

# Aerotropolis Remedial Action Plan

## Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

<b>Project number</b>	WSA-200-SBT
<b>Document number</b>	SMWSASBT-CPG-SWD-SW000-GE-RPT-040527
<b>Revision date</b>	5 June 2023
<b>Revision</b>	A04

### Document approval

A01	2/05/2023	[REDACTED]	[REDACTED]	-
A02	12/05/2023	[REDACTED]	[REDACTED]	Update to address Site Auditor comments
A03	19/05/2023	[REDACTED]	[REDACTED]	Update to amend remediation vol. and import procedure
A04	05/06/2023	[REDACTED]	[REDACTED]	Updated to include Sydney Metro landuse plan



## Executive Summary

Sydney Metro has engaged the CPB Contractors Ghella Joint Venture (CPBG) for the design and construction of the Station Boxes and Tunnelling Works (SBT Works) of the Sydney Metro Western Sydney Airport project (the Project).

The SBT Works involve the construction and operation of a new 23 km metro rail line from the existing Sydney Trains suburban T1 Western Line (at St Marys) in the north and the Aerotropolis (at Bringelly) in the south. The Project includes tunnels and civil structures, including a viaduct, bridges, and surface and open-cut troughs between the two tunnel sections.

The Aerotropolis Station site ("the SBT Site") is to be redeveloped for open space and commercial land use. Commercial areas will predominately be covered in hard pavements (i.e. buildings, roads and parking) with minimal soft landscaping. This type of land use is analogous with a commercial/industrial land use as defined in Schedule B7, Section 3.2.4 of the ASC NEPM.

Open Space areas within the SBT Site include the Central Park and the western end of a Pedestrian only street. The ASC NEPM defines open space land use as parks, playgrounds, playing fields and recreational areas which are fully accessible to the general public.

CPG has engaged Tetra Tech Major Projects Pty Ltd (TTMP) to provide geotechnical, hydrogeological and contaminated land services associated with the design and construction of the SBT Works.

## Detailed Site Investigation Findings

TTMP prepared a Detailed Site Investigation (DSI) for the SBT Site, which conceptualised contamination impact into four main areas based on site history, ground conditions, and analytical data. These areas are shown in the following figure and included three areas of Low Impact (i.e. North, South and West) and a Medium Impact Area. These areas are shown in the figure on the following page.

### Low Impact Areas

Soil materials in the Low Impact Area North, South and West reported contaminant concentrations which were below the adopted human health and ecological commercial/industrial guidelines, and Airport Regulations.

Materials in the Low Impact Areas are not considered to pose unacceptable risks to human health or the environment for a commercial/industrial land use. As such, it is considered that remediation is not required for the Low Impact Areas.

