicle registration numbers, and dates/times the material is received on site; and

- Retaining records of the certification, importation and placement of all remedial excavation backfill materials.

6.4.9 Unexpected Finds

If unexpected finds (UEFs) of potentially contaminating material are encountered during excavations or intrusive maintenance operations on the Site, works should cease immediately, and the Client notified. This procedure does not cover the unexpected finds of heritage and/or archaeological items. This would be subject to procedures specified by a suitable professional.

The nature, location and extent of the unexpected finds is to be recorded and photographed. The Client should then engage an appropriately qualified and experienced environmental practitioner to assess the nature and extent of the contamination, and to prescribe appropriate management requirements. Works may resume upon receiving approval from the Client.

UEFs may include:

- Previously unidentified contamination including large volumes of asbestos and/or friable asbestos.
- Large quantities of anthropogenic materials (>10%).
- Offensive odours emanating from soil or groundwater.
- Unusual staining (e.g. sheen or dark colouring) of soil.
- Ingress of steady flow of groundwater.
- Underground infrastructure (e.g. underground storage tanks, underground sumps/pits).

A summary of the UEF Protocol is provided in Chart 5-1

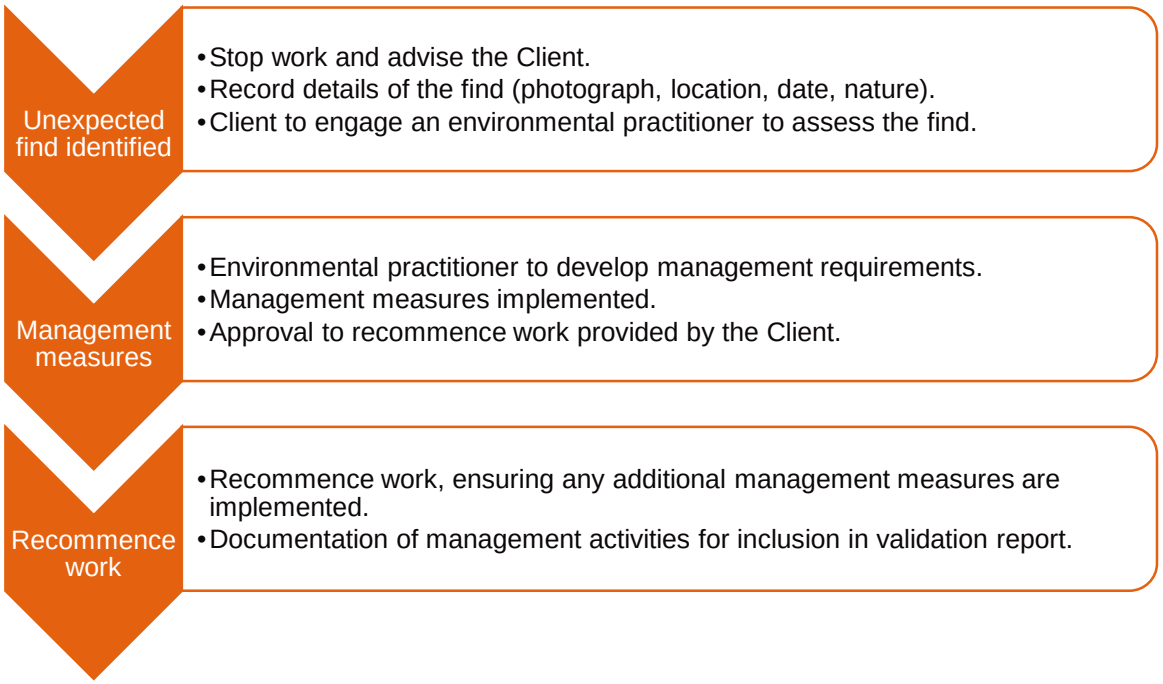


Chart 5-1 Unexpected Finds Protocol

The NSW EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* details requirements when landowners and parties responsible for land contamination must report the contamination to the NSW EPA under Section 60 of the *Contaminated Land Management Act*

1997. If UEF of contamination are identified during the remediation works, an experienced environmental practitioner should be engaged to assess the contamination and the requirement for the duty to report.

Any unexpected finds of contamination discovered during the remediation works may trigger a review of the CSM and final revised CSM shall be incorporated within the Validation Report.

6.4.10 Contingency

There is a degree of uncertainty inherent in site construction and the provisional remediation works. Based on the site history information made available to Arcadis prior to preparing this RAP, it is considered the unexpected scenarios presented could occur during remedial works. Contingency plans and protocols to be implemented, should those scenarios arise, are also presented in the table below:

Table 6-2 Unexpected Scenarios and Contingency Plans

Scenario	Contingency Plan
Unexpected finds of buried contamination or underground structures encountered during remedial works which are beyond the scope or increased complexity of the remedial options proposed (e.g. buried waste, underground storage tank, underground sump/pit).	• Cease remedial works. • Consider undertaking intrusive soil investigations into and around the unexpected find, to assess the potential nature and extent of the contamination / structure. • Consider undertaking groundwater assessment works, if the potential nature and extent of the contamination / structures suggest a risk to groundwater. • Prepare an amendment to the remediation and/or validation strategy in the RAP (if required), pending the outcomes of the soil and/or groundwater assessment works. • Remediate the unexpected contamination. • Undertake validation of the remedial works.
Asbestos in the form of AF/FA identified	• Cease remedial works • Consider undertaking intrusive soil investigations into and around the UEF to assess the extent of the contamination. This will generally involve collecting asbestos 500 mL w/w samples from the walls and base of the excavation and in a 1 m radial direction of the contamination, in accordance with NSW EPA (2022) *Contaminated Land Guidelines: Sampling design part 1 – application* and the NEPM (NEPC, 2013). • If delineation identifies the extent to be feasible and practicable to remediate, engage a Class A asbestos removal contractor in accordance with SafeWork NSW (2022) *How to safely remove asbestos: Code of practice.* • Notify SafeWork NSW of the remediation of friable asbestos proposed.

Scenario	Contingency Plan
	• Prepare an amendment to the remediation and/or validation strategy in the RAP. • Remediate the unexpected contamination in accordance with the revised remedial and validation strategy. • Undertake validation of the remedial works.
Potential asbestos encountered which are considered unfeasible or impractical to remediate via onsite treatment or excavation and disposal (including potential continuation of asbestos impacted soils extending beyond the Site boundary (e.g. chasing out of ACM under building structures) or alternate methods that would result in ongoing contamination management	• Cease remedial works. • Notify relevant asset owners and seek approval for works that may impact assets. • Consider undertaking intrusive soil investigations into and around the potential asbestos identified beyond the inferred remedial extent and assess whether the asbestos is bonded and/or friable. • Discuss and seek approval from the Client for an alternative remedial option, such as cap and containment. • Prepare an amendment to the remediation and/or validation strategy in the RAP. • Remediate the unexpected contamination in accordance with the revised remedial and validation strategy. • Undertake validation of the remedial works. • Prepare a long term EMP to manage the ongoing contamination risk.

7 Validation

To demonstrate that remediation activities have achieved the objectives and purpose of the RAP, as described in *Section 1.2*, the validation activities within this section are required.

7.1 Data quality objectives

To facilitate collection of the type, quantity and quality of data needed to inform decisions relating to the environmental condition of the Site following remediation, the seven-step data quality objective (DQO) process described in NEPC (2013) was completed, as presented in *Table 7-1*.

Table 7-1 Data quality objectives – validation activities

Step	Discussion
1. State the problem	Bonded ACM was identified in stockpiled material excavated from the Site and may be present at the Site, in addition to potentially asbestos containing conduit and structures associated with existing electrical services installed, presenting a potentially unacceptable risk to Site users, intrusive maintenance workers and construction workers.

Step	Discussion
2. Identify the decision and/or goal of the validation	The goal of remedial activities is to manage potential bonded ACM in soil at the Site so that it does not present an unacceptable risk to human health. The decision to be made in relation to validation of the Site is whether bonded ACM- at the Site (if present) has been remediated so that it does not present an unacceptable risk to human health.
3. Identify the information inputs	Information inputs will include, but may not be limited to: • This RAP • Field logs and/or observations • Photographs • Field screening results • Analytical results (i.e. for waste classification) • Assessment criteria • Waste management and materials tracking records • Classification and records of imported material
4. Define the boundaries of the validation	The validation is defined laterally by the extent of potential asbestos impact and the Site boundary, and vertically by the extent of potential asbestos impact. The validation is defined temporally from the date of the *DSI* investigations in February 2025 (DP, 2025a) until completion of the site redevelopment.
5. Develop the analytical approach (or Decision Rule)	The remediation and validation criteria are presented in *Section 7.2*. Inspections, sampling and analysis for the purpose of Site validation is described in *Section 7.3*.
6. Specify Tolerable Limits on Decision Errors	There are two types of decision error, which includes the following: • Sampling errors occur when the sampling program does not adequately detect the variability of a contaminant from point to point across the site. That is, the samples collected are not representative of site conditions (e.g. an appropriate number of representative samples have not been collected from each stratum to account for estimated variability); and • Measurement errors occur during sample collection, handling, preparation, analysis and data reduction. In the assessment of land contamination, these errors can result in either: • a Type I error, where contamination exposure risks are considered to be acceptable, when they are not; or • a Type II error, where contamination exposure risks are considered to be not acceptable, when they are. In order for decision rules to be sound, they should be designed to minimise decision errors. The risk of decision error will be mitigated by the following:

Step	Discussion
	• Fieldwork tasks will be undertaken by suitably experienced field staff and sub-contractors, with reference to the DQO presented in this report; • Laboratory analyses (i.e. for remediation validation and waste classification) will be undertaken by NATA accredited laboratories; and • Interpretation of data will be undertaken by suitably experienced environmental consultants.
7. Develop the plan for obtaining data	The required data will be obtained through field observations and validation sampling and analysis as described in *Section 7.3* together with data provided by contractors (e.g. waste tracking documentation).

7.2 Soil Validation Criteria

Based on the proposed development, the 'Open Space/Recreational C' land use scenario has been adopted for the Site as defined in the *NEPM* (NEPC, 2013). The soil assessed during the validation works will be screened against the following criteria set forth in Table 7 of the *NEPM* (NEPC, 2013).

- No visible asbestos (all forms of asbestos) in surface soil
- Bonded ACM <0.02% w/w
- AF/FA asbestos <0.001% in all soils

7.3 Validation Plan

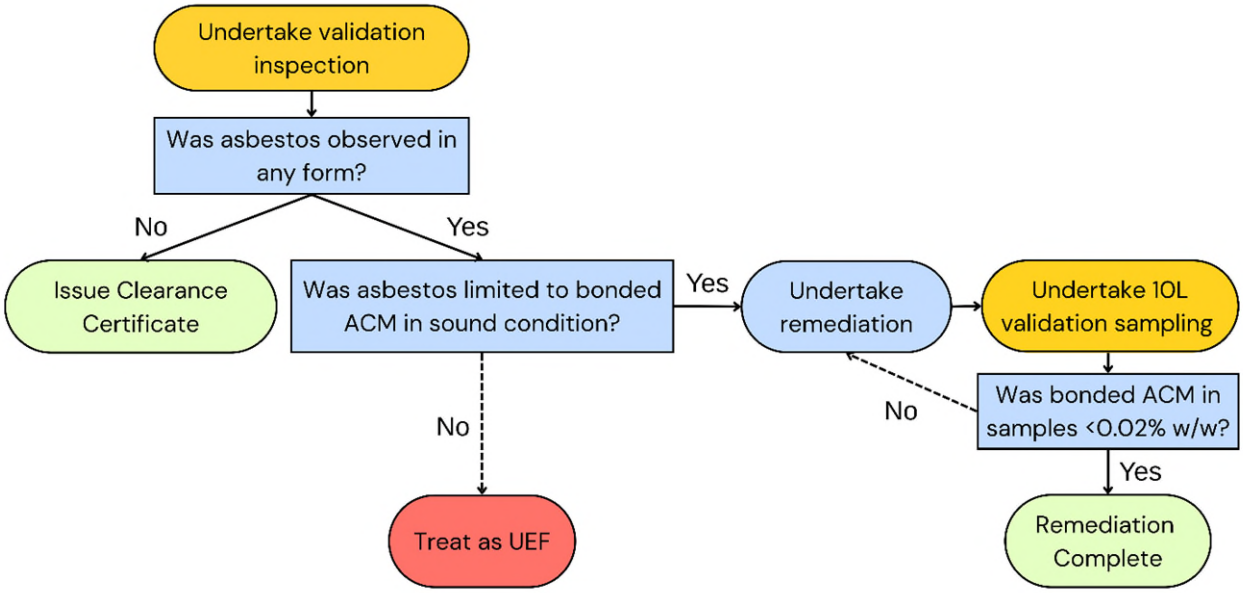
The following validation methodology was developed in consideration of the following guidelines and standards:

- Arcadis (2022), *Standard Operating Procedures (SOPs)*.
- *The NEPM* (NEPC, 2013).
- NSW EPA (2022) *Contaminated Land Guidelines: Sampling Design Part 1, Application Guidelines*
- WA DOH (2009) *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites.*

7.3.1 Validation Strategy Summary

The validation strategy is summarised in *Chart 7-1* with relevant validation activities shown in yellow.

Chart 7-1 Validation Strategy



7.3.2 Validation Inspection

Surfaces are to be systematically visually inspected for the presence of asbestos by an appropriately competent person[2].

Inspections are to comprise walking a maximum of 1.5 m wide transects using a systematic grid across the remediated area to thoroughly inspect surface soils for the presence of visible asbestos (all forms of asbestos). For validation of pit excavations, a thorough inspection of each wall and the base of the pit is required.

If no visible asbestos (all forms of asbestos) is identified, then an asbestos Clearance Certificate is to be prepared by the person who conducted the inspection. Should asbestos be identified, further remediation or quantification to assess suitability will be required.

7.3.3 Validation Sampling

If remediation is required, then validation of the remediation is by both visual inspection and by asbestos validation sampling and field screening to be undertaken in accordance with the recommended methodology detailed in the *NEPM* (NEPC, 2013).

Samples are to be collected at double the minimum sampling density specified in the NSW EPA (2022) *Contaminated Land Guidelines: Sampling Design Part 1*, consistent with the double density recommendation detailed in the WA DOH (2009) guidelines for sites with a known presence of asbestos in soils. For validation of pit excavations, samples are to be collected from each wall and the base of the pit.

Samples are to comprise a 10 L bulk sample of material excavated from the remediated surface. The sample is to be manually screened onsite through a <7 mm mesh sieve, with material remaining on the sieve examined for potential bonded ACM. If the collected 10 L sample material is not suitable for sieving (e.g. clay,

[2] Here, a competent person is consistent with the description provided in Section 6.3.4.

large pieces of anthropogenic material), then the sample is to be spread out for inspection on a contrasting colour, HDPE sheet (minimum 200 µm thickness) and systematically inspected for potential bonded ACM.

All ACM or potential ACM is to be collected in a zip-lock plastic sample bag (minimum 200 µm thickness) and weighed onsite for asbestos quantification. Asbestos in soil concentration is to be calculated by gravimetric approach using the following formula for screening against the validation criteria in Section 7.2:

$$\%\ w/w\ asbestos\ in\ soil = \frac{15\%\ (Asbestos\ Content)^{3}\ X\ Bonded\ ACM\ Weight\ (kg)}{Soil\ Volume\ (L)\ X\ Soil\ Density\ (kg/L)^{4}}$$

Bagged ACM is to be disposed of in accordance with *Section 8*.

7.4 Validation Report

Following remediation, a Site Validation Report is to be prepared, with reference to the relevant sections of NSW EPA (2020) *Consultants reporting on contaminated land*. The report must include:

- An executive summary.
- The scope of reporting work undertaken;
- Site identification details.
- A summary of site history.
- A summary of site condition and the surrounding environment.
- A summary of geology and hydrogeology.
- Information on supplementary contamination assessment works undertaken (if any).
- Information on the remedial works undertaken, including material tracking for material relocated onsite.
- Information on the estimated volume of waste taken offsite (including receipts from the receiving facility, and a reconciliation of waste receipts with remediation contractor waste disposal logs).
- Results of field observations.
- Details of unexpected finds of contamination and incorporated into the final revised CSM.
- A figure showing the remediation area and validation sample locations.
- A discussion on site validation and a statement on suitability of the remediation area for the proposed land use.
- Conclusions.

[3] A 15% asbestos content assumption was applied as recommended in Section 4.10 of the NEPC 2013
[4] Soil density can be determined by weighing a known volume (e.g. 1 L) of the excavated material.