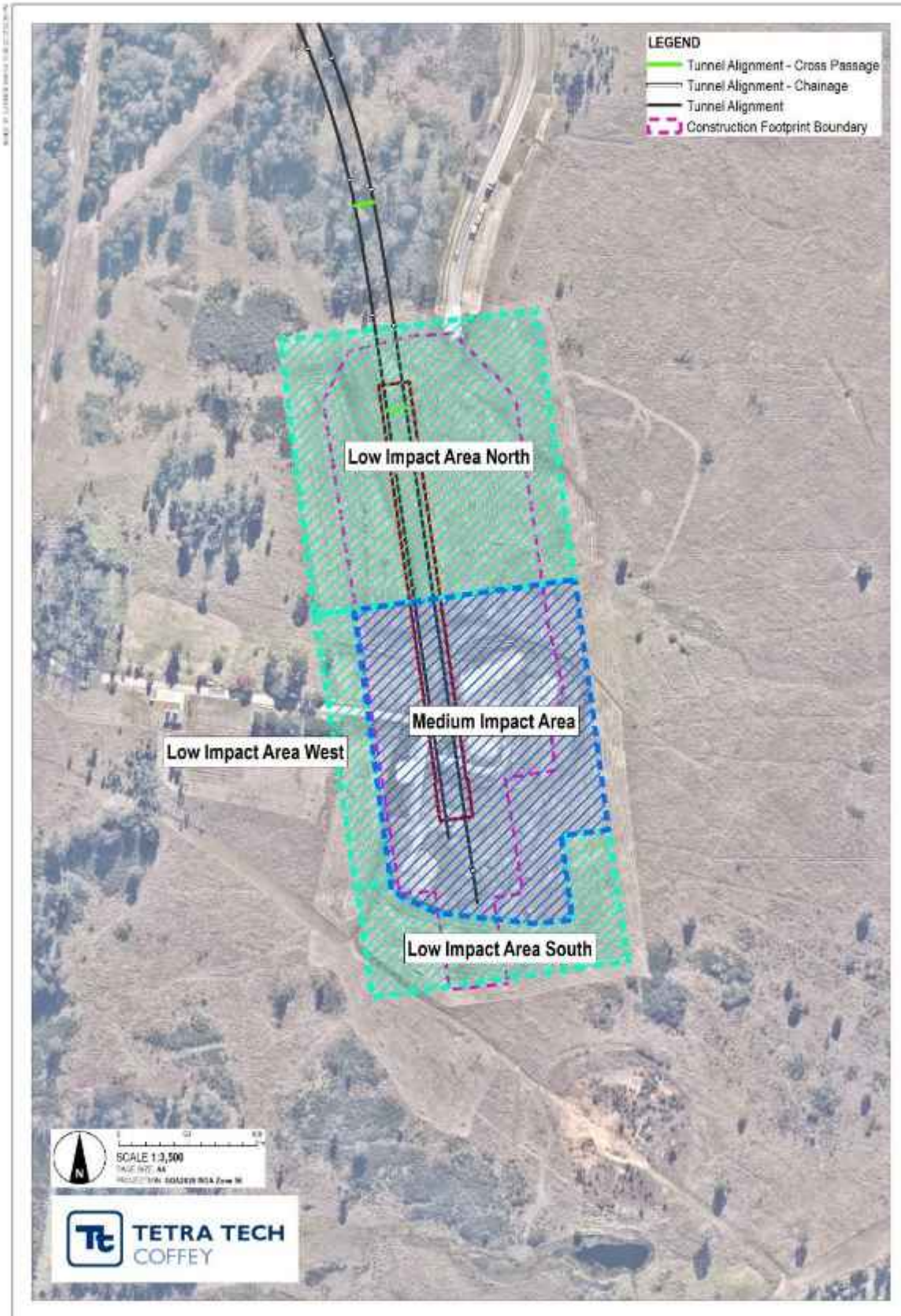
### Medium Impact Area

Fill/topsoil materials within the Medium Impact Area should be considered as containing asbestos which may pose potentially unacceptable health risks for a commercial and open space land use without management/remediation.

In the Medium Impact Area, PFAS impacted soil has been reported in multiple locations associated with the historical use of the SBT Site as a Defence radar receiving facility, which included a fire suppressant system and secondary sources including a former septic system and contaminated soil stockpile. PFAS impacted soil extends beyond the eastern boundary of the Aerotropolis site.

The location and extent of the Low and Medium Impact Areas relative to the construction footprint boundary and SBT Works are illustrated on the figure on the following page.





Aerotropolis Low and Medium Impact Areas



Elevated concentrations of PFAS are predominately located within the top 1 m of soil material in these Medium Impact Area. PFAS in soil within the footprint of the Aerotropolis site is considered to be 'low risk' if it is sealed beneath a low permeable hardstand. However, if improperly managed, PFAS in soil at the SBT Site poses a potential unacceptable risk to future off-site human receptors (residential receptors), groundwater and surface water receptors, and terrestrial and aquatic ecological receptors.

PFAS has been found in groundwater which exceeds the adopted human health guidelines (drinking water guidelines) and ecological guidelines (99% species protection). PFAS has also been found to be migrating off the SBT Site via surface water in previous investigations with concentrations which exceed 95% species protection. PFAS has also been confirmed to be present in Thompsons Creek. Probable off-site sources of PFAS have also been identified in previous investigations.

Consideration to PFAS in soil, groundwater, and surface water beyond the boundary of the SBT Site was outside the scope of the DSI completed by TTMP.

The DSI concluded that the SBT Site can be made suitable, as per the requirements of *State Environmental Planning Policy (Resilience and Hazards) 2021*, for the proposed station box.

Remediation of the Medium Impact Area (Remediation Area) is required to make the SBT Site suitable for commercial and open space land use on account of asbestos in fill materials. Remediation of PFAS impact in soil the Medium Impact Area is also considered to be required to make the SBT Site suitable for commercial and open space land use and to reduce potential risks to off-site receptors.

Accordingly, TTMP have recommended the development of a Remedial Action Plan (RAP) for the Medium Impact Area of the SBT Site.

## Remediation Strategy

The remediation strategy required by Sydney Metro to mitigate risks from asbestos and PFAS materials is the removal of contamination sources such that the SBT Site is made suitable for commercial and open space land use as per the configuration of the SBT Site shown in Figure 3, Appendix 1.

Fill material in the Remediation Area<sup>1</sup> potentially contains asbestos and is to be removed from the SBT Site. At the time of preparing this RAP fill materials from the Medium Impact Area have been stripped and either disposed off-site to an appropriately licenced waste management facility or retained on-site in a managed stockpile for off-site disposal to an appropriately licenced waste management facility.

Reduction in flux of PFAS migrating off-site via surface and groundwater pathways is expected to be achieved through a combination of removal of PFAS-impacted soil, introduction of hardstand pavement and stormwater drainage in commercial land use areas that will substantially reduce infiltration through soils containing residual levels of PFAS.

Based on the implementation of this RAP and the intended land use of the SBT Site, TTMP considers that potential risks from asbestos and PFAS contamination can be adequately mitigated to make the SBT Site suitable for commercial and open space land use as shown in Figure 3, Appendix 1.

<sup>1</sup> The area of the SBT Site requiring remediation (Remediation Area) and the subject of this RAP is the Medium Impact Area and the strip of land between the eastern most boundary Medium Impact Area and the SBT Boundary. Remediation is not required in the Low Impact Areas.



## Table of contents

1. Introduction and Background .....	10
1.1. Project Overview .....	16
1.2. Requirements to Prepare a RAP .....	17
2. Objectives and Scope of Work .....	21
3. Technical and Regulatory Framework .....	22
4. SBT Site Information .....	23
4.1. SBT Site Identification .....	23
4.2. Site Description .....	23
4.2.1. Removal of Topsoil and Fill Materials .....	24
5. Environmental Setting and Site History .....	24
5.1. Environmental Site Setting Summary .....	24
5.2. Site History Summary .....	25
6. Aerotropolis Precinct Plan and Master Plan .....	26
7. Pre-Construction Site Conditions .....	27
8. Site Characterisation .....	29
8.1. Existing Ground Conditions .....	29
8.2. Contamination in Soil .....	30
8.2.1. Fill Materials .....	30
8.2.2. Natural Soil Materials .....	32
8.3. Groundwater and Surface Water .....	35
8.4. Conceptual Site Model .....	35
8.4.1. Contamination Sources .....	35
8.4.2. Receptors .....	36
8.4.3. Exposure Scenario & Risk Evaluation Discussion .....	36
8.4.4. Refined CSM .....	36
9. Remediation Objective .....	40
10. Remediation Options .....	40
11. Remediation Strategy .....	41
11.1. Overview .....	41
11.2. Remediation Criteria .....	41
11.2.1. Surface Water and Groundwater .....	41
11.3. Project Approvals .....	42
11.4. Construction Earthworks .....	42
11.5. Materials Requiring Remediation .....	43
11.5.1. Fill Materials in Medium Impact Area .....	43
11.5.2. Materials with PFAS Requiring Remediation .....	44
11.6. Bulk Excavation with the Station Box .....	44



11.7. Material Movement in Medium Impact Area .....	44
11.8. Asbestos Management Plan.....	44
11.9. Construction Water Management.....	44
11.10. Waste Management .....	45
12. Validation of Remediation .....	46
12.1. Validation Objective.....	46
12.2. Data Quality Objectives and Data Quality Indicators.....	46
12.3. Validation Methodology .....	46
12.3.1. Fill Materials in Remediation Area .....	46
12.3.2. PFAS Remediation Areas .....	47
12.3.3. Sampling Methods .....	47
12.3.4. Survey of Remediation Areas .....	48
13. Imported Material .....	48
13.1.1. Overview .....	48
13.1.2. Visual Inspections .....	49
13.1.3. Sampling and Field Screening .....	49
13.1.4. Sample Storage and Preservation .....	50
13.1.5. Sampling Equipment Decontamination Procedures.....	50
13.1.6. Equipment Calibration.....	51
13.1.7. Field Quality Control Samples.....	51
13.1.8. Laboratory Analysis.....	51
13.1.9. Quality Assurance and Control .....	52
13.1.10. Imported Material Assessment Reporting .....	53
14. Validation Report .....	53
15. Conclusion .....	54



## Annexures

<b>APPENDIX 1</b>	Figures.....	55
<b>APPENDIX 2</b>	Precinct and Master Plan.....	56
<b>APPENDIX 3</b>	Remediation and Assessment Criteria.....	60
<b>APPENDIX 4</b>	Geotechnical Cross-Section.....	67
<b>APPENDIX 5</b>	Relevant Summary Tables of Analytical Results (DSI).....	68
<b>APPENDIX 6</b>	Additional Data Post Commencement of Construction.....	71
<b>APPENDIX 7</b>	Environment Procedures.....	89
<b>APPENDIX 8</b>	Erosion and Sediment Control Plan (ESCP).....	90
<b>APPENDIX 9</b>	Temporary Drains and Sediment Pond.....	91
<b>APPENDIX 10</b>	Data Quality Objective and Data Quality Indicators.....	92
<b>APPENDIX 11</b>	Technical Memorandum.....	101
<b>APPENDIX 12</b>	DSI Summary.....	102

## Abbreviations

Abbreviation	Definition
ACM	Asbestos-Containing Material
AEC	Area of Environmental Concern
AHD	Australian Height Datum
AMP	Asbestos Management Plan
ARC	Australian Reinforcing Company
ASS	Acid Sulfate Soils
ATM	Airport Terminal Station
BTEXN	Benzene, toluene, ethylbenzene, xylene and naphthalene
BSF	Bringelly Services Facility
CEMP	Construction Environmental Management Plan
CMF	Claremont Meadows Services Facility
CPBG	CPB Ghella Joint Venture
DGB	Densely Graded Base
DP	Deposited Plan
DSI	Detailed Site Investigation
EIS	Environmental Impact Statement
ENM	Excavated Natural Materials
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ESCP	Erosion and Sediment Control Plan
GMP	Groundwater Monitoring Plan
LNAPL	Light Non-Aqueous Phase Liquid
LOR	Limit of Reporting
MIP	Membrane Interface Probe
NATA	National Association of Testing Authorities
OCP/OCP	Organochlorine / organophosphate pesticides
PAC	Potential Area of Concern
PACM	Potential Asbestos Containing Material



Abbreviation	Definition
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PCE	Tetrachloroethene
PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
PID	Photo-Ionisation Detector
POEO	Protection of the Environment Operations
RAP	Remedial Action Plan
RL	Reduced Level
SGAR	Supplementary Groundwater Assessment Report
SSRA	Site-Specific Risk Assessment
SSSTOM	Stations Systems Trains and Operations and Maintenance
STM	St Marys Station Site (the STM site)
SWMP	Soil and Water Management Plan
TCE	Trichloroethene
TRH	Total Recoverable Hydrocarbons
TTMP	Tetra Tech Major Projects Pty Ltd
UST	Underground Storage Tank
VENM	Virgin Excavated Natural Materials
WHS	Work Health and Safety
WSI	Western Sydney International

## 1. Introduction and Background

Sydney Metro has engaged the CPB Ghella Joint Venture (CPBG) for the design and construction of the Station Boxes and Tunnelling Works (SBT Works) of the Sydney Metro Western Sydney Airport project (the Project).

The SBT Works involves the construction and operation of a new 23 km metro rail line from the existing Sydney Trains suburban T1 Western Line (at St Marys) in the north and the Aerotropolis (at Bringelly) in the south. The Project includes tunnels and civil structures, including a viaduct, bridges, and surface and open-cut troughs between the two tunnel sections. Figure A overleaf shows the proposed alignment and key features of the Project and the approximate location of the Aerotropolis SBT project site ("the SBT Site"). The boundary of the SBT Site is shown in Figure 1, Appendix 1.