8 Waste

8.1 Stockpiles

Asbestos impacted excavated soil requiring temporary stockpiling for the purpose of sampling and classification prior to offsite disposal should be managed in accordance with the *L-CEMP* for the Site. Stockpiled material requirements include:

- Stockpile material atop a HDPE sheet or hardstand.
- Manage stockpiles in such a way as to minimise infiltration by rainwater, runoff to stormwater, and generation of dust and/or odour.
- Use barriers and/or segregate materials known to be asbestos impacted from 'clean' soils.
- Record the origin, and any subsequent movement of the stockpile to facilitate validation activities.
- Undertake asbestos clearance/validation of surfaces following removal of stockpiles.

8.2 Waste Classification

Asbestos impacted excavated soil is to be classified for offsite disposal to a suitably licensed landfill facility in accordance with the six-step process in the NSW EPA (2014) *Waste Classification Guidelines*. If appropriate, previous results may be utilised to classify the material with additional analyses undertaken as required for further assessment.

Criteria for determining a waste's classification using chemical assessment are defined for the specific contaminant concentration (SCC) and toxicity characteristics leaching procedure (TCLP). To establish soil waste classification using both SCC and TCLP, the results for each chemical contaminant must be compared with the threshold values set in Table 2 of the NSW EPA (2014a) guidelines. A summary of the classification relevant to the SCC and TCLP results is provided in *Table 8-1.*

Table 8-1 Waste Classification Criteria Summary

Classification	SCC Value	TCLP Value
General solid waste	≤ SCC1	≤ TCLP1
Restricted Solid Waste	≤ SCC2	≤ TCLP2
Hazardous Waste	> SCC2	> TCLP2

8.3 Waste Management

All waste generated at the Site is required to be disposed of in accordance with the *POEO Act 1997*, with disposal to a facility which is licensed to accept that waste. Further information about material tracking requirements for asbestos impacted waste is presented in *Section 9.2*.

All transport and disposal dockets must be provided to the Environmental Consultant for inclusion in the validation report and retained for a minimum of four years in accordance with the *POEO (Waste) Regulation 2014*. This should include details of:

- Copies of each consignment authorisation issued to the consignor
- Copies of each waste transport certificate
- Weighbridge dockets
- Place of disposal

9 Material Tracking

The movement of all earth-based materials on, to and from the Site is required to be managed by the Remediation Contractor in accordance with the *POEO (Waste) Regulation 2014*.

9.1 Material Tracking Records

All excavation and filling works undertaken for the purposes of remediation require the following information to be recorded by the Remediation Contractor on Material Tracking Forms and in an electronic Material Tracking Spreadsheet for verification by the Environmental Consultant:

- Date (yyyy/mm/dd).
- Unique Material Tracking identification number (starting at 001).
- Estimated volume (cubic metres).
- Type of material (i.e. ENM, VENM);
- Truck run sheets – date times and quantities
- Source (from) information in terms of address and company name.
- Placement (to) information for onsite use.
- Placement (to) information for offsite disposal (e.g., landfill, EPA tracking number, docket reference).
- Reference document where necessary (i.e. ENM / VENM classification).
- Comments (when required).

It is the responsibility of the Remediation Contractor to ensure the Material Tracking Forms are completed and submitted to the Environmental Consultant. The Environmental Consultant is required to review the submitted Material Tracking Forms and to investigate/resolve any discrepancies. Following this review and any discrepancies resolved, a copy of the Material Tracking Forms will be forwarded to the Client.

9.2 Asbestos Waste

Section 42 of the *POEO (Waste) Regulation 2014* stipulates special transportation, reporting, re-use and recycling requirements relating to asbestos waste with additional guidelines provided in the NSW EPA (2024) *Asbestos and Waste Tyres Guidelines, Version 3*. Requirements for the transportation of asbestos waste include:

- bonded asbestos material must be securely packaged at all times,
- friable asbestos material must be kept in a sealed container,
- asbestos-contaminated soils must be wetted down,
- all asbestos waste must be transported in a covered, leak-proof vehicle.

The transporter of asbestos waste must ensure the following information is provided to the EPA prior to the transportation of asbestos waste loads:

- source site details including address, name and contact details.
- date of proposed transportation commencement.
- name, address and contact details of disposal site; and
- approximate weight of each class of asbestos in each load.

The transporter of asbestos waste must ensure the following information is given to the licensed disposal facility before or at delivery:

- unique consignment code issued by EPA in relation to that load; and
- any other information specified in the NSW EPA (2024) *Asbestos and Waste Tyres Guidelines, Version 3*.

9.3 Imported Material

Material to be imported to the site as part of the site remediation shall generally be tracked as per one of the following classifications:

- VENM as defined under the *POEO Act 1997*.
- ENM, as defined under the *ENM Order* and *ENM Exemption*.
- Material which may be beneficially reused under another applicable NSW EPA Resource Recovery Order and Exemption.

10 Environmental Management

Environmental management activities to be implemented during construction are detailed within the Arcadis (2025) *L-CEMP* which forms a sub-plan to the construction contractor's CEMP. The *L-CEMP* provides procedures and controls for the management of human health and environmental risks from potential residual bonded ACM to be implemented during remediation. This includes requirements for:

- Workplace Health and Safety
- Asbestos management
- Air monitoring and dust control
- Decontamination
- Roles and responsibilities

11 Conclusions

This RAP has been prepared to facilitate remedial works in the event that bonded ACM is identified during the proposed redevelopment of the Parramatta Civic Link – Block 3 site. If required, this RAP should be implemented in conjunction with the Arcadis (2025) *L-CEMP* to safely manage remedial works.

This RAP is limited to the procedures and requirements for the remediation of potential bonded ACM at the Site. Other findings of contamination encountered during redevelopment, including non-bonded asbestos or large volumes of asbestos, constitute UEFs in the context of this RAP and will require further assessment and management outside the scope of this RAP.

Arcadis considers that the remedial objectives can be achieved, and the Site made suitable for the proposed land use, subject to the implementation of the strategies and methodologies set out in this RAP.

12 References

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13 Limitations

The findings of this report are based on the Scope of Work described in this report. Arcadis performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental profession. That standard of care may change, and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

No warranties, express or implied, are made. Subject to the Scope of Work, Arcadis' assessment is limited strictly to identifying typical environmental conditions associated with the subject property.

While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Arcadis, or developments resulting from situations outside the scope of this project.

Arcadis prepared this report for the sole and exclusive benefit and use of the client. Notwithstanding delivery of this report by Arcadis or the client to any third party, any copy of this report provided to a third party is provided for informational purposes only, without the right to rely. Arcadis cannot accept any responsibility for any use of or reliance on the contents of prepared reports by any third party except where expressly agreed via an agreed and properly executed reliance letter. Subject to the terms of the reliance letter, Arcadis would disclaim all and any liability to any third person in respect of anything or in consequence of anything done or omitted to be done by that person in reliance, whether whole or partial.

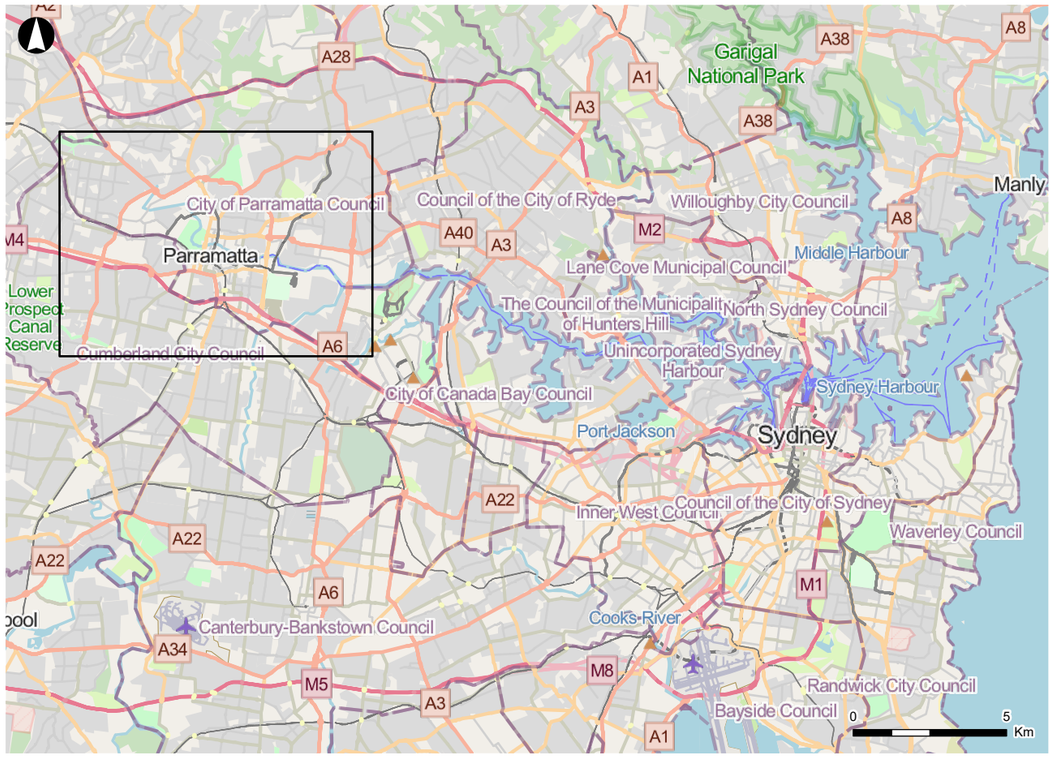
Information from samples collected by Arcadis or historical data reviewed relating to soil, groundwater, waste, air or other matrix conditions in this document is considered to be accurate at the date of issue. Surface, subsurface and atmospheric conditions can vary across a particular site or region, which cannot be wholly defined by investigation. As a result, it is unlikely that the results and estimations presented in this report will represent the extremes of conditions within the site that may exist. Subsurface conditions including contaminant concentrations can change in a limited period of time and typically have a high level of spatial heterogeneity.

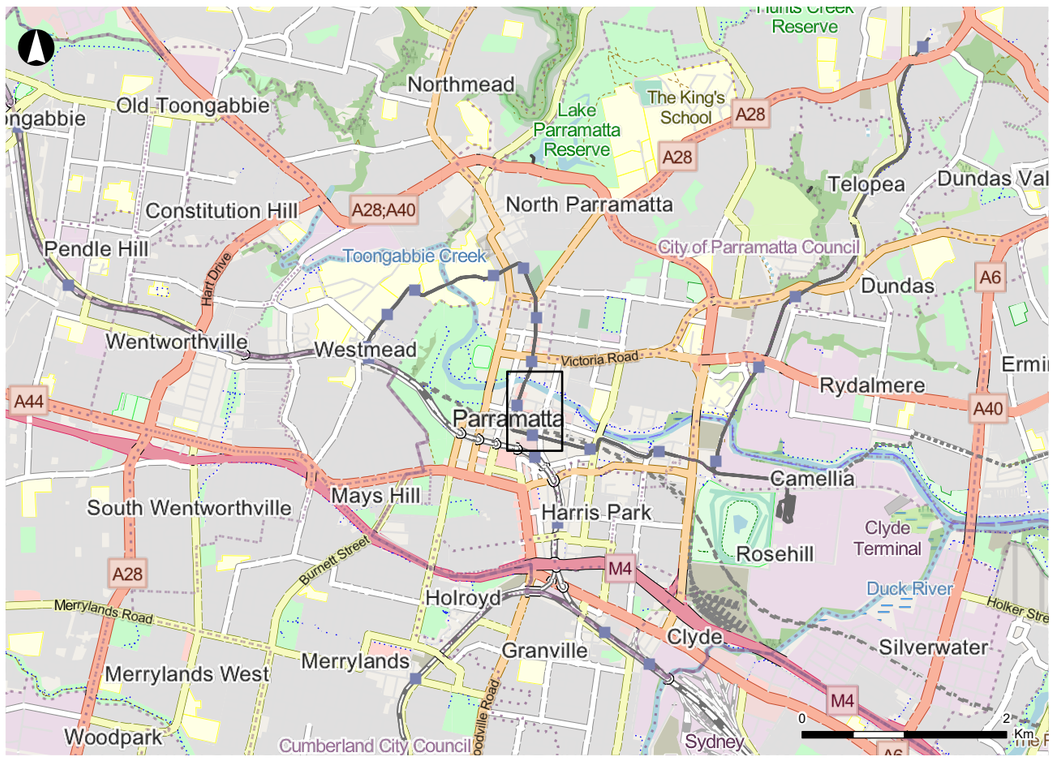
From a technical perspective, there is a high degree of uncertainty associated with the assessment of subsurface, aquatic and atmospheric environments. They are prone to be heterogeneous, complex environments, in which small subsurface features or changes in geologic conditions or other environmental anomalies can have substantial impact on water, air and chemical movement.

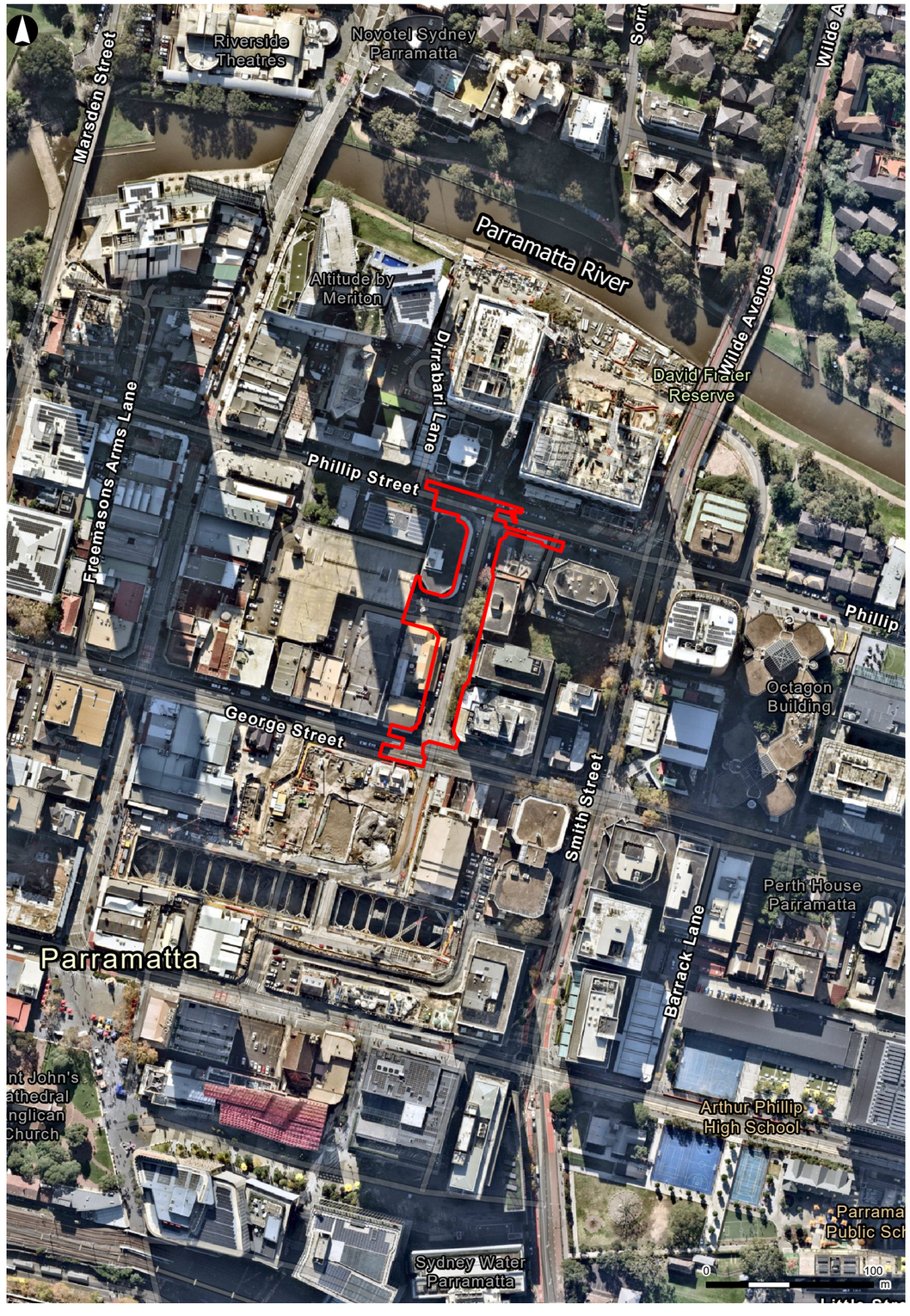
Arcadis' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report. It is possible that additional testing and analysis might produce different results and/or different opinions. Arcadis has limited its investigation(s) to the scope agreed upon with its client.