CPBG has engaged Tetra Tech Major Projects Pty Ltd (TTMP) to provide geotechnical, hydrogeological and contaminated land consultancy services associated with the design and construction of the SBT Works.

TTMP has prepared the following documents for the SBT Site which were approved by the Site Auditor:

- Aerotropolis Detailed Site Investigation, SMWSASBT-CPG-SWD-SW000-GE-RPT-040515, 13 November 2022, Rev A06 (TTMP, November 2022) ("the DSI").
- Aerotropolis Remedial Action Plan, SMWSASBT-CPG-SWD-SW000-GE-RPT-040523, 16 November 2022, Rev A03 (TTMP, November 2022) ("the 2022 RAP").

Based on the DSI the Aerotropolis Site was divided into four main areas which are shown in Figure B which includes the Medium Impact Area (roughly the central portion of the SBT Site), Low Impact Area North, Low Impact Area South and Low Impact Area West. The basis for the determination of these areas is included in the DSI report.

Contamination which requires management through a remedial action plan (RAP) is associated with the Medium Impact Area, and in summary includes:

- asbestos containing materials (ACM) asbestos fines / fibrous asbestos in fill materials. The DSI concluded that fill materials and disturbed natural ground within the Medium Impact Area should be considered as potentially containing asbestos.
- PFAS impact in soil has been reported in samples collected from multiple locations associated with the historical use of the SBT Site as a former Defence radar receiving facility containing a fire suppressant system, and secondary sources including a former septic system and contaminated stockpile. PFAS source areas are shown in Figure C. PFAS impact in soil extends beyond the eastern boundary of the Aerotropolis site. Elevated concentrations of PFAS are predominately located within the top 1 m of soil material in these areas.

Completion of the Aerotropolis Metro Station is outside the scope of the SBT Works and will be completed under a Stations Systems Trains and Operations and Maintenance (SSTOM) works package.

The specific layout of the proposed development post construction of the SBT Works was not available at the time of preparation of the DSI and the 2022 RAP. It was assumed that the Aerotropolis Station site would be predominately covered in hard landscaping (train station, buildings and carparking) with minimal soft landscaping (e.g. small garden bed in carpark with trees or shrubs). This type of land use is analogous with a commercial/industrial land use as defined in Schedule B7, Section 3.2.4 of the ASC NEPM.



Figure A: Overview of SBT Works

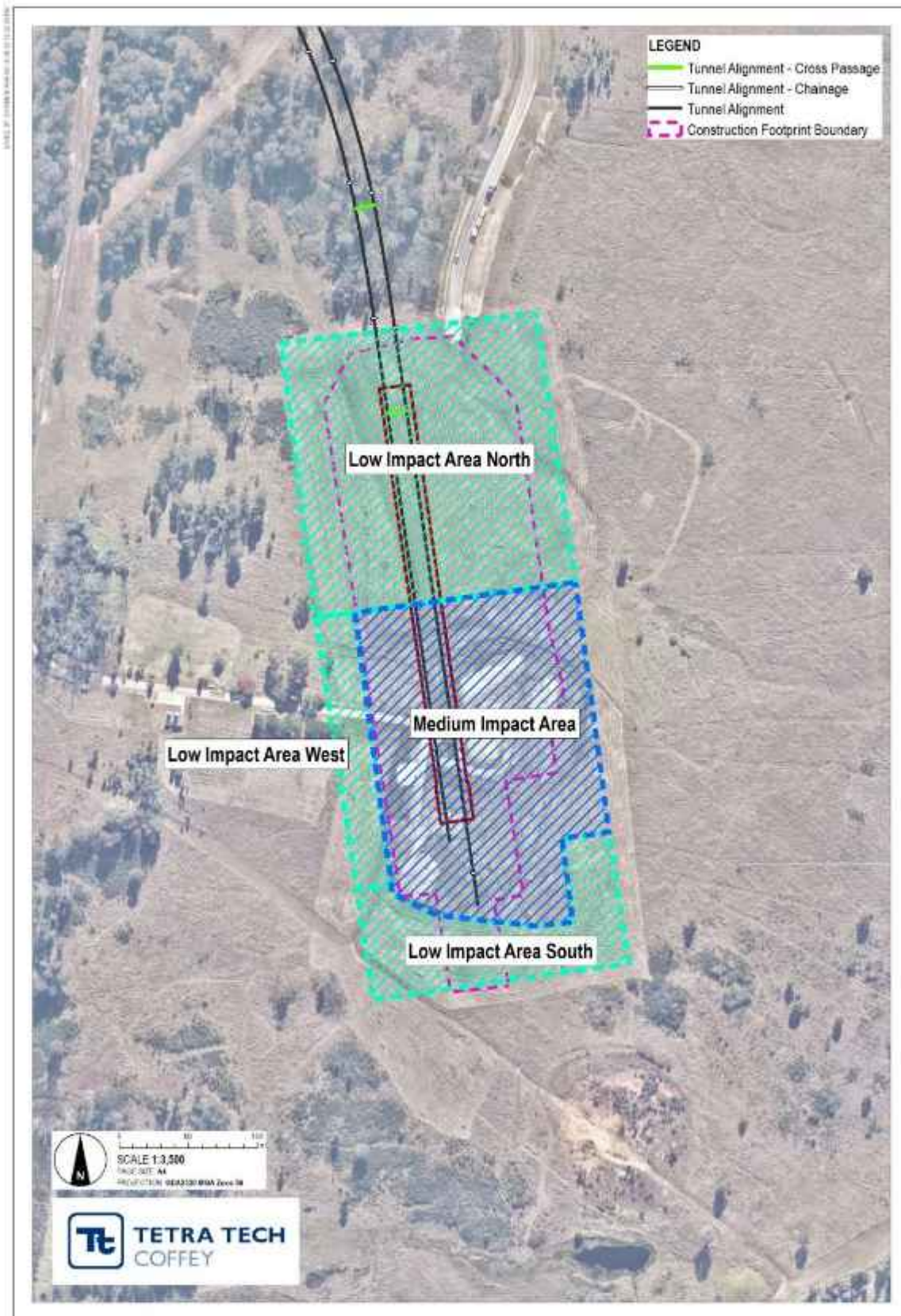


Figure B: Aerotropolis Impact Areas: Medium Impact Area is shown in blue hatching

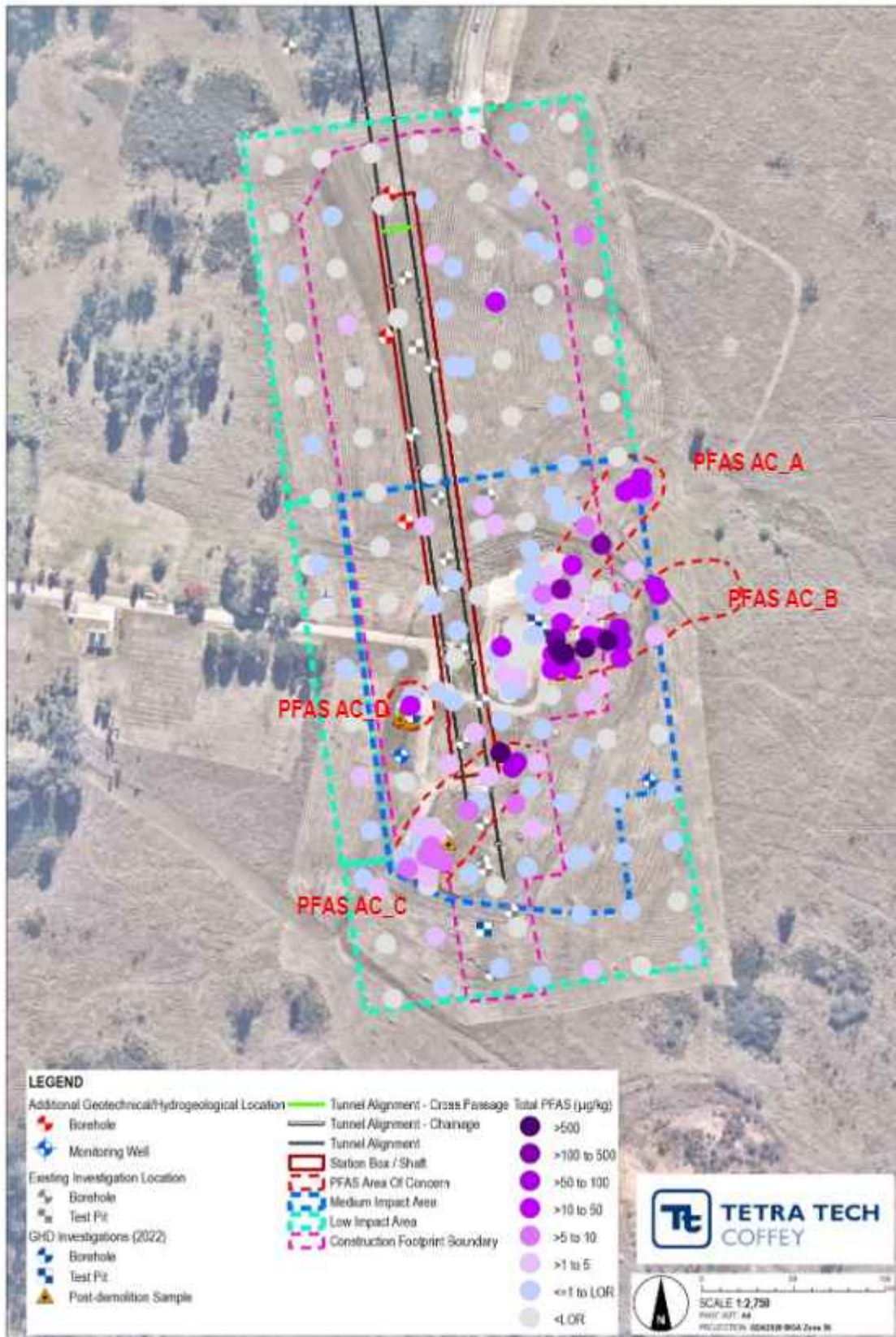


Figure C PFAS Areas of Concern (AC) in the Medium Impact Area

In the 2022 RAP, TTMP considered two feasible remediation strategies for the SBT Site with consideration to programme and cost constraints which included:

- removal of impacted sources (i.e. removal of contaminated soil) and disposal to landfill.
- on-site containment of contaminant sources to break source-pathway-receptor linkages.

Based on an option assessment, on-site contaminant beneath hard landscaping was considered as the preferred remediation strategy for the 2022 RAP. This was based on consideration of the remediation hierarchy in the ASC NEPM, and other project requirements including but not limited to programme and cost. Implementation of the 2022 RAP required the development and implementation of a Long-Term Environmental Management Plan (LTEMP) and permanent cover layer (hardstand or equivalent).

Subsequent to the approval of the 2022 RAP by the Site Auditor, Sydney Metro advised in a meeting on the 31 January 2023 that the 2022 RAP was not accepted by Sydney Metro based on the requirements of the Interface Agreement between Sydney Metro and Western Parkland City Authority (WPCA). It is understood that under the Interface Agreement, the SBT Site is to be made suitable for commercial land use without any encumbrances such as the requirement for a LTEMP to be implemented or permanent cover layer being constructed.