Figures

103072296 - Parramatta Civic Link - Block 3, Horwood Place







LEGEND

Approximate Site Boundary

CITY OF PARRAMATTA

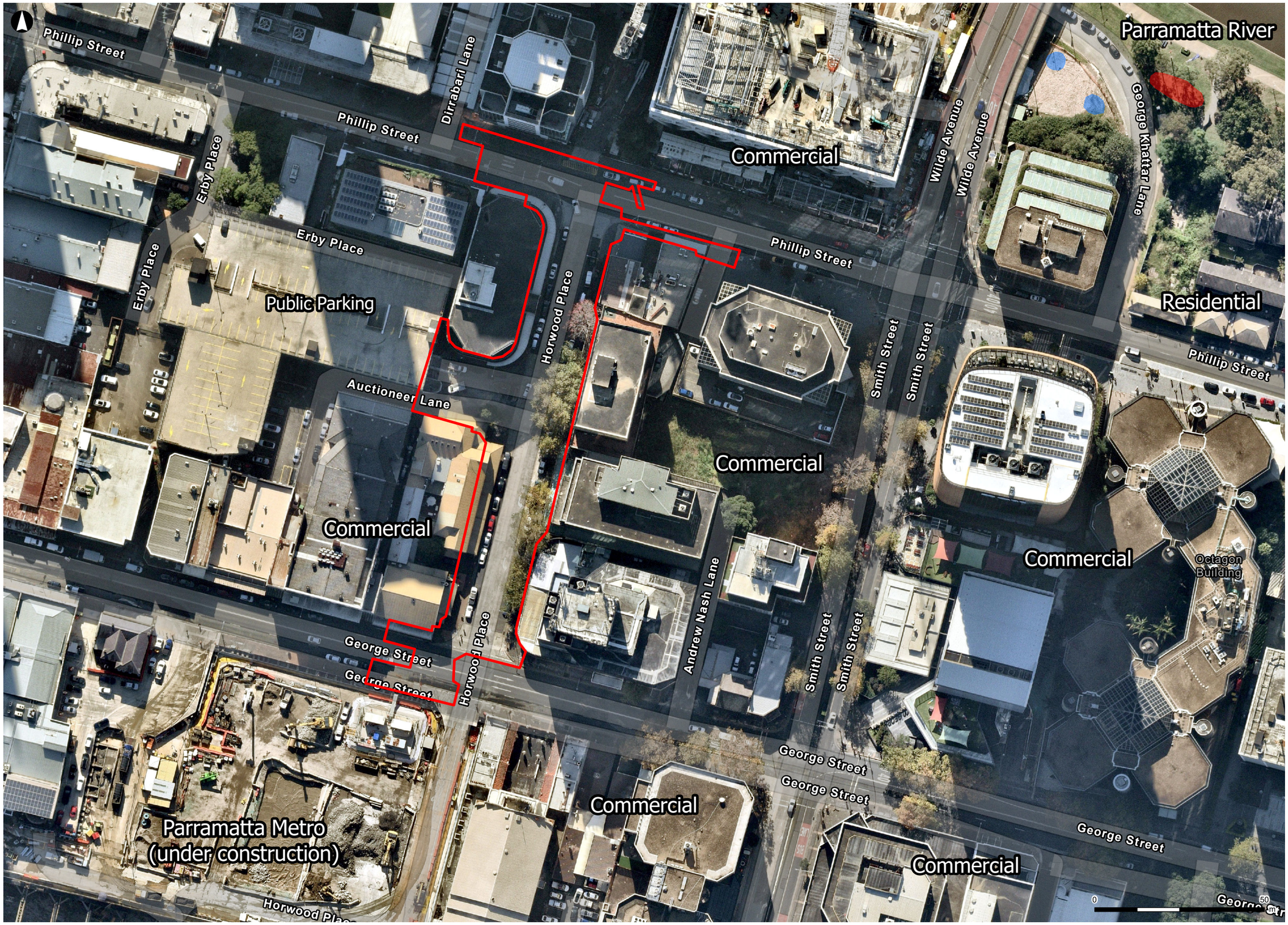
ARCADIS

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

Coordinate System: GDA2020 MGA Zone 56
Date issued: June 26, 2025
Topographic Service Layer Credits: OpenStreetMap
Imagery: Nearmap, captured on 28/05/2025

Figure 1 - Site Location

103072296 - Parramatta Civic Link - Block 3, Horwood Place



LEGEND

- Approximate Site Boundary
- Waste Stockpiles, EHOC (2025a and 2025b) - General Solid Waste
- Waste Stockpile, DP (2025a) - Special Waste Asbestos

1:1,100 at A3

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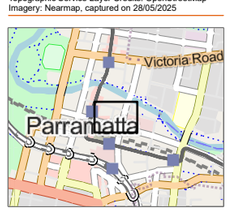
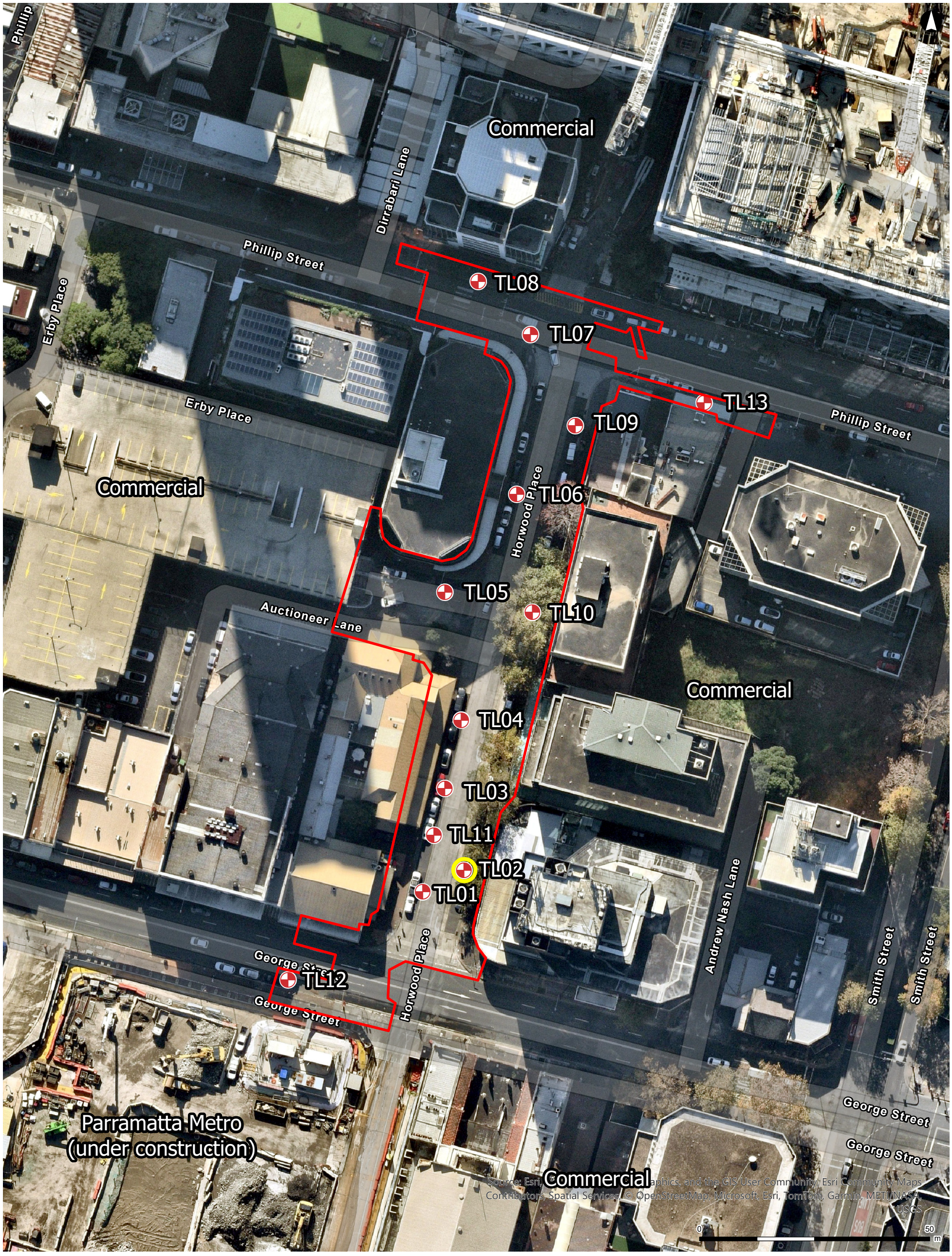


Figure 2 - Site Layout



LEGEND

- Approximate Site Boundary
- Douglas Partners (2025b) Sample Locations
- Asbestos Visually Detected

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ABN 76 104 485 289
Level 16, 580 George St | Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001

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Imagery: Nearmap, captured on 28/05/2025

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ARCADIS

CITY OF PARRAMATTA

Figure 3 - Sample Locations and Asbestos Detected

Appendix A

Appendix A – Site Plans

General

- Site Boundary
- Awning overhead
- Provisional proposed lighting
- Grey precast seats

Walls & Edges

- WA01A
  Custom ribbon edge
  Brick, timber & steel elements
- WA01B
  Custom ribbon edge
  Brick, timber & steel elements
- WA01C
  Custom ribbon edge
  Brick, timber & steel elements
- New concrete kerb
- Existing kerb retained

Pavements & Surfaces

- Existing Asphalt
- COP Standard Paver
- Pavement Type
  PV01
  Civic Link granite paver 01 (veh)
- Pavement Type
  PV02
  Civic Link granite paver 02 (ped)
- Pavement Type
  PV03
  Stone setts (veh)
- Pavement Type
  PV04
  Timber planks

Softscape

- Softscape Type
  MP01
  Native Mix 'The Gully'
- Softscape Type
  MP02
  Native Mix Streetscape
- Softscape Type
  MP03
  Biofiltration swale
- TR
  Proposed tree

MCGREGOR COXALL

Client
City of Parramatta

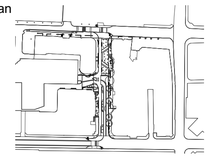
Project Team
ARCADIS
TERROIR

Project Name
Civic Link Block 3

Project No.
1066SYD

Address
Horwood Pl, Parramatta

Key Plan



Issue Log

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All dimensions are in millimetres unless otherwise noted.
Do not scale from this drawing.

North

Phase
Schematic Design

Sheet Title
Concept Plan End State

Sheet No.
MCGC-SK-004

Rev
A

PHILLIP STREET

MAKE SMOOTH CONNECTION TO PHILLIP STREET WORKS DESIGN LEVELS.

PIT TO BE CONSTRUCTED ON EXISTING LINE. PIT TO INTERFACE WITH WATER SENSITIVE URBAN DESIGN TREATMENT MEASURES WITHIN THE GREEN SPINE.

MAKE SMOOTH CONNECTION TO PHILLIP STREET WORKS DESIGN LEVELS.

EXISTING PIT TO BE CONVERTED TO GRATED INLET PIT

PIT POTENTIALLY CONTAINS DIRECT CONNECTION FROM ADJACENT BUILDINGS. EXISTING PIT TO BE CONVERTED TO JUNCTION PIT.

ACCESS TO BUSINESSES TO BE RETAINED DURING CONSTRUCTION.

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ACCESS TO BUSINESSES TO BE RETAINED DURING CONSTRUCTION.

FOR CONTINUATION REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0202

LEGEND

- HORWOOD PLACE WORKS SITE BOUNDARY
- PHILLIP STREET WORKS SITE BOUNDARY
- DESIGN CONTOURS
- EXISTING CONTOURS
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NOTES

1. PAVEMENT MARKINGS AS PER NSW DELINEATION GUIDELINES.
2. SIGNS AS PER TfNSW GUIDELINES.
3. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0251 FOR THE ROAD LONGITUDINAL SECTIONS.
4. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0281 FOR THE ROAD CROSS SECTIONS.
5. STRATAVAULT CELLS TO BE DESIGNED AND DOCUMENTED AS PART OF LANDSCAPE ARCHITECTS DETAILS.
6. FOR DEMOLITION PLANS REFER TO LANDSCAPE ARCHITECTS DESIGN DRAWING MCGC_L_101 TO MCGC_L_103.
7. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0361 FOR CIVILWORKS DETAILS.

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100mm on Original

Scales

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1 : 100

Surveyor: surveyplus, DURKIN

Architect: MCGREGOR COXALL

Client: CITY OF PARRAMATTA

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	G. DUNSTAN	Grid	MGA/20-56
Verified	M. KURTZ		

Project: PARRAMATTA CIVIC LINK HORWOOD PLACE WORKS

Title: CIVIL WORKS PLAN SHEET 1

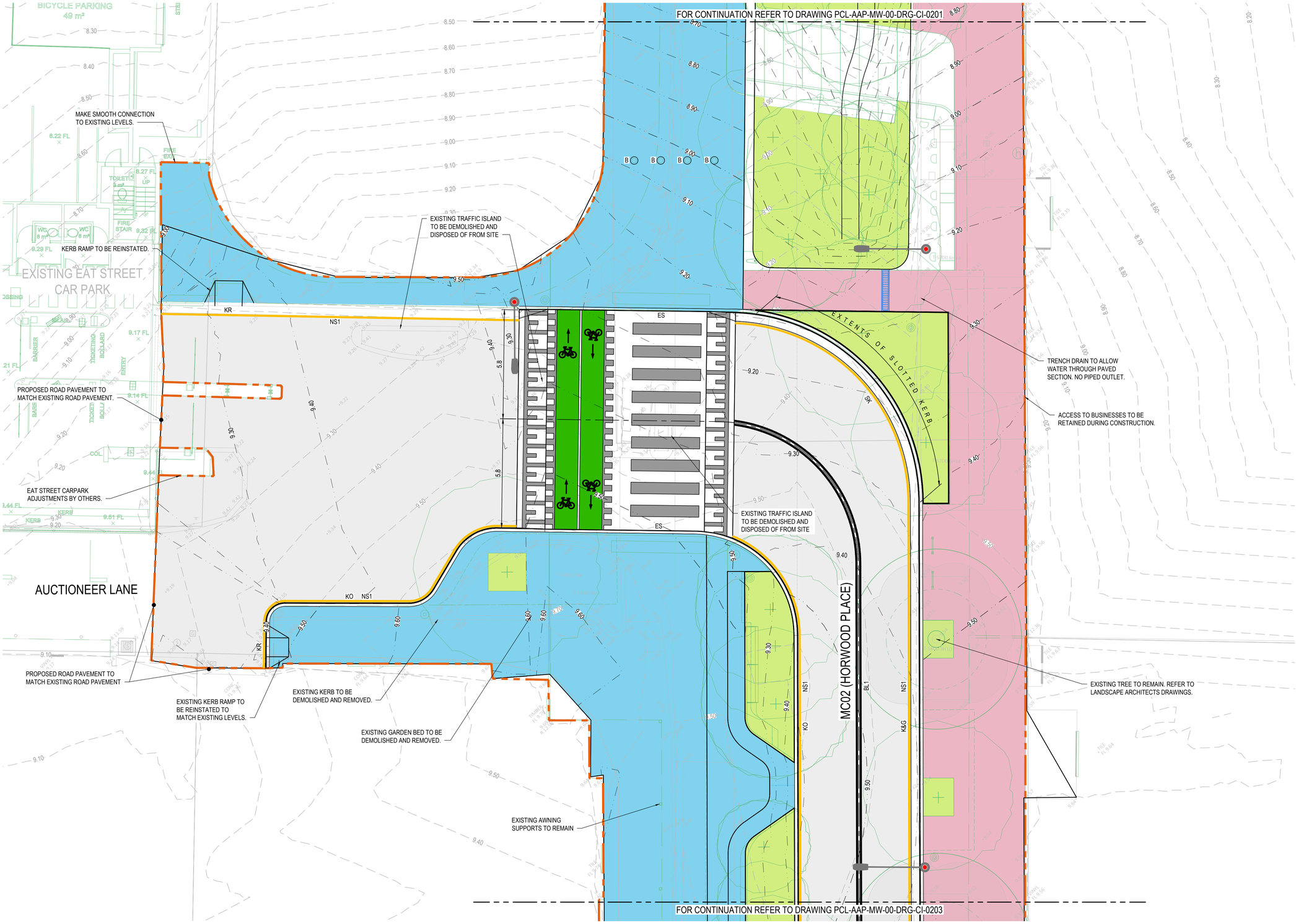
ARCADIS
Arcadis Australia Pacific Pty Limited
Level 16, 580 George Street
SYDNEY NSW 2000
ABN 76 104 485 289
Tel No: +61 2 8907 9000
www.arcadis.com/au

Project Number: 30190380

Drawing No.: PCL-AAP-MW-00-DRG-CI-0201

Issue: 01

Date Plotted: 19 Feb 2025 - 04:29pm File Name: C:\Users\santosa4174\DC\ACCDocs\Arcadis ACC US\AAU-30190380-Parramatta Civic Link\Project Files\10_WIP\10_ARC_Civil_CI\Stage_MainWorks\DRG\PCL-AAP-MW-00-DRG-CI-0201-CivilWorksPlanSheet1.dwg