Accordingly on-site containment of contaminant sources as a remedial strategy could no longer be considered a feasible remediation strategy. As such the default remediation strategy for the SBT Site will be the removal of contaminated sources.

Subsequent to the meeting on the 31 January 2023, Sydney Metro (WPCA) provided the Master Plan for the Aerotropolis Precinct on the 10 March 2023 which is shown in Appendix 2. From the Master Plan and subsequent discussions with Sydney Metro it understood that land use within the SBT Site will include open space and commercial land use.

CPBG requested TTMP to prepare a new RAP for the Medium Impact Area to make the SBT Site suitable for the commercial and open space land uses shown in Figure 3, Appendix 1. Figure 3, Appendix 1 incorporates landscape areas provided by Sydney Metro on the 24 May 2023 in DRG No. SWMSAEDS-SMD-AEC-AT-DRG-100200, Rev D, 12 December 2022 (included in Appendix 2.3) ("Aerotropolis Architectural Design Plan").

***This RAP has been prepared to address this requirement and applies to the SBT Site which shown in Figure 3, Appendix 1. Under this RAP remediation activities are to be undertaken within the 'Remediation Area'<sup>2</sup> shown in Figure D and Figure 3, Appendix 1.***

The RAP has been prepared based on the following:

- the configuration of the SBT Site involving commercial and open space shown in Figure 3, Appendix 1.
- the existing conditions of the SBT Site at the time of preparing this RAP.
- instructions which have been issued to CPBG by Sydney Metro during construction in relation to the removal of topsoil/fill material from the Medium Impact Area.

This RAP supersedes the 2022 RAP.

<sup>2</sup> The area of the SBT Site requiring remediation (Remediation Area) and the subject of this RAP is the Medium Impact Area and the strip of land between the eastern most boundary Medium Impact Area and the SBT Boundary. Remediation is not required in the Low Impact Areas.



Figure D SBT Site, Medium Impact Area and Remediation Area

## 1.1. Project Overview

The SBT Works involves the construction and operation of a new 23 km metro rail line from the existing Sydney Trains suburban T1 Western Line (at St Marys) in the north and the Aerotropolis (at Bringelly) in the south. The Project includes tunnels and civil structures, including a viaduct, bridges, and surface and open-cut troughs between the two tunnel sections. Figure A shows the proposed alignment and key features of the Project and the approximate location of the SBT Site.

The SBT Works are divided into two parts:

- SBT North: STM site to Orchard Hills Station. St Marys Station is an existing heritage-listed suburban rail station. Orchard Hills is a new station for the Sydney Metro line and will include the portal dive structure. Claremont Meadows Services Facility (CMF) is included along this alignment.
- SBT South: Airport business park dive structure to the Western Sydney Airport Aerotropolis station. This section of work is largely greenfield, with construction both on and off-airport land. The Airport Terminal Station (ATM) and Bringelly Services Facility (BSF) are included along this alignment.

Key elements on the SBT Works include:

- Two sections of twin tunnels with a combined length of approximately 9.8 km, plus associated portal structures. This includes one section from St Marys to Orchard Hills and the other under Western Sydney International (WSI) airport to the new Aerotropolis Station.
- Excavations at either end to enable trains to turn back, and stub tunnels to enable future extensions.
- Station box excavations with temporary ground support for four new Metro stations at St Marys, Orchard Hills, Airport Terminal and Aerotropolis (the SBT Site).
- Excavations for two intermediate services facilities, one in each of the tunnel sections at Claremont and Bringelly.



## 1.2. Requirements to Prepare a RAP

Table 1 summarises Project documentation relevant to the preparation of this RAP.

Table 1: Requirements and Recommendations for a RAP for the SBT Site

Document	Comment
Environmental Impact Statement (EIS) and Submissions Report	The Contamination Technical Paper of the EIS and Submissions Report included a mitigation measure (SC3) for off-airport areas regarding the preparation of a RAP where additional data review and detailed site investigation confirmed that contamination would require remediation.
Infrastructure Approval	Condition E93 of Sydney Metro Western Sydney Airport – Conditions of Approval (SSI 10051) requires that should remediation be required to make land suitable for the final intended land use, a RAP must be prepared and include measures to remediate the contamination at the SBT Site, to ensure the SBT Site will be suitable for the proposed use when the RAP is implemented.
Design and Construct (D&C) Deed	The Project D&C Deed <sup>3</sup> includes a provision for the preparation of RAPs (Clause 20.20) prior to commencing any excavation activities (except in relation to Preliminary Works <sup>4</sup> ) in respect of each Detailed Site Investigation. Table 2 overleaf outlines the Deed Requirements in relation to preparing RAPs.
Technical Memorandum (refer to Appendix 11)	<p>Based on the GHD investigation<sup>5</sup> and available data from the TTMP DSI investigation an assessment of the AEC sites was undertaken in TTMP (2022) Technical Memorandum: Soil Results for Aerotropolis, SMWSASBT-CPG-SWD-SW000-GE-MEM-040551, 4 August 2022 (Technical Memorandum) (refer to Appendix 11).</p> <p>The Technical Memorandum provided a summary of the SBT Site investigation data for Aerotropolis<sup>5</sup> (at the time of writing), and consideration as to whether the AECs should continue to be considered Medium and/or High risk with regards to contamination and the Project. The Technical Memorandum resulted in the removal AEC47 and the re-drawing of boundaries for AEC46. The re-drawn boundaries are shown in Figure B. Further information on the basis for the revision to the boundaries is included in the Technical Memorandum.</p> <p>The Technical Memorandum included controls to be completed for the preparatory works in Low Impact Areas, and included a recommendation for no disturbance to the Medium Impact Area pending completion of the DSI.</p>
Detailed Site Investigation	TTMP recently prepared a DSI in October 2022, a summary of which is provided in Section 7. The DSI identified contamination which triggered the requirement to prepare a RAP for the Medium Impact Area (Remediation Area) in accordance with NSW guidance (refer to Section 3).
Remedial Action Plan 2022	TTMP recently prepared a RAP in October 2022 endorsed by the Site Auditor. On-site contaminant beneath hard landscaping was considered as the preferred remediation strategy in