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100mm on Original

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Verified	M. KURTZ		

Project: PARRAMATTA CIVIC LINK
HORWOOD PLACE WORKS

Title: CIVIL WORKS PLAN
SHEET 2

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 16, 580 George Street
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ABN 76 104 485 289
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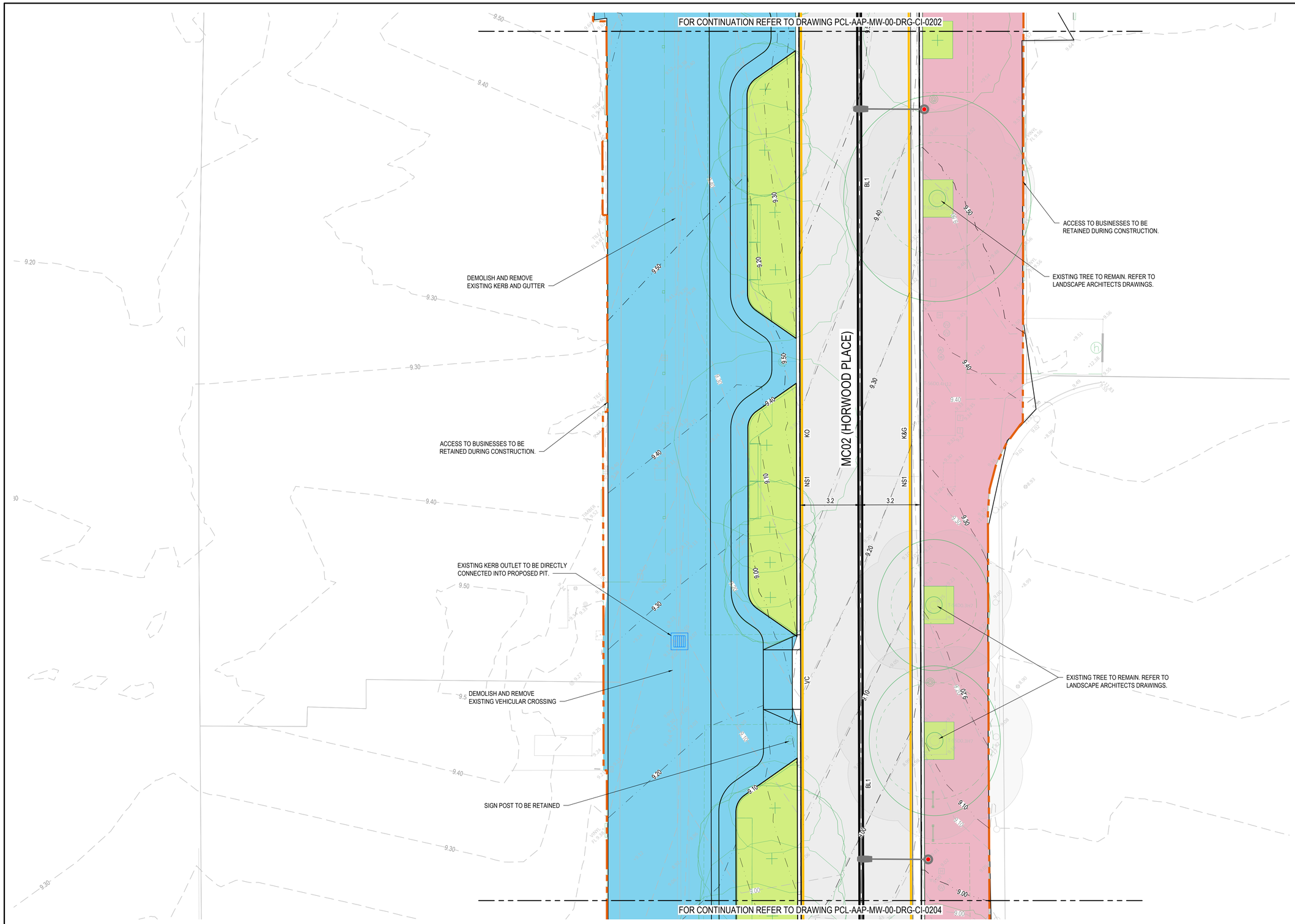
www.arcadis.com/au

Project Number: 30190380

Drawing No.: PCL-AAP-MW-00-DRG-CI-0202

Issue: 01

Date Plotted: 19 Feb 2025 - 04:29pm File Name: C:\Users\santosa4174\DC\ACCDocs\Arcadis ACC US\AAU-30190380-Parramatta Civic Link\Project Files\10_WIP\10_ARC_Civil_CI\Stage_MainWorks\DRG\PCL-AAP-MW-00-DRG-CI-0202-CivilWorksPlanSheet2.dwg



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4. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0281 FOR THE ROAD CROSS SECTIONS.
5. STRATAVAULT CELLS TO BE DESIGNED AND DOCUMENTED AS PART OF LANDSCAPE ARCHITECTS DETAILS.
6. FOR DEMOLITION PLANS REFER TO LANDSCAPE ARCHITECTS DESIGN DRAWING MCGC_L_101 TO MCGC_L_103.
7. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0361 FOR CIVILWORKS DETAILS.

Issue	Description	DR	CH	VE	Date
01	ISSUED FOR INFORMATION - 50% DETAILED DESIGN	RS	GD	MK	19.02.25

Scales

0 1 2 4 6 8 10m

1 : 100

100mm on Original

Surveyor: surveyplus, DURKIN

Architect: MCGREGOR COXALL

Client: CITY OF PARRAMATTA

Status: PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	G. DUNSTAN	Grid	MGA/20-56
Verified	M. KURTZ		

Project: PARRAMATTA CIVIC LINK
HORWOOD PLACE WORKS

Title: CIVIL WORKS PLAN
SHEET 3

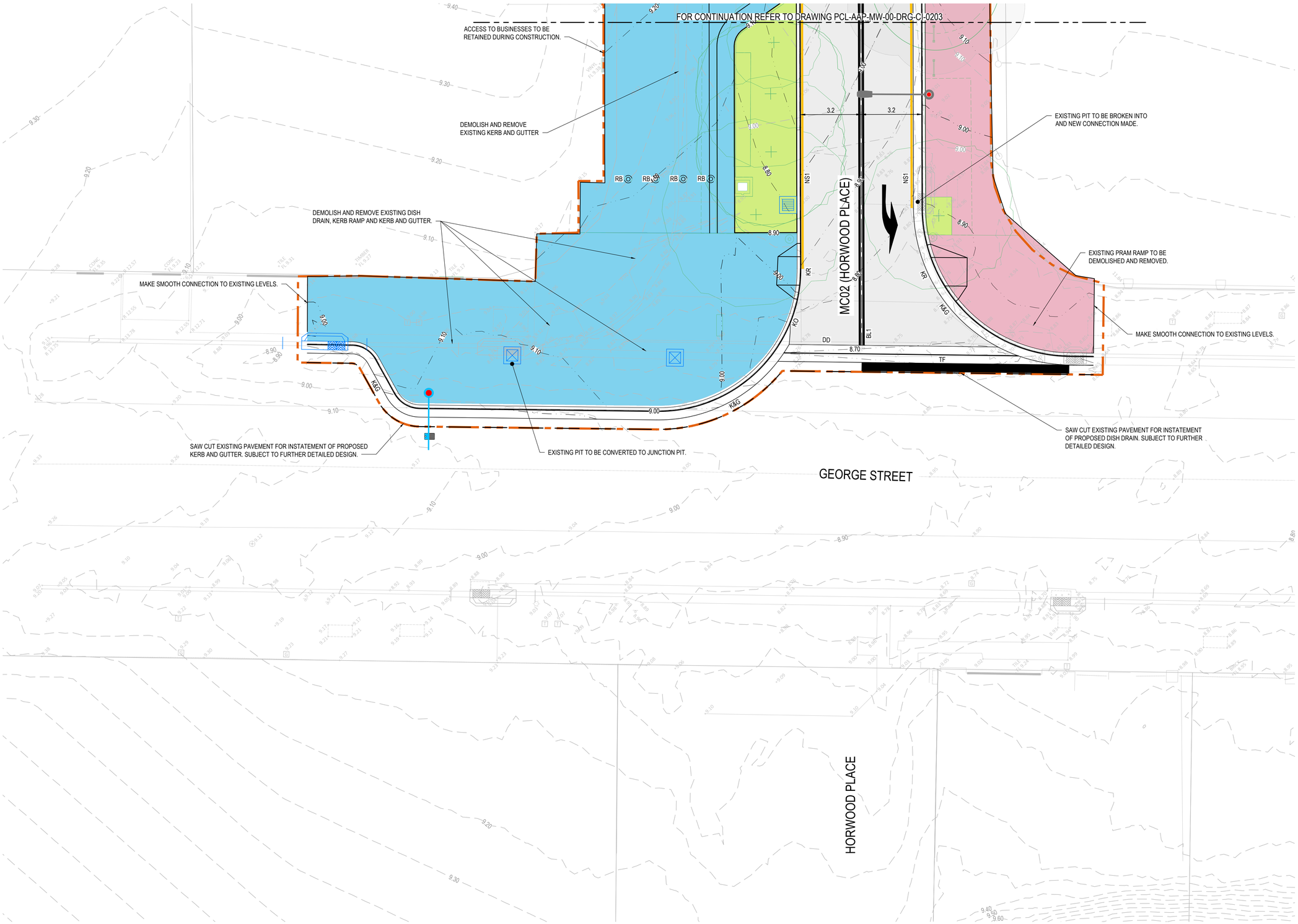
ARCADIS
Arcadis Australia Pacific Pty Limited
Level 16, 580 George Street
SYDNEY NSW 2000
ABN 76 104 485 289
Tel No: +61 2 8907 9000
www.arcadis.com/au

Project Number: 30190380

Drawing No.: PCL-AAP-MW-00-DRG-CI-0203

Issue: 01

Date Plotted: 19 Feb 2025 - 04:29pm File Name: C:\Users\santosa4174\DC\ACCDocs\Arcadis ACC US\AAU-30190380-Parramatta Civic Link\Project Files\10_WIP\10_ARC_Civil_CI\Stage_Main\Works\DRG\PCL-AAP-MW-00-DRG-CI-0203-CivilWorksPlanSheet3.dwg



LEGEND

- HORWOOD PLACE WORKS SITE BOUNDARY
- PHILLIP STREET WORKS SITE BOUNDARY
- DESIGN CONTOURS
- EXISTING CONTOURS
- ARCHITECTURAL WORKS
- PROPOSED KERB INLET PIT
- PROPOSED JUNCTION PIT
- PROPOSED GRATED PIT
- PROPOSED GRATED DRAIN
- EXISTING INLET PIT
- EXISTING JUNCTION PIT
- EXISTING GRATED PIT
- K&G — PROPOSED KERB AND GUTTER (K&G) AS PER CITY OF PARRAMATTA COUNCIL STANDARDS
- SK — PROPOSED SLOTTED KERB (SK) AS PER CITY OF PARRAMATTA COUNCIL STANDARDS
- KO — PROPOSED KERB ONLY (KO) AS PER CITY OF PARRAMATTA COUNCIL STANDARDS
- ES — PROPOSED KERB ONLY (KO) AS PER CITY OF PARRAMATTA COUNCIL STANDARDS
- KR — PROPOSED KERB RAMP
- VC — PROPOSED DRIVEWAY
- PROPOSED SIGN POST
- PROPOSED PAVEMENT MARKING BA-1
- PROPOSED PAVEMENT MARKING PS-3
- LINEMARKING DELINEATION BL1
- LINEMARKING DELINEATION TF
- LINEMARKING DELINEATION NS1
- B — FIXED BOLLARDS
- RB — REMOVABLE BOLLARDS
- PROPOSED FOOTPATH
- PROPOSED SHARED FOOTPATH
- PROPOSED ROAD PAVEMENT
- PROPOSED LANDSCAPING
- EXISTING LIGHT POLES
- PROPOSED MFP

NOTES

1. PAVEMENT MARKINGS AS PER NSW DELINEATION GUIDELINES.
2. SIGNS AS PER TINSW GUIDELINES.
3. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0251 FOR THE ROAD LONGITUDINAL SECTIONS.
4. REFER TO DRAWING PCL-AAP-MW-00-DRG-CI-0281 FOR THE ROAD CROSS SECTIONS.
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Issue	Description	DR	CH	VE	Date
01	ISSUED FOR INFORMATION - 50% DETAILED DESIGN	RS	GD	MK	19.02.25

Scales

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100mm on Original

Surveyor: surveyplus, DURKIN

Architect: MCGREGOR COXALL

Client: CITY OF PARRAMATTA

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Designed	I. SUMMERS	Height Datum	AHD
Project Manager	G. DUNSTAN	Grid	MGA/20-56
Verified	M. KURTZ		

Project: PARRAMATTA CIVIC LINK
HORWOOD PLACE WORKS

Title: CIVIL WORKS PLAN
SHEET 4

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Arcadis Australia Pacific Pty Limited
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ABN 76 104 485 289
Tel No: +61 2 8907 9000
www.arcadis.com/au

Project Number: 30190380

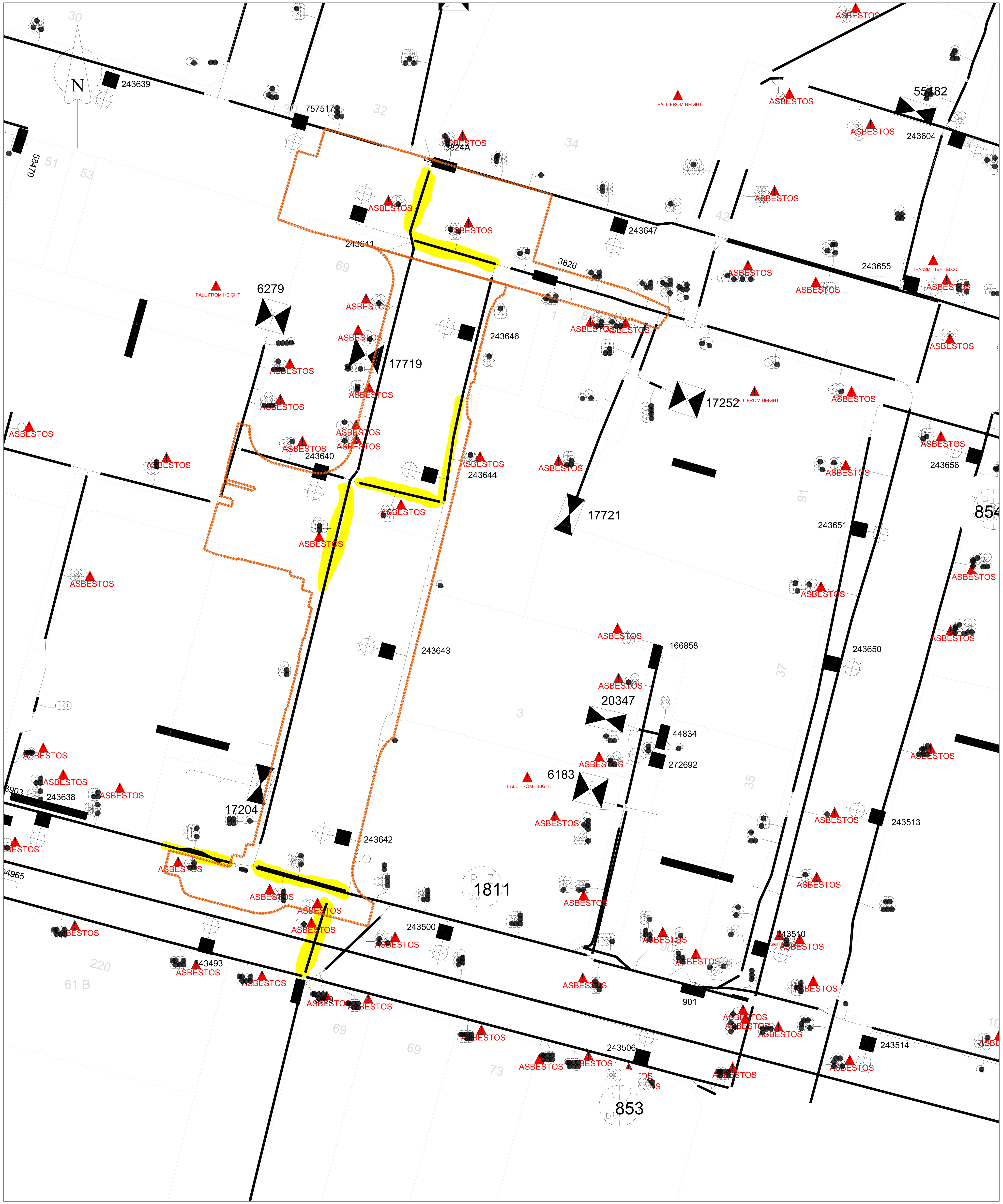
Drawing No.: PCL-AAP-MW-00-DRG-CI-0204

Issue: 01

Date Plotted: 19 Feb 2025 - 04:30pm File Name: C:\Users\santosa4174\DC\ACCDocs\Arcadis ACC US\AAU-30190380-Parramatta Civic Link\Project Files\10_WIP\10_ARC_Civil_CI\Stage_MainWorks\DRG\PCL-AAP-MW-00-DRG-CI-0204-CivilWorksPlanSheet4.dwg

Appendix B

Appendix B – Utility Survey and Asbestos Conduits/Ducts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17204
243638
243642
1811
243500
243493
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901
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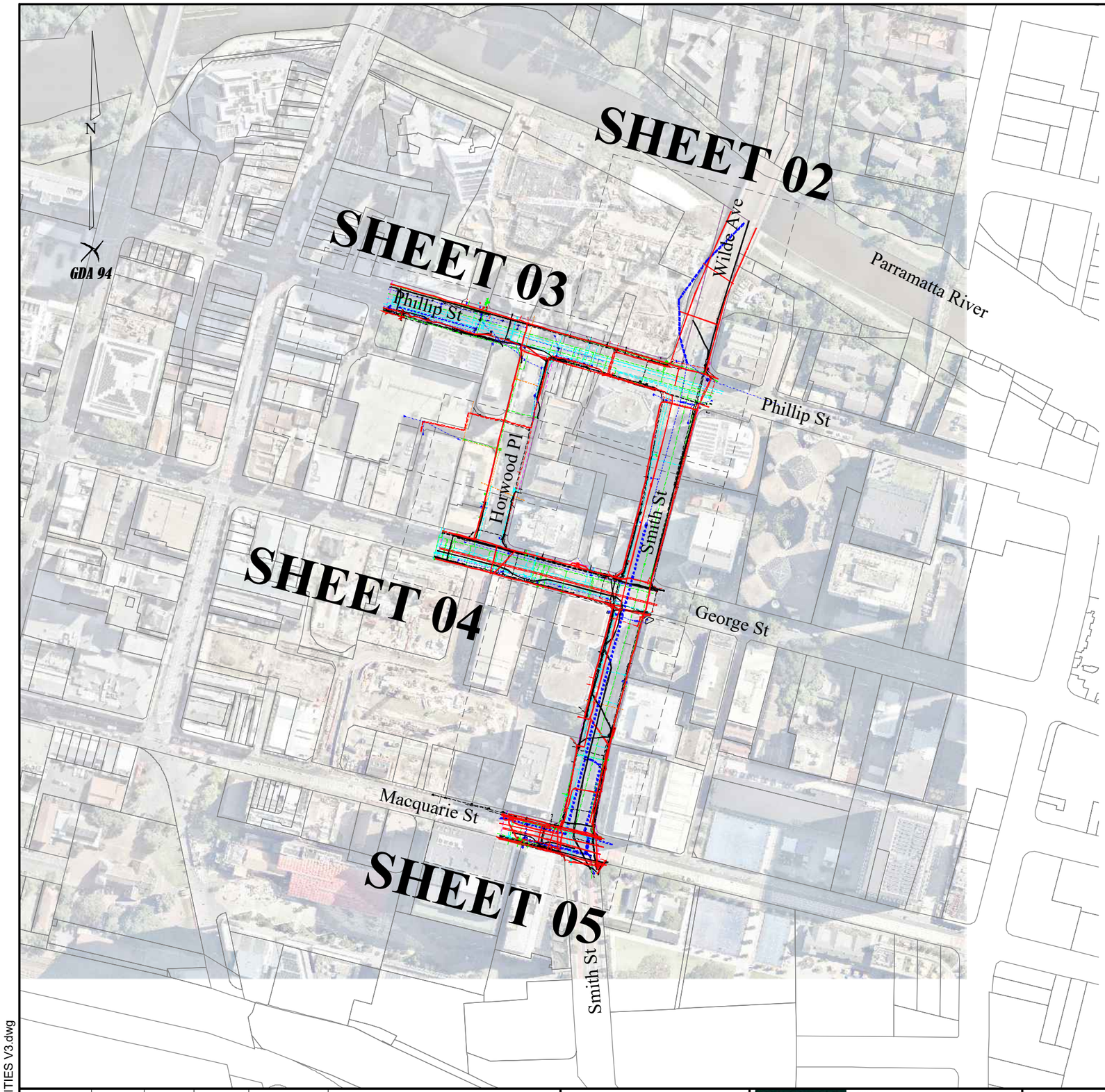
243514
ASBESTOS
FALL FROM HEIGHT
TRANSMITTER TELCO

SITE PLAN



Electronic Subsurface Utility Information (SUI) detection techniques such as EM & GPR are influenced by Sub-Surface Utility (SSU) type & ground conditions. Best practice detection rates are 80-90% and depth accuracy ranges between +/- 300mm for 90% of readings with significant outliers for the remainder.

Quality levels (as per AS-5488-2019) are mentioned for each point. Please note that Quality Levels may vary for different points of a string. Please see the definitions of the Quality Levels for more information.

Telstra depths are indicative and to be used for design purposes only.
Telstra Guidelines regarding potholing must be followed prior to any construction works.
Telstra pipes, conduits and banks may contain optical fibres from other asset owners (e.g. Optus).

Electricity cables are not necessarily enclosed in conduits and are not necessarily covered with markers, tape or other indicators of their presence.

In some cases, depth and location of some pipe inside large chambers could not be measured accurately due to the shape of the chambers. In these cases, those specific points are marked as QL-B.

Storm Water assets are QL-A at SW Pits unless the pipes have not been accessible (pits full of dirt, rusted gatic lids, etc.) and QL-C between pits. Storm Water pipes have been shown where the judgment could be made based on the location of the SW surface features. In some areas, it's impossible to work out the alignments as the SW pipes bend and change directions. If the exact route of the SW pipes is needed for design purposes, a comprehensive drainage survey using CCTV techniques is required to confirm the alignments and connectivity.

"Measurements of all drainage and sewer pipes are to Invert Level, unless otherwise stated".
Not all of kerb outlets are shown in this drawing.

All diameters are in millimetres(mm) unless otherwise specified.
Potholing is recommended to confirm the depth & position of all utilities located.

DURKIN Utility location use BEFORE YOU DIG AUSTRALIA as one source if information only when locating utilities.

It remains the responsibility of the company and or individual conducting physical works to ensure an up to date version of BEFORE YOU DIG AUSTRALIA plans is consulted and available on site. Physical works may include, but not limited to, excavating, boring (horizontal or vertical) and drilling.

This plan shows a representation of a 3d utility model: UTIL D22868 UTILITIES V2 that should be viewed in a CADD Environment to interpret the 3d information.

This utility map has been generated for design purposes only. It needs to be printed in colour and at the specific page size noted in table on bottom of the page. Failure to do this will void all information indicated for this job.

Some utilities are shown outside of scope and these are shown as reference only. Other utilities may exist outside of scope and are not shown on this plan.

UTIL D22868 UTILITIES V3.dwg

DRAWING NUMBER	STATUS	VERSION	DATE	SPATIAL DATA PROCESSOR	AMENDMENT
D22868-UT-01	*FOR REVIEW*	V1	2023/07/13	CC	-
D22868-UT-01	*FOR REVIEW*	V2	2023/10/10	CC	add utility data - Auctioneer Ln

NOT TO SCALE

CO-ORDINATE SYSTEM: GDA 1994 (MGA Zone 56)
HEIGHT DATUM: AHD 71
FILE NAME: UTIL D22868 UTILITIES V2
DBYD ENQUIRY: BYDA DATE: 29-MAY-23
APPROVED: CR DATE: 13-JUL-23

DURKIN
DURKIN Construction Pty Ltd
3/50-52 Derby Street
Silverwater NSW 2128
Ph (02) 9712 0308
Fax (02) 9712 0308
www.durkinconstruction.com.au

UTILITIES:	MR/BS	DATE: 08-OCT-23
SURVEYED:	AF/MP/DH/MP	DATE: 08-OCT-23
COMPILED:	CC	DATE: 10-OCT-23
REVIEWED:	CR	DATE: 10-OCT-23

NOT FOR CONSTRUCTION

City of Parramatta Council

Civil Link Block 3, Parramatta, NSW 2150

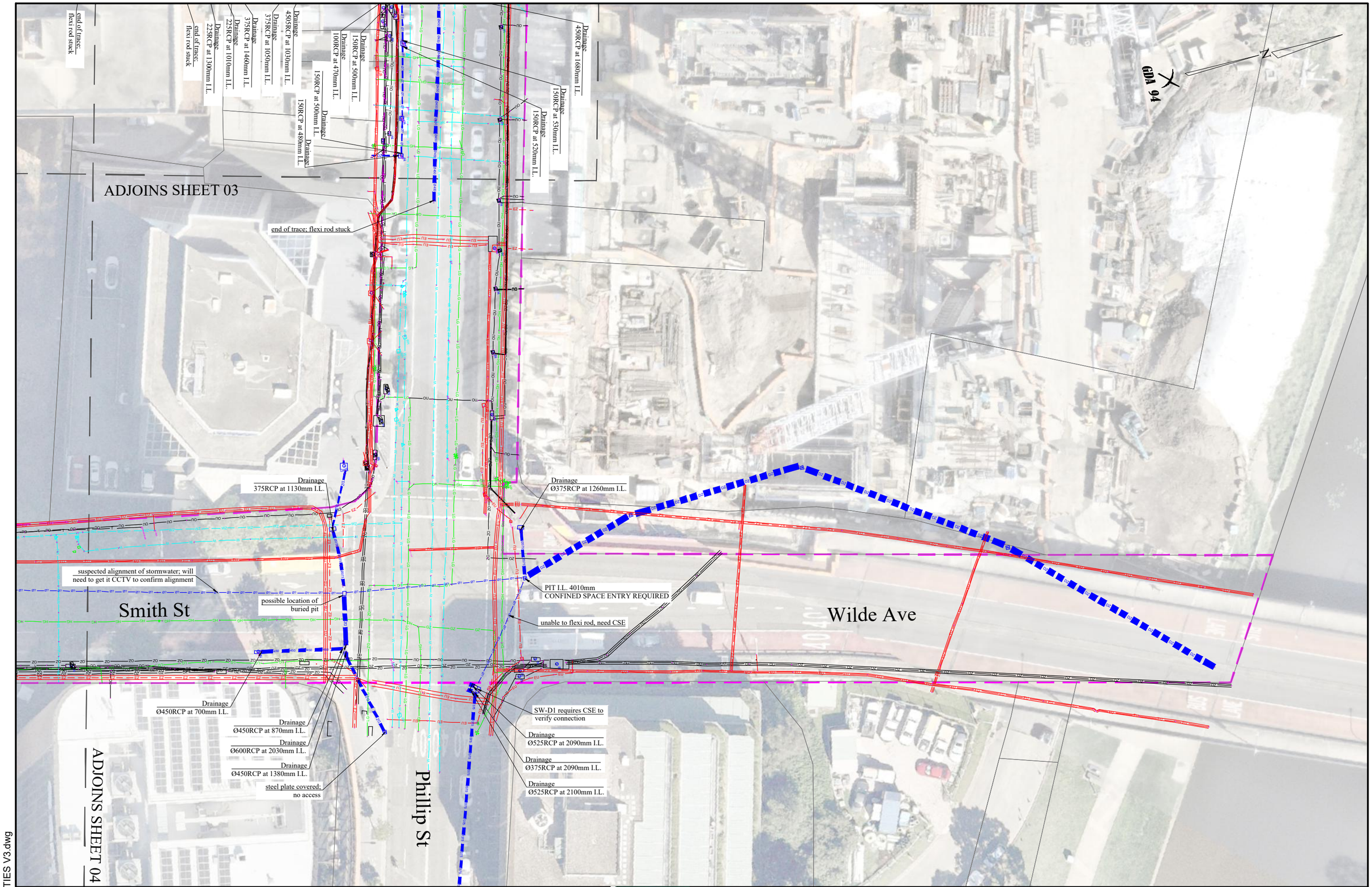
UTILITY PLAN

DRAWING NUMBER: **D22868-UT-01**

DRAWING STATUS: **FOR REVIEW** VERSION: V2

No. of SHEETS: 05

SHEET No.: 01



UTIL D22868 UTILITIES V3.dwg

DRAWING NUMBER	STATUS	VERSION	DATE	SPATIAL DATA PROCESSOR	AMENDMENT
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D22868-UT-01	*FOR REVIEW*	V2	2023/10/10	CC	add utility data - Auctioneer Ln

A3 SCALES
0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 1994 (MGA Zone 56)
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UTILITY PLAN

DRAWING NUMBER: **D22868-UT-01**

DRAWING STATUS: **FOR REVIEW** VERSION: V2

No. of SHEETS: 05

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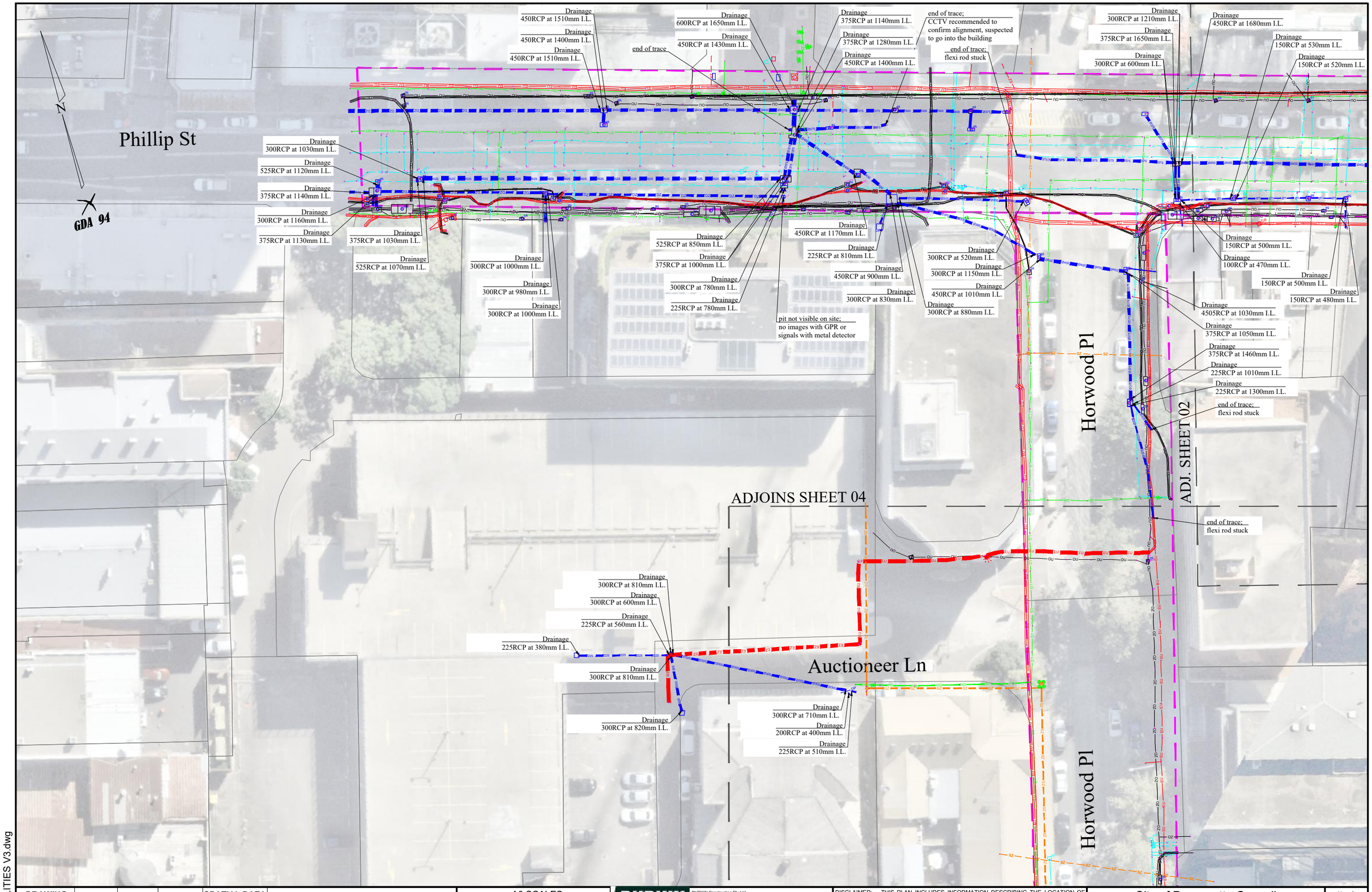