<sup>3</sup> Sydney Metro - Western Sydney Airport Station Boxes and Tunnelling Works Design and Construction Deed Contract No: WSA-200-SBT

<sup>4</sup> Preliminary Works means works required for the initial establishment of the Construction Site including site clearance works, demolition, installation of services, de-vegetation, erection of work compounds and site offices, fencing to site boundaries and any Archaeological Clearance Works.

<sup>5</sup> GHD (2022) Sydney Metro Western Sydney Airport – Aerotropolis Station Box Compound – Entry Contamination Report, 215 Badgerys Creek Road, Bringelly, 9 June 2022 (GHD Investigation).

Document	Comment
	the RAP. This RAP was subsequently rejected by Sydney Metro on the basis that it would require the implementation of a LTEMP and permanent cover layer (hardstand or equivalent). Accordingly the remedial strategy which needs to be implemented at the SBT Site is source removal to make the SBT Site suitable for commercial use and open space based on the configuration of the SBT Site shown in the WPCA Master Plan.
Master Plan	Sydney Metro (WPCA) provided the Master Plan for the Aerotropolis Precinct on the 10 March 2023 which is shown in Appendix 2. The Master Plan shows that the SBT Site is to include commercial and open space land use. Open Space areas within the SBT Site include the Central Park and the western end of a Pedestrian only street. This RAP has been prepared based on this configuration of land uses.
Aerotropolis Architectural Design Plan	Sydney Metro provided Drawing DRG No. SWMSAEDS-SMD-AEC-AT-DRG-100200, Rev D, 12 December 2022 (included in Appendix 2.3) on the 24 May 2023 which shows additional open space / landscaped areas. These additional open space areas are shown in Figure 3, Appendix 1 and have been considered in the preparation of this RAP.
Western Sydney Aerotropolis Precinct Plan	<p>The <i>Western Sydney Aerotropolis Precinct Plan</i>, March 2022 (NSW Government, 2022) ("the APP") shows the produced land use within at in the immediate vicinity of the Aerotropolis Station is 'commercial centre – mixed use' (refer to Appendix 2). Commercial centre – mixed use is defined in the APP as "Mixed use environment focused on employment generating land uses, leveraging off metro/mass transit. Residential land uses provide density but do not undermine employment capacity."</p> <p>Sydney Metro has provided CPBG with the instruction that the SBT Site is to be made suitable for commercial land use. This RAP has been prepared to address this requirement as well as the open space areas within the SBT Site which are shown in the Master Plan.</p>

This RAP has been prepared at the request of CPBG to meet the objectives outlined in Section 2.

Table 2: Deed Requirements in Relation to Preparing RAPs.

Deed Item	Included in RAP	RAP Reference
(a) The SBT Contractor must prepare and submit to the Principal's Representative and the Independent Certifier a Remediation Action Plan in respect of each Detailed Site Investigation performed in accordance with clause 12.19 prior to commencing any excavation activities (except in relation to Preliminary Works).	✓	This document
(b) Except in relation to the Remediation Action Plan in respect of Orchard Hills East Station, the SBT Contractor may not submit a Remediation Action Plan under this clause unless and until the Detailed Site Investigation report for the relevant area has been submitted to the Principal's Representative and has not been the subject of a notice under clause 12.19(f)(ii) within the time period specified in clause 12.19(f)(ii) (or clause 12.19(g)) as applicable.	Note 1	Note 1
(c) Each Remediation Action Plan must:		
(i) describe the nature and extent of Contamination based on the Detailed Site Investigation, the Information Documents and any other relevant information which is necessary to characterise the risk to the construction, operation and maintenance of Sydney Metro – Western Sydney Airport;	✓	Section 8
(ii) describe the manner in which the SBT Contractor will Remediate Contamination within the proposed areas of excavation and/or disturbance;	✓	Section 9 to Section 15
(iii) include a detailed risk assessment to determine and describe the requirements for Remediation of Contamination of land (including soil, groundwater, ground gas and vapour) within the Construction Site or Extra Land surrounding the areas of proposed excavation or disturbance with respect to potential exposure scenarios, including but not limited to migration of Contamination via groundwater, ground gas and odour into the areas of excavation or disturbance;	✓	Note 2
(iv) present a preferred Remediation option based on:	✓	Section 10
(A) whole-of-life costs;	✓	Section 10
(B) to the extent practicable, maintaining the Overall D&C Program;	✓	Section 10
(C) benefits (as far as is practicable based on available infrastructure design information); and	✓	Section 10
(D) compliance with this deed;	✓	Section 10
(v) define what will constitute Remediation Practical Completion of the Remediation;	✓	Section 14
(vi) be prepared in accordance with Law, Approvals, applicable Codes and Standards, the lawful requirement of any Authority, Good Industry Practice, all guidelines made or approved by the EPA, the National Remediation Framework, the Human Health and Environment Risk Assessment and any other requirements of this deed;	✓	Section 3
(vii) be reviewed and approved by a Certified Contaminated Land Consultant;	✓	Refer to cover page.
(viii) be reviewed and endorsed by an Accredited Site Auditor;	Note 1	N/A
(ix) be accompanied by an Interim Site Audit Advice prepared by the Accredited Site Auditor when submitted to the Principal's Representative and the Independent Certifier	Note 1	N/A
(x) include details of any Remediation completed during the performance of any Preliminary Works; and	Note 3	N/A
(xi) consider and plan to mitigate the migration of Contamination from the Construction Site.	N/A	N/A