UTIL D22868 UTILITIES V3.dwg

DRAWING NUMBER	STATUS	VERSION	DATE	SPATIAL DATA PROCESSOR	AMENDMENT
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0 5 10 15 20
SCALE 1:500m

CO-ORDINATE SYSTEM: GDA 1994 (MGA Zone 56)
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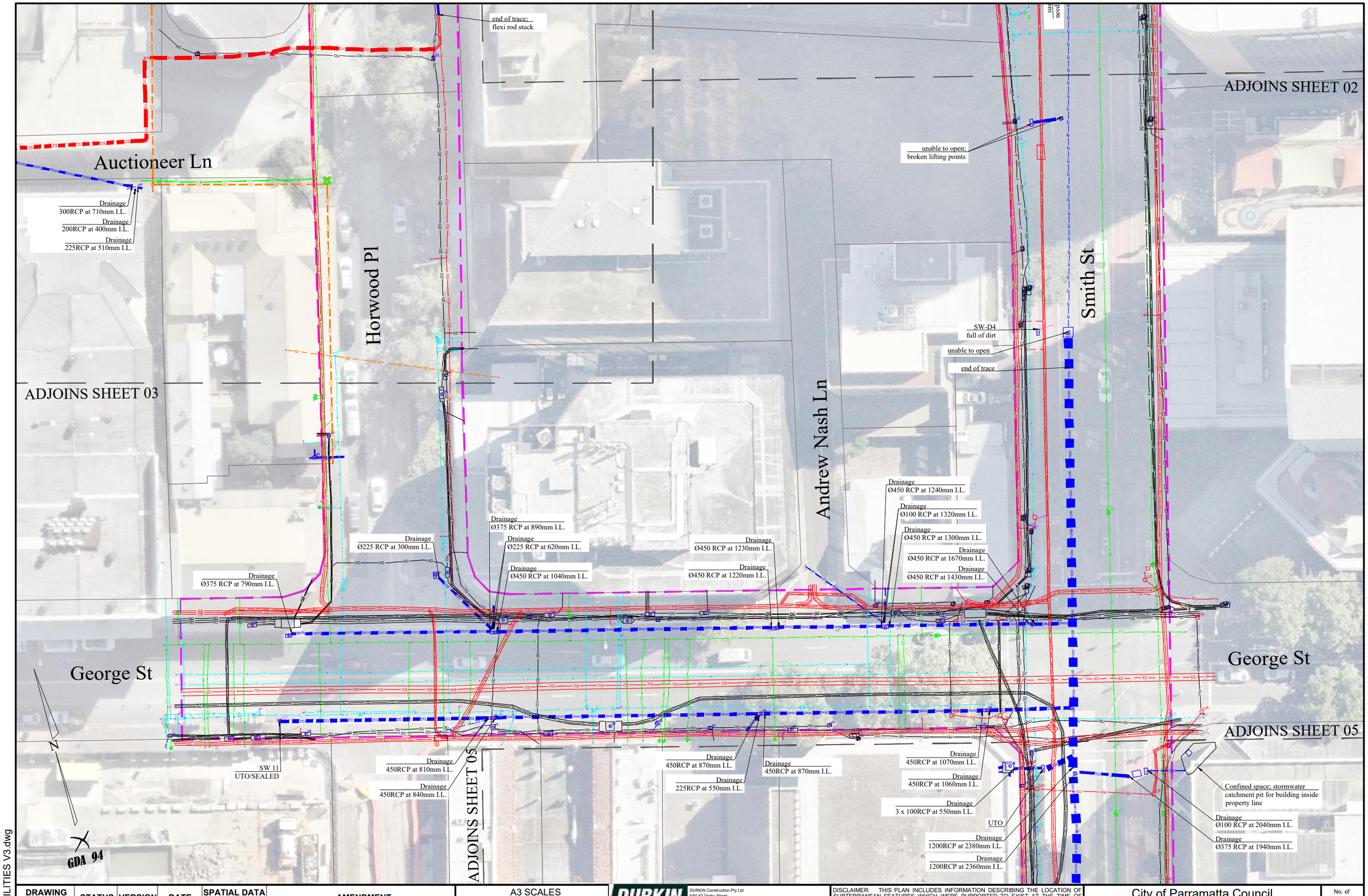
UTILITY PLAN

DRAWING NUMBER: **D22868-UT-01**

DRAWING STATUS: **FOR REVIEW** VERSION: V2

No. of SHEETS: 05

SHEET No.: 03



UTIL D22868 UTILITIES V3.dwg

DRAWING NUMBER	STATUS	VERSION	DATE	SPATIAL DATA PROCESSOR	AMENDMENT
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0 5 10 15 20
SCALE 1:500m

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UTILITY PLAN

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DRAWING STATUS: **FOR REVIEW** VERSION: V2

No. of SHEETS: 05

SHEET No.: 04

GDA 94

Macquarie St

Smith St

ADJOINS SHEET 04

Drainage Ø225RCP at 1170mm I.L.

Drainage Ø450RCP at 2270mm I.L.

Drainage Ø225RCP at 1150mm I.L.

Drainage Ø1200RCP at 3250mm I.L.

Drainage Ø225RCP at 1250mm I.L.

Drainage Ø375RCP at 2050mm I.L.

Drainage Ø450RCP at 2270mm I.L.

Drainage Ø525RCP at 2300mm I.L.

Drainage Ø900RCP at 2320mm I.L.

Drainage Ø525RCP at 2320mm I.L.

Drainage Ø900RCP at 2350mm I.L.

CSE required; CCTV recommended; unable to trace

Drainage Ø900RCP at 2950mm I.L.

Drainage Ø225RCP at 1350mm I.L.

Drainage Ø1200RCP at 3130mm I.L.

PIT FOD; no visible pipes

end of trace

Drainage Ø1050RCP at 3250mm I.L.

Confined space entry required; unable to push flexi rod, gets stuck straight away; CCTV recommended

Drainage Ø750RCP at 2640mm I.L.

Drainage Ø600RCP at 2600mm I.L.

Drainage Ø600RCP at 2420mm I.L.

Drainage Ø600RCP at 2420mm I.L.

CSE required; CCTV recommended

Drainage Ø600RCP at 2500mm I.L.

Drainage Culvert 1800W x 600H at 3400mm I.L.

Drainage Ø1200RCP at 3300mm I.L.

Drainage Ø1200RCP at 2590mm I.L.

Drainage Ø100RCP at 810mm I.L.

Drainage Ø1200RCP at 2480mm I.L.

Drainage Ø900RCP at 2470mm I.L.

Drainage Ø1200RCP at 2500mm I.L.

Drainage Ø1200RCP at 2340mm I.L.

Drainage Ø825RCP at 1390mm I.L.

Drainage Ø225RCP at 2360mm I.L.

Drainage Ø825RCP at 1630mm I.L.

Drainage Ø255RCP at 2620mm I.L.

Drainage 450RCP at 870mm I.L.

Drainage 225RCP at 550mm I.L.

Drainage 450RCP at 870mm I.L.

Drainage 3 x 100RCP at 550mm I.L.

Drainage 1200RCP at 2360mm I.L.

Drainage 1200RCP at 2380mm I.L.

Drainage 450RCP at 1066mm I.L.

Drainage 450RCP at 1070mm I.L.

UTO

Drainage Ø375 RCP at 1940mm I.L.

Drainage Ø100 RCP at 2040mm I.L.

Confined space; stormwater catchment pit for building inside property line

UTIL D22868 UTILITIES V3.dwg

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UTILITY PLAN

DRAWING NUMBER: **D22868-UT-01**

DRAWING STATUS: **FOR REVIEW** VERSION: V2

No. of SHEETS 05

SHEET No. 05

Durkin Legend

COMMUNICATIONS

- ITS — ITS Cable (IT)
- OU — Optic Fibre (OU)
- OZ — Optic Fibre - Digitised (OZ)
- TH — Telephone Line - House Connection (TY)
- T — Telephone Line (TN)
- TZ — Telephone Line - Digitised (TZ)
- Telephone Sump (TS)
- Telstra Single Concrete Pit (PTSP)
- Telstra Twin Concrete Pit (PTTP)
- Telstra Triple Concrete Pit (PT3P)
- TDP — Telstra Distribution Pillar (PTDP)
- OFP — Optic Fibre Pit (POFP)

ELECTRICITY

- EH — Electric House Connection (EY)
- EU — Electric Line Underground (EU)
- EZ — Electric Line Underground - Digitised (EZ)
- Electric Main Sump (EN)
- EMH — Electricity Cable Manhole (PEMH)
- Street Light Pole (PLPL)
- Power & Street Light Pole (PPLP)
- EJB — Electrical Junction Box (PEJB)
- Transformer Cabinet Centre (PETC)
- EP — Electric Power Pole (PPPL)
- EC — Electric Cable Marker (PECM)
- Power Service Pillar - Underground (PEUP)
- Electric Light with Outreach (LI)
- Electric Transformer Cabinet (EC)
- EFP — Electric Distribution Fuse Point (PEFP)

TCS

- Traffic Control Signal (PSGL)
- TSC — Traffic Signal Controller (PSCL)
- Traffic Signal Junction Box (PSJX)
- TSD — Traffic Signal Detector (PSDR)
- Traffic Light with Outreach (TO)

SEWER

- SH — Sewer House Connection (SY)
- S — Sewer Main (SM)
- SZ — Sewer Main - Digitised (SZ)
- Sewer Manhole Cover (PSMH)
- SLH — Sewer Lamphole (PSLH)
- SVP — Sewer Vent Pipe (PSVP)

GAS

- GH — Gas House Connection (DG)
- GZ — Gas Main Digitised (ZG)
- HG — Gas Main High Pressure Pipeline (HG)
- LG — Gas Main Low Pressure Pipeline (LG)
- GMH — Gas Manhole Cover (PGHL)
- Gas Valve Box (PGAS)
- HP — High Pressure Gas Marker (PGHM)
- GP — Gas Marker (PGPM)
- Gas Meter (PGMR)

WATER

- W — Water Main (WM)
- WH — Water House Connection (WY)
- WR — Water Main - Recycled (RM)
- WZ — Water Main - Digitised (WZ)
- Water Stop Valve (PWSV)
- Water Fire Hydrant (PWFB)
- WH — Water Hydrant (PWHY)
- Water Tap (PWTP)
- Water Meter (PWMR)

DRAINAGE

- ?H — Box Culvert - Unspecified High (UB)
- 150H — Box Culvert - 150 High (B0)
- 225H — Box Culvert - 225 High (B1)
- Headwall Top (HW)
- Ø? — Drainage Pipe - ØUnspecified (UU)
- DZ — Drainage - Digitised (DZ)
- Ø225 — Drainage Pipe - Ø225 (U1)
- Ø300 — Drainage Pipe - Ø300 (U2)
- Ø375 — Drainage Pipe - Ø375 (U3)
- Ø450 — Drainage Pipe - Ø450 (U4)
- Ø525 — Drainage Pipe - Ø525 (U5)
- Ø600 — Drainage Pipe - Ø600 (U6)
- Ø750 — Drainage Pipe - Ø750 (U7)
- Ø900 — Drainage Pipe - Ø900 (U9)
- Ø1050 — Drainage Pipe - Ø1050 (V1)
- Ø1200 — Drainage Pipe - Ø1200 (V2)
- Ø1350 — Drainage Pipe - Ø1350 (V3)
- Ø1500 — Drainage Pipe - Ø1500 (V5)
- Ø1650 — Drainage Pipe - Ø1650 (V6)
- Ø1800 — Drainage Pipe - Ø1800 (V8)
- Drainage Pit (DP)
- Gully Pit (IP)
- Gully Pit Point (PGUL)
- Kerb Inlet (KI)

MISC

- BH — Bore Hole (PBHX)
- GAT — Gatic Cover Lid
- HO — High Pressure Oil Pipeline (HO)
- HPO — High Pressure Oil Pipeline Mark (POHM)
- ? — Unknown Surface Feature (PUSR)
- ?P — Unidentified Pipeline (UP)
- Miscellaneous Structure (OM)

DURKIN Definition & Abbreviation

B 600	Quality Level (as per AS-5488-2019) & Depth
UTT	Unable To Trace
UTL	Unable To Locate
UTO	Unable to Open
FOD / FOW	Full of Dirt/ Full of Water
EOT	End Of Trace
NGMV	No Gas Meter Visible at Locating Time
NWMV	No Water Meter Visible at Locating Time
PN	Property Number
DBYD	Dial Before You Dig
	Flow Direction
	Extent of Potholing Trench
	Approx. Extent of Utility Investigation

PIPE MATERIAL

CICL	Cast Iron Cement Lined
PVC	Polyvinylchloride
SGW	Salt Glazed Ware
VC	Vitrified Clay
DICL	Ductile Iron Cement (mortar) Lined
SCL	Steel Cement (mortar) Lined
oPVC	Polyvinylchloride - Oriented
uPVC	Polyvinylchloride - Unplasticised
EW	Earthenware
AC	Asbestos Cement
RCP	Reinforced Concrete Pipe
GI	Galvanised Iron
SCL IBL	Steel Cement Lined Internal Bitumen Lined
NB GI	Nominal Bore Galvanised Iron
PE	Polyethylene
HD PVC	High Density Polyvinylchloride
FC	Ferro Cement
NY	Nylon
ST	Steel
GRP	Glass Reinforced Plastics
DB	Direct Buried
A	Asbestos
CE	Concrete Encased
C	Concrete

Quality Levels of Sub-Surface Utility Investigation (SUI) AS 5488-2019

(Reproduced with permission from SAI Global under licence number 1610-c097)

This Standard provides a framework for the classification of subsurface utility location and attributes information in terms of specified quality levels. The objective of this Standard is to provide utility owners, operators and locators with a framework for the consistent classification of information concerning subsurface utilities. Project risks related to underground utilities can then be properly managed.

A quality level describes the amount and accuracy of information that is collected or held on a subsurface utility.

There are four quality levels D, C, B and A.

Quality Level D (QL-D) is the lowest of the four quality levels. The attribute information and metadata of a subsurface utility can be compiled from any, or a combination of, the following:

(a) Existing records.

(b) Cursory site inspection.

(c) Anecdotal evidence.

Quality Level-X (QL-X) Electronically located with Ground Penetrating Radar or other electronic locating techniques not compliant with AS5488. Estimated positional tolerance is +/-300mm in plan, +/-500mm in depth (high confidence level).

Quality Level Y(QL-Y) Electronically located but with reduced confidence in plan position/depth (medium confidence level).

Quality Level Z (QL-Z) Electronically located with low confidence level in plan position/depth (low confidence level).

Quality Level C (QL-C) is described as a surface feature correlation or an interpretation of the approximate location and attributes of a subsurface utility asset using a combination of existing records (and/or anecdotal evidence) and a site survey of visible evidence, and/or methods to indicate the existence of an undefined entity. The minimum requirement for quality level C is relative spatial position. Information is collected by correlating the survey of visible utility surface features such as marker plates or water hydrants and acquired dial-before-you-dig plans to “draw”a string which shows the approximate position of services.

Horizontal Tolerance of Surface Features: -/+ 300 mm

Quality Level B (QL-B) provides relative subsurface feature location in three dimensions. The minimum requirement for quality level B is relative spatial position. Information is collected by designating the horizontal and vertical location of underground utilities by using electromagnetic pipe and cable locators, sondes or flexi-trace, ground penetrating radar and acoustic pulse equipment.

Horizontal Tolerance: -/+ 300 mm

Vertical Tolerance: -/+ 500 mm

Quality Level A (QL-A) is the highest quality level and consists of the positive identification of the attribute and location of a subsurface utility at a point to an absolute spatial position in three dimensions. It is the only quality level that defines a subsurface utility as ‘validated’. Where the whole line segment cannot be verified by line of sight, quality level A shall not be attributed to the line segment between validated points. The vertical information for this locating method is to the top or shallowest part of the located service.

Horizontal and Vertical Tolerance: -/+ 50mm

DRAWING NUMBER	STATUS	VERSION	DATE	SPATIAL DATA PROCESSOR	AMENDMENT
D22868-UT-01	*FOR REVIEW*	V1	2023/07/13	CC	-
D22868-UT-01	*FOR REVIEW*	V2	2023/10/10	CC	add utility data - Auctioneer Ln

CO-ORDINATE SYSTEM: GDA 1994 (MGA Zone 56)
HEIGHT DATUM: AHD 71
FILE NAME: UTIL D22868 UTILITIES V2
DBYD ENQUIRY: BYDA DATE: 29-MAY-23
APPROVED: CR DATE: 13-JUL-23

DURKIN Construction Pty Ltd
3/50-52 Derby Street
Silverwater NSW 2128
Ph (02) 9712 0308
Fax (02) 9712 0308
www.durkinconstruction.com.au

UTILITIES:	MR/BS	DATE: 08-OCT-23
SURVEYED:	AF/MP/DH/MP	DATE: 08-OCT-23
COMPILED:	CC	DATE: 10-OCT-23
REVIEWED:	CR	DATE: 10-OCT-23

NOT FOR CONSTRUCTION

City of Parramatta Council

Civil Link Block 3, Parramatta, NSW 2150

UTILITY PLAN

DRAWING NUMBER: **D22868-UT-01**

DRAWING STATUS: **FOR REVIEW** VERSION: V2

No. of SHEETS: 05

SHEET No.: -

Appendix C

Appendix C – RAP Addendum

Parramatta City Council

RAP Addendum

‘Parramatta Civic Link – Block 3’, Horwood Place, Parramatta, NSW, 2150

10 October 2025

RAP Addendum

'Parramatta Civic Link – Block 3', Horwood Place, Parramatta, NSW, 2150

10 October 2025

Our Ref:

30286862_PCC-Parra-Block3_RAP-Addend_R01

Prepared By:
Arcadis Australia Pacific Pty Ltd
Level 16
580 George Street
Sydney, NSW, 2000
Tel: +61 2 8907 9000
Fax: +61 2 8907 9001

Simon Spyrdz

Associate Technical Director

Licensed Asbestos Assessor: LAA000116

Prepared For:
Emily Forrest
Senior Design Manager
City of Parramatta
9 Wentworth Street
Parramatta NSW 2150

Beau Dubois

Principal Environmental Consultant

Suzanne, Geerdink

Senior Project Manager

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Revision No.	Date Issued	Description	Author	Approver
0	25/09/2025	Draft for client review	BD & SS	GD
1	10/10/2025	Final addressing client comments	BD	SG

Contents

Tables and Images (in text)

1 Introduction

Arcadis Australia Pacific Pty Ltd (Arcadis) was engaged by Parramatta City Council (PCC or the Client) to prepare an Addendum to the Remediation Action Plan (RAP Addendum) for the project identified as 'Parramatta Civic Link – Block 3'; located at Horwood Place, Parramatta, NSW, 2150 (the Site). The Site location is shown in *Figure 1*.

This RAP Addendum provides alternate contingency action for remedial and validation strategy outlined in the Remediation Action Plan developed for implementation during proposed construction works, to address contamination risks which may otherwise remain onsite in the event that residual in-situ bonded asbestos containing material (ACM) is identified. The contingency actions outlined in this RAP Addendum focus on options for the onsite capping and containing methodology for onsite identified asbestos containing materials.

This RAP Addendum should be read in conjunction with the Arcadis Remediation Action Plan - *'Parramatta Civic Link – Block 3', Horwood Place, Parramatta, NSW, 2150 (RAP)* (Arcadis, 2025c) and Arcadis (2025b) *Limited Construction Environmental Management Plan, 'Parramatta Civic Link – Block 3', Horwood Place, Parramatta, NSW, 2150 (L-CEMP)* which provides procedures and controls to be implemented during construction to manage human health and environmental risks from potential asbestos.

1.1 Objectives and Purpose

The purpose of preparing this RAP Addendum is to provide the contingent remediation options in the form of onsite capping and containing of asbestos material as an alternative to processes outlined in Section 6.4.6 and 6.4.7 of the RAP.

The objectives of the RAP Addendum are as follows:

- Identify the remediation objectives, criteria and extent.
- Provide alternate remediation strategy for identified asbestos material onsite then that outlined in the RAP.
- Detail the remediation and validation strategy to be implemented to address potential unacceptable exposure risks from residual bonded ACM (if identified) at the Site, based on the future public open space land use scenario.

It is noted that this RAP Addendum is not designed to replace the RAP, however, provide alternate methods for specific sections relating to remediation methodology only. All other management requirements outlined in the RAP are to be adhered to.

1.2 Scope of Work

Arcadis undertook the following scope of work to meet the objectives:

- Reviewed previous environmental investigations to identify potential risks to human health and/or the environment from the identified contamination.
- Set remediation objectives to allow for the proposed use of the Site, with no unacceptable risks to human health and/or the environment.
- Defined the remediation extent required to achieve the remediation objectives.
- Documented the process required to remediate and validate the Site, based on the future public open space land use scenario.

This Addendum was prepared in consideration of the following guidelines:

- SafeWork NSW (2022). Code of Practice: How to Manage and Control Asbestos in the Workplace.
- SafeWork NSW (2022). *Code of Practice: How to Safely Remove Asbestos*.
- NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme (3rd edition)* (NSW EPA, 2017).
- NSW EPA (2020). *Consultants reporting on contaminated land* (NSW EPA, 2020).
- NSW EPA (2022). *Contaminated Land Guidelines: Sampling Design Part 1 - Application Guidelines* (2022).
- NSW EPA 2014. *Waste Classification Guidelines– Part 1-4*
- NSW EPA (2016). *Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste*
- National Environment Protection Council (NEPC). 2013. *National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999*, as amended May 2023 (the NEPM; NEPC, 2013)
- Heads of EPA Australia and New Zealand (HEPA) 2020. *PFAS National Environmental Management Plan: Version 2.0* (The NEMP 2.0; HEPA, 2020)

2 Pre-Remediation Conceptual Site Model Summary

2.1 Adopted Assessment Criteria

Based on the information provided, the Site ultimately will be developed into open space area, accessible to the public, with a combination of hardstand and landscaped garden beds. Therefore, the proposed land use for the Site is consistent with Public Open Space ('Open Space or 'Recreational C') land use scenario, defined in the NEPM (NEPC, 2013).

2.2 Source

Based on the previous contamination assessments conducted at the Site, the main sources of contamination are detailed in Table 3-1.

Table 2-1 Sources of Contamination

Source ID	Matrix	Description
Potential unexpected finds of bonded ACM impacted fill material	Fill	Possible bonded asbestos fragments in fill soils, deemed unfeasible or impracticable for disposal to a licensed landfill
Bonded ACM conduit	Conduit service	Bonded asbestos conduit, pits and infrastructure associated with existing Endeavor Energy assets

2.3 Receptors

The potential receptors of the sources of contamination identified at the Site include future site users (Recreational / Public Open Space) and construction workers.

2.4 Exposure Pathways

The identified (or potential) pathways for contamination to move from the contamination source to the identified receptors at the Site are considered to include inhalation of asbestos free fibres during disturbance works.

3 Remediation Method

The below presented remediation methodology is as an alternative to the onsite treatment and offsite disposal options presented in the RAP. All other aspects of the RAP are applicable to site remediation works and should be followed as outlined in the RAP. These include, but are not limited to:

- Approvals and Notifications
- Implementation of Site Construction Management Plan
- Site establishment
- Contingency plans,
- Unexpected finds,
- Stockpile management,
- Material tracking
- Importation of material
- Waste disposal and
- Material tracking.

If asbestos is identified in fill, all works will be carried out in general accordance with SafeWork NSW (2020) *Code of Practice: How to Manage and Control Asbestos in the Workplace* 2020, SafeWork NSW (2022) *Code of Practice: How to Safely Remove Asbestos* and the NEPM (NEPC, 2013). Any asbestos removal works will be undertaken by a suitably licensed asbestos remediation contractor, which includes:

- Class A for all friable asbestos (AF/FA)
- Class B for all non-friable asbestos (bonded ACM).

The remedial works for the project will generally include the following:

Insitu Asbestos retention and capping (Section 3.3)

- Excavation of asbestos impacted fill to the extent required for development and validation in accordance with the RAP.
- Survey the lateral extent and vertical RL of residual asbestos contaminated fill,
- Undertake asbestos air monitoring while asbestos impacted soils are exposed.
- Installation of a marker layer above the asbestos impacted material,
- Capping above the asbestos impacted fill material with 'clean' fill.
- Survey of the top of final surface RL,
- Validation of the capping requirements.
- All soil placement and compaction works should be undertaken as per the requirements with any geotechnical specifications.

Abandonment of asbestos conduit in situ (Section 3.4)

- Positive identification of the location of onsite conduit and access pits.
- Removal of near surface pits and access points.
- Removal of electrical wiring/infrastructure within conduits (if required).

- Sealing of conduits ends.
- Survey of conduit location and RL.
- Validation of the capping requirements.

3.1 Remediation Goal

The goal of the proposed remedial activities is to manage the identified contamination exposure risks to a level that does not present an unacceptable human health or ecological exposure risk, based on the proposed land use scenario. Following remediation and validation works the site will be managed under a long-term environmental management plan (EMP).

3.2 Remedial Method

The associated remediation methods in this RAP Addendum will focus on contingency plan for capping and managing asbestos material onsite, in the event assessment of the volume and extent of asbestos or portions of asbestos onsite are determined to be unsuitable for onsite treatment or offsite disposal. The preferred remedial option for each area of concern, associated rationale and applicable remedial method is presented below.

Table 3-1 Remedial Option

Areas of Concern	Preferred Remedial Option	Rationale	Remedial Method
Unexpected Finds of Asbestos-Impacted fill	Retained in situ and management of impacted soils under a suitable capping mechanism.	The SPR Linkage is considered broken if a suitable capping layer is installed to prevent access.	Identified impacted fill outside proposed disturbance areas will be retained in situ, covered with high-visibility geofabric and a minimum 0.5 m layer of clean fill material and finished with grass, mulch or concrete (pedestrian pathways) installed over the top.
Asbestos conduit	Containment and management asbestos conduit under a suitable capping mechanism.	The SPR Linkage is considered broken if sufficient clean material is retained over and around existing infrastructure prevent disturbance and future access.	Removal of near surface pits and inspection access ports, abandonment of asbestos conduit in situ, with a minimum 0.5m of overlying cover.

Any asbestos retained onsite that exceeds the land use criteria for open space as defined in NEPM 2013, will require management under a Long Term Environmental Management Plan (LTEMP) and notification on title.

3.3 Remedial Works – In situ asbestos retention and capping

3.3.1 Asbestos Handling

All Site works being undertaken within known asbestos contaminated areas, should be considered 'exclusion zone(s)' with restricted access, to authorised personnel, with appropriate personal protection equipment. Exclusion zones will be maintained during the duration of the works and only removed post decontamination and issuing of the asbestos clearance certificate.

For details refer to *Section 3.7 - Limiting access, displaying signs and installing barricades* and Section 4.2 - *Indicating the asbestos removal areas* of *Code of Practice: How to Safely Remove Asbestos* (SafeWork NSW 2022).

All asbestos clearance certification is to be issued by an independent competent person or Licenced Asbestos Assessor (LAA) as appropriate. Refer to Section 3.5 – Asbestos Clearance Certificate.

3.3.1.1 Excavation Methodology

Excavation of asbestos impacted soils will be carried out under the supervision of the asbestos remediation contractor using equipment suitable of the scale of works being undertaken. Consideration of the requirements provided in *Section 7.1* SafeWork NSW (2022) will be applied.

All plant involved in the handling of asbestos impacted soils will remain withing the exclusion zones until a clearance certificate is issues for that plant.

During earthworks, dust generation and distribution will be minimised through the processes including, but not limited to:

- Dampening the surface of the Site and working area with a water cart or similar control.
- Deploying covers over stockpiled or exposed soils,
- Placement of soils directly into haulage plant in a manner to minimise dust, and
- Ceasing work in strong winds.

When loading vehicles/plant for haulage of the impacted soils, they will be loaded in a manner that there is no spillage or loss of containment of the asbestos material during transport. Spillage of material on the side or edges of the truck body will be removed prior to commencement of material movement.

At the completion of the excavation works, the final scrape of the works area will be done in a manner that prevents cross contamination of clean soils. This could involve the "backing out" of the works area by scraping soils on exiting the area ready for validation.

Once a final surface level is achieved, a marker layer will be placed in a manner that prevents the cross contamination of non-contaminated plant and equipment (as per Section 3.3.4). The purpose of this layer is to allow the asbestos exclusion zone to be removed following a suitable clearance inspection.

3.3.1.2 Haulage of Soils

Soil must not be tracked off the Site as a result of vehicle, plant and equipment movements. To limit the potential for tracking of soil off-site via vehicle, plant or equipment movement, the following controls should be implemented:

- Vehicles, plant and equipment on the Site will be kept to a practical minimum.

- Dedicated plant will be located within the proposed excavation/placement and haulage areas.
- No soils being transported are permitted to spill or leak from the transporting vehicle.
- Dedicated haul road/area with exclusion zones will be dedicated for the haulage and onsite relocation of asbestos materials.
- Plant will be subject to full decontamination and asbestos clearance prior leaving the leaving the exclusion zone

3.3.1.3 Decontamination

Prior to any plant or personnel leaving the exclusion zone, decontamination must be undertaken. Details for decontamination procedures can be found in *Section 4.6 – Decontamination* of SafeWork NSW (2022).

Procedures to be applied should include but not be limited to the details outlined in the tables below.

Table 3-2: Personal Decontamination

Personal Decontamination Procedures	
Issue	Appropriate hygiene and decontamination assists with minimising worker exposure and the transportation of potentially contaminated materials from work areas to more sensitive environments.
Criteria	No contaminated clothing or PPE to leave the work areas.
Controls	1) Eating, drinking, chewing gum and smoking will be prohibited at all times whilst working in potentially hazardous areas. 2) All individuals working at the Site will pass through a decontamination unit or decontamination prior to exiting work areas. All outer work material will be physically removed from personnel prior to exiting work areas. 3) Remain in full PPE in work areas at all times. 4) Plant operators are to remain inside vehicle during operation with windows and doors closed and air-conditioning on recycle only or switched off.

Table 3-3: Vehicle Decontamination

Vehicle/Plant Decontamination Procedures	
Issue	Appropriate vehicle and equipment decontamination assists with minimising worker exposure and the transportation of potentially contaminated materials from work areas to more sensitive environments
Criteria	No contaminated vehicle or equipment to leave the work areas
Controls	1) Trucks and equipment will remain within the works area until the completion of works. Vehicles will not traffic between work areas and other areas of the Site, including lunch areas, car parks, etc. 2) a designated cleaning areas will be used to wash down all vehicles and equipment potentially coming into contact with contaminated soil leaving all remediation or works areas. 3) Vehicles will be cleaned by the asbestos removalist in the designated wash down area to remove all viable soil and debris. 4) Plant / equipment can only be removed from the works area following inspection and the issuing of a clearance certificate.

3.3.1.4 Asbestos Clearance Certificate

Following the removal works, and prior to removal of any plant/vehicles or equipment from the asbestos works area, an Asbestos Clearance Certificate will be issued. Asbestos clearance should be undertaken in accordance with the requirements outlined in *Section 3.10 - Clearance inspection* SafeWork NSW (2022).

Soil validation sampling of the removal area will be required. Refer to Section 4 – Validation Method section of this addendum for soil sampling requirements.

Clearance certificates will be required for:

1. Any plant and equipment being removed from the exclusion zones.
2. The excavation area following completion of removal works and final scrape.
3. Haul road at completion of material movement.
4. Final placement area post installation of marker layer.

3.3.2 Air monitoring

The SafeWork NSW (2022) *Code of Practice: How to Safely Remove Asbestos* state that *"control monitoring is not required for bonded asbestos removal but may be carried out by an independent licensed asbestos assessor or competent person to ensure that controls being used to eliminate or minimise exposure to airborne asbestos are effective.*" Additionally, it also states that "*Air monitoring should be considered where the asbestos removal work is being undertaken in or next to a public location".*

Given the public location of the works, it is recommended that asbestos air monitoring be undertaken onsite to confirm control measures are being appropriately implemented.

All air monitoring will be undertaken in accordance with the requirements set out in Section 3.11 of the Code of Practice: *How to Safely Remove Asbestos* (SafeWork NSW, December 2022).

Monitoring requirements will include:

- Airborne Asbestos Monitoring during all works undertaken within areas identified with unexpected finds of asbestos; and,
- Final clearance monitoring within the remediation area following the removal of all visible asbestos contamination.

Operational airborne asbestos monitoring is to be conducted during all potentially asbestos disturbing works on Site. The number of monitors used will be dependent on the proposed works with a minimum of two sample pumps to be used.

Location of monitors will be assessed daily as required by Site works and will be based upon the most susceptible areas to airborne asbestos contamination and transportation or areas of higher risk, e.g. downwind of works, enclosure entry/exit, potential off-Site receptors etc.

Monitoring results will be reported to the client as soon as possible after the conclusion of the monitoring interval. Results are required to be readily available and accessible to both Site management, employees and PCC's Project Manager and displayed in a prominent position. Every week, the Project Manager will provide a summary of current monitoring results detailing dates of sampling, fibre concentration levels and the date of notification of results to the Site foreman and PCC's Project Manager. These results will also be communicated to all site personnel. If an exceedance of air monitoring results for asbestos fibres is detected, the Site Manager shall inform PCC's Project Manager and advise of the actions taken in accordance with Table 3-4 below.

The risk associated with asbestos relates to the inhalation of airborne asbestos fibres. These fibres may be liberated by disturbance of the asbestos-containing material or dusts. Air sampling is used to determine exposure to airborne asbestos fibres, using a modified version of the NOHSC, (2005). Once asbestos exposure levels are determined, a level of action is to be taken in response to the recorded levels. These actions are provided in Section 3.11 of the SafeWork NSW (2022) and are presented below.

Table 3-4: Recommended Action Levels for Asbestos Exposures

Measured Fibre Concentration (% of Exposure Standard)	Control Measures	Recommended Action
<0.01 fibres/mL	No new control measures are necessary.	Continue with Control Measures.
≥0.01 fibres/mL but ≤ 0.02 fibres/mL	1) Review	Review Control Measures.
	2) Investigate	Investigate the cause.
	3) Implement	Implement controls to eliminate or minimise exposure and prevent further release.
>0.02 fibres/mL	1) Stop removal work	Stop removal work.
	2) Notify regulator	Notify the relevant regulator by phone followed by a written statement that work has ceased and the results of the air monitoring
	3) Investigate the cause	For example, conduct a thorough visual inspection of the enclosure (if used) and associated equipment in consultation with all workers involved with the removal work
	4) Implement controls to eliminate or minimise exposure and prevent further release	For example, extend the isolated/barricaded area around the removal area/enclosure as far as reasonably practicable until fibre levels are at or below 0.01 fibres/mL, wet wipe and vacuum the surrounding area, seal any identified leaks (e.g. with expanded foam or adhesive (cloth or duct) tape) and smoke test the enclosure until it is satisfactorily sealed.
	5) Do not recommence removal work until further air monitoring is conducted	Do no recommence until fibre levels are at or below 0.01 fibres/mL

It is important that the interpretation of these results is undertaken by an experienced person conversant with the Membrane Filter Method and its limitations. All results of air sampling must be recorded and filed. The results will be reported and made available to all employees.

Airborne Asbestos Monitoring will be carried out using the only internationally recognised sampling and analytical methodology, *The Membrane Filter Method for Estimating Airborne Asbestos Dust* [NOHSC: 3003 (2005)].

3.3.3 High Visibility Marker Layer

The marker layer shall consist of a bright coloured (e.g. orange) non-woven polyester mesh with a minimum density of approximately 150 grams per square metre (or equivalent). The marker layer must:

- Be easily recognisable within soils (i.e. bright orange in colour).
- Be permeable and durable as a long-term marker layer (i.e. > 150 grams per square metre).
- Be secured to the ground, to prevent movement.
- Maintain integrity during remedial/civil works such as capping layer insulation and prevent manual hand tools from penetrating.
- Be overlapped by a minimum 200mm at the edges between sheets/rolls.
- Overlay the finished capped area by a minimum of 0.5m on all sides.

Damage sustained to the marker layer during or following installation will be rectified by placement of a patch of marker layer atop the damage and including sufficient overlap for the shear strength of the underlying soil.

3.3.4 Capping Requirements

Following installation of the marker layer, a minimum 0.5 m thick capping layer will be placed over the top of the marker layer. Capping material should consist of site sourced suitable fill or imported material compliant with the requirements for material importation outlined in Section 3.3.6 below.

To reduce the potential for erosion or penetration of the capping layer, loose or unconsolidated sediments should not be used to create the cap.

Areas are to be finished with a layer of grass, mulch or concrete (for the pedestrian pathway) as is required for future land use. A schematic example of the required capping is shown in image below.

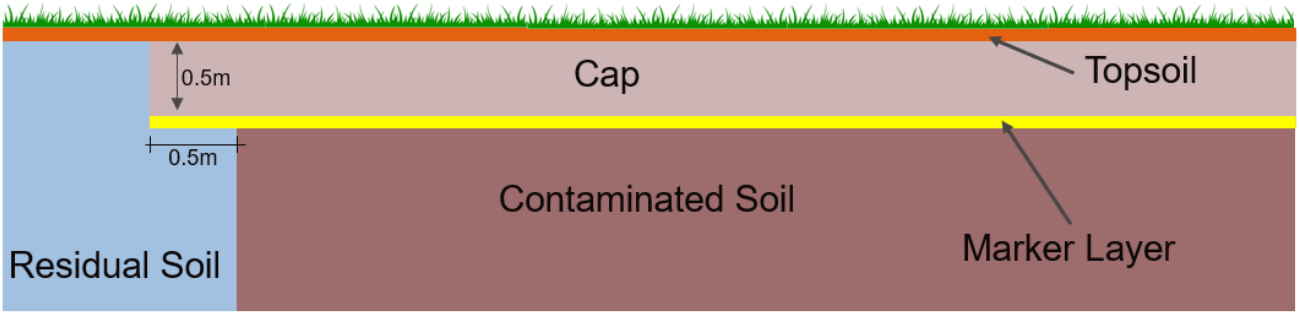

Image 1: Landscaped Area Capping Example

3.3.5 Capping Materials and Import Material Verification

The backfill material will be limited to:

- Onsite sourced material that has been demonstrated to be compliant with the proposed end land use. This would include natural material at the Site as well as fill material outside of the inferred asbestos-impacted area.
- Imported virgin excavated natural material (VENM).
- Imported excavated natural material (ENM).

- Other imported materials that have been certified as compliant with a NSW EPA issued resource recovery exemption.

Prior to the reuse of any onsite sourced material, the Site Manager shall provide PCC's Project Manager with documentation certifying that the site sourced material meets the definition of VENM or ENM. Noting PCC's preferred position is that certified imported VENM or ENM is the preferred backfill material.

All material importation should comply with the requirements outlined in the RAP.

3.3.6 Survey of Cap

A survey will be carried out by a suitably qualified and experienced contractor to document the lateral extent of the marker layer installed over retained in situ contaminated soils on-site. Subsequent surveys will be undertaken on completion of the capping layers and pavement to confirm the thicknesses of the various layer. A copy of the survey figures will be included in the validation report.

The survey should include:

- Site boundary.
- Lateral extents of cap and impacted media.
- Elevations at marker layer and surface cap, and thickness of cap.
- Material types used for capping layer in each area and marker layer material type.

The survey will be provided for inclusion into the validation report.

3.4 Remedial Works – Asbestos conduit

3.4.1 Decommissioning

The electrical services will be depowered and disconnected by a NSW Government Level 1 Accredited Service Provider (ASP) for constructing distribution network assets in NSW, prior to any disturbance. Specific instruction should be sought from Endeavour Energy on any decommissioning specific requirements of the electrical service.

3.4.2 Removal of Access and Inspection Pits

All near surface (i.e. <0.5m below surface level) infrastructure that contains asbestos, such as risers, access pits etc are to be removed by a licensed asbestos contractor. Removal works will comply with the requirements outlined in the SafeWork NSW (2022) *Code of Practice: How to Safely Remove Asbestos.*

The Site Manager shall commission a photographic record documenting the removal of the near surface infrastructure and immediate post removal condition of the affected area. The photographic records will be provided for inclusion in the Validation Report to PCC, as per Section 4.5 Asbestos Conduit Abandonment.

All asbestos waste generated form the removal works will be required to be disposed of as Special Waste to a suitably licensed landfill facility.

Asbestos air monitoring should be undertaken in accordance with the requirements and processes outlined in Section 3.3.3.

Following the removal works, and prior to removal of any plant/vehicles or equipment from the asbestos works area, an Asbestos Clearance Certificate will be issued. Asbestos clearance should be undertaken in

accordance with the requirements outlined in *Section 3.10 - Clearance inspection* SafeWork NSW (2022). Refer to Section 3.3.2.5 – Asbestos Clearance certificate.

3.4.3 In situ abandonment of asbestos conduit

Specific instruction should be sought from Endeavour Energy on removal of cabling prior to abandonment and should be conducted in accordance with Arcadis' Lighting Relocation Design Drawings (ARP6198-A536471).

Where pits have been removed and exposed ends of the conduit is present, the ends of the conduit will be sealed to prevent ingress of water prior to abandonment by a suitable means such as installation of a 0.5m plug inside the conduit using, for example, concrete slurry or waterproof expanding foam.

3.4.4 Survey

A survey will be carried out by a suitably qualified and experienced contractor to document the location and depth of the asbestos conduit retain onsite. Subsequent surveys will be undertaken of the completed surface level of the Site to provide details on the capping thickness present overlying the abandoned services. A copy of the survey figures will be included in the validation report.

The Site Manager shall commission a photographic record of the insitu footprint of the abandoned conduit and shall provide the photographic record for inclusion in the validation report as per Section 4.5 Asbestos Conduit Abandonment.

The survey should include:

- Site boundary.
- Lateral extents of asbestos conduits.
- RL details for the top of the conduit along regular intervals along the entire length.
- Description of the conduit configuration. i.e. single conduit, grouped set of six pipes etc.

4 Validation Method

Validation data are required to be collected to verify the effectiveness of the remediation works and document the condition of the site as being suitable for the proposed future uses. Validation activities to be undertaken for the remediation areas include the following:

- Documentation of installation of containment measures.
- Clearance sampling / asbestos clearance certificate for removal areas.
- Validation of imported fill material to demonstrate its suitability for use as a capping layer or in trenching works.
- Movement tracking of all soil and fill material onsite.
- Waste classification of excess materials requiring offsite disposal (if required).
- Surveys showing depth of contained material, height of capping layers and locations and depths of services onsite.
- A photographic record verifying the removal of the near surface infrastructure, sealing of the conduit and the insitu footprint of the abandoned conduit.

4.1 Excavation Validation

This will be applied to areas where asbestos contaminated soils were present, or where pit removal has occurred.

Visual inspection will be undertaken by the Licensed Asbestos Assessor to undertake an asbestos clearance inspection to allow reoccupation of the work area. If it suspected that AF/FA has been generated as a result of the removal works, or evidence come to light that AF/FA is present, soil sampling should be completed on the walls and base of the excavated area as part of the validation works. Soil samples will be collected at a rate in accordance with the NSW EPA (2022) *Sampling Design Part 1- Application* guidelines, based on the area of the excavation for asbestos analysis (500ml sample size).

This work is generally completed as part of the requirements of the Asbestos Clearance Certificate will be issued, prior to removal of asbestos work area access restrictions in a stagged approach.

4.2 Marker Layer Inspection

Visual inspection will be undertaken by the environmental Consultant to verify the installation of the marker layer and minimum 200mm overlap where required as per the capping requirements for the specific works area. Photographic records and a survey of the marker layer installation, including vertical and lateral extents by the Contractor will be retained for inclusion in the validation report.

4.3 Capping Layer Validation

Material to be used as a capping layer must be validated by the environmental consultant to be environmentally suitable, consisting of VENM, ENM, or material considered suitable for beneficial reuse via a resource recovery exemption issued by NSW EPA. Additionally, any onsite sourced capping layer material must not exceed the adopted site validation criteria for soils. Photographic records and a survey of the capping layer installation, which details the minimum 0.5m final thickness of the capping layer including the vertical and lateral extents by the Contractor, which will be retained for inclusion in the validation report.

4.4 Validation of Storage Areas

Upon completion of removal of any stockpiled contaminated material, in the event that interim stockpile storage areas were required to be used, validation of the stockpile excavation footprint will be performed by way of:

- Visual inspection and photographic log soil sampling if the stockpile was placed on heavy duty (minimum 200µm plastic) or geofabric.
- Visual inspection, photographic log and soil sampling if the stockpile was placed directly on soils.

The visual inspection will confirm no visible asbestos fragments are present in the top 100mm of soils, no foreign materials remain and that all stockpile materials have been removed. Photographic records will be prepared by the Environmental Consultant and retained for inclusion in the Validation Report.

Upon completion of the removal process and satisfactory visual inspection results validation soil sampling will be conducted within the stockpile footprint. Soil samples will be collected at a rate in accordance with the NSW EPA (2022) *Sampling Design Part 1- Application* guidelines, based on the area of the footprint and a minimum eight samples across a systematic grid for asbestos analysis (500ml sample size).

4.5 Asbestos conduit abandonment

Photographic evidence will be collected of all abandonment works associated with the asbestos conduits including removal works of pits, plug installation and depth of conduit below ground level. This will be supported with survey data of conduit location and depth, developed as per Section 3.4.4.

5 Site Validation Report

At the completion of remedial works, a site validation certificate will be prepared, will not be in accordance with but reference to the NSW EPA (2020). The Site validation certificate will include:

- An executive summary.
- The scope of reporting work undertaken.
- Site identification details.
- Information on the remedial works undertaken, including material tracking for material relocated onsite.
- Information on the estimated volume of waste taken offsite (including receipts from the receiving facility, and a reconciliation of waste receipts with remediation contractor waste disposal logs).
- The results of field work and laboratory analysis (if applicable).
- An assessment of field and laboratory quality assurance / quality control data (if applicable).
- Results of field inspection observations, including documentation of installed marker layers.
- Survey data of surface levels (RLs) to confirm adequate thickness of capping.
- Survey locations of retained asbestos services in situ including orientation and depth below surface.
- Non-conformances or deviations from the RAP and details of rectification of non-conformances register
- A figure showing the locations of asbestos impacted material.
- Advice on site suitability for the proposed land use.
- Information on ongoing site monitoring requirements, including any data gaps and linkage to the proposed LTEMP; and
- Conclusions.

6 Long Term Environmental Management Plan

At the completion of remedial works, a legally enforceable long term EMP should be prepared to outline the measures to eliminate the risk to human health or the environment from the buried contaminated material onsite. The EMP will detail the management strategies required to ensure the long-term integrity of the marker and capping layers. For example, the EMP will specify the requirements for routine inspection of the capping layer, breaches to the containment system and management controls for intrusive works around and below the marker layer.

The EMP will be prepared following the completion of the Validation Report for the Site and will include, as a minimum:

- Statement of objectives.
- Outline of on-going contamination concerns that require management under the EMP.
- A survey plan showing extent and distribution of contamination.
- A survey showing capping thicknesses and location of services.
- Outline of roles and responsibilities under the EMP.
- Description of environmental control measures including environmental monitoring and reporting requirements.
- Description of management controls (including site-specific asbestos management protocols).
- Corrective or contingency measures in the event of a breach.
- Description of health and safety procedures for particular works.
- Inclusion of a mechanism for legal enforcement of the EMP
- Requirements for the review and amendments to the EMP
- Timeframe for EMP implementation and review period.
- Procedures for intrusive works for different penetration of cap scenarios:
    - Penetrate the cap but not the marker layer, which may include a simple capping reinstatement to original specification.
    - Penetrate the marker layer and disturb underlying impacted soil, which may include appropriate material management in addition to capping reinstatement.

7 Conclusions

Based on Arcadis’ assessment of the information presented in the available historical contamination assessment reports, Arcadis considers that the remedial goal can be achieved, and the Site made suitable for the proposed land use, subject to:

- The implementation of the strategies and methodologies set out in this RAP Addendum.
- Preparation of a site validation report.
- Preparation and implementation of a long-term environmental management plan that is legally enforceable.

This report must be read in conjunction with the Limitations in Section 8.

8 Limitations

The findings of this report are based on the Scope of Work described in this report. Arcadis performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental profession. That standard of care may change, and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

No warranties, express or implied, are made. Subject to the Scope of Work, Arcadis' assessment is limited strictly to identifying typical environmental conditions associated with the subject property.

While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Arcadis, or developments resulting from situations outside the scope of this project.

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Information from samples collected by Arcadis or historical data reviewed relating to soil, groundwater, waste, air or other matrix conditions referred in this document is considered to be accurate at the date of issue. Surface, subsurface and atmospheric conditions can vary across a particular site or region, which cannot be wholly defined by investigation. As a result, it is unlikely that the results and estimations presented in this report will represent the extremes of conditions within the Site that may exist. Subsurface conditions including contaminant concentrations can change in a limited period of time and typically have a high level of spatial heterogeneity.

From a technical perspective, there is a high degree of uncertainty associated with the assessment of subsurface, aquatic and atmospheric environments. They are prone to be heterogeneous, complex environments, in which small subsurface features or changes in geologic conditions or other environmental anomalies can have substantial impact on water, air and chemical movement.

Arcadis' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report. It is possible that additional testing and analysis might produce different results and/or different opinions. Arcadis has limited the scope as detailed herein, that which was agreed upon with the client.

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Arcadis Australia Pacific Pty Ltd
On the Lands of the Gadigal
Level 16
580 George Street
Sydney, NSW 2000
Tel: (02) 8907 9000
www.arcadis.com