Deed Item	Included in RAP	RAP Reference
(d) In addition to the requirements set out in clause 1.1(c) and without limiting clause 12.20(j), each Remediation Action Plan must contain sufficient detail and justification to enable the determination of any Agreed Remediation Scope, including:		
(i) an ACC Classification and Excavation Map, being a detailed map or maps, drawn to a practical scale of the relevant area the subject of a Remediation Action Plan that accurately identifies:	✓	Note 4
(A) the location of any samples that have been taken by and/or made available to the SBT Contractor, including the Detailed Site Investigation samples or any relevant information provided to the SBT Contractor in the Information Documents; and	✓	Section 7, 8 Appendix 1 Appendix 5
(B) a detailed mapping of remaining Solid Waste and its respective waste classification in accordance with the Waste Classification Guidelines and the relevant provisions of the POEO Act including resource recovery exemptions and orders across the relevant area the subject of a Remediation Action Plan, based on the relevant Detailed Site Investigations and clearly detailing the extent of lateral and vertical classification of Waste within each area the subject of a Remediation Action Plan;	✓	Note 4
(ii) a detailed excavation plan that is consistent with the ACC Classification and Excavation Map prepared under clause 1.1(d)(i) describing the quantities in tonnes and cubic metres of each material, including a register in estimated tonnes and cubic metres of each waste classification of Solid Waste, proposed to be excavated and to be reused and/or disposed offsite (ACC Excavation Quantity Register);	✓	Note 4
(iii) details of any other elements of Remediation that are required to mitigate risks to the construction, operation and maintenance of Sydney Metro - Western Sydney Airport including, but not limited to infrastructure design requirements, treatment of Contamination, capping and containment; and	✓	Section 9 to Section 14
(iv) precise details of how the validation of Remediation will be achieved and demonstrated.	✓	Section 14

Notes:

- 1) these items are requirements of the Deed and relates to an administrative process
- 2) a qualitative risk assessment including consideration to source-pathway-receptors during and post construction was included in the DSI report and has been summarised in Section 7.
- 3) Information on any remediation undertaken as part of the Preliminary Works is to be included in the Validation Report.
- 4) ACC Classification and Excavation Maps and material classification reports have been prepared as separate documents and are not included in this RAP.

## 2. Objectives and Scope of Work

NSW EPA guidance<sup>7</sup> defines the objective of a RAP as being "to set remediation objectives and document the process to remediate the contaminated site".

The TTMP *Aerotropolis Detailed Site Investigation - Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works*, 13 September 2021 ("the DSI") has identified contamination which poses potentially unacceptable risks to human health in a generic commercial/industrial land use setting, and contamination which poses a potential unacceptable risk to off-site groundwater, surface, ecological and human receptors.

Accordingly, the DSI has identified contamination that has triggered the requirement to remediate the SBT Site so it is suitable for land uses described in the Master Plan.

This RAP has been prepared to:

- Summarise the contamination findings to date.
- Describe the preferred remediation strategy for the SBT Site which has been developed to meet stakeholder requirements and land use requirements.
- Describe the remedial criteria to achieve the planned land use, the soil materials which need to be removed in order for the remediation strategy to be achieved, and the validation of the SBT Site post removal of the materials.
- Outline the procedure to assess/validate imported material as suitable for use (from a contamination perspective).
- Outline the requirement for validation sampling during construction.
- Comply with NSW EPA reporting requirements.
- Refer to relevant environmental construction management documents prepared by CPBG.

---

<sup>7</sup> Section 1.5, NSW EPA (May 2020) "Consultants reporting on contaminated land"

### 3. Technical and Regulatory Framework

This RAP has been developed in general accordance with the following legislation, industry standards, codes of practice, and guidance documents, where relevant:

- NSW Work Health and Safety (WHS) Act 2011 (WHS Act 2011)
- NSW WHS Regulation 2017 (WHS Regulation 2017)
- Protection of the Environment Operations (POEO) Act 1997 (POEO Act 1997)
- POEO (Waste) Regulation 2014 (POEO Waste Regulation 2014)
- National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (amended April 2013) (ASC NEPM 2013)
- NSW EPA Contaminated Land Guidelines: Consultants Reporting on Contaminated Land, 2020 (NSW EPA 2020)
- NSW EPA Waste Classification Guidelines: Part 1 – Classifying Waste, 2014 (NSW EPA Waste Classification Guidelines)
- Addendum to the Waste Classification Guidelines (2014 Part 1: Classifying Waste (NSW EPA, 2016).
- NSW EPA Sampling design guidelines for contaminated land (Part 1 and Part 2), 2020 (NSW Sampling Design Guidelines)
- NSW EPA Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition), 2017 (NSW EPA 2017)
- PFAS National Environmental Management Plan (HEPA, 2020; Version 2.0) (PFAS NEMP)
- CRC Care Technical Report No. 10, Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, 2011 (CRC CARE 2011).

## 4. SBT Site Information

### 4.1. SBT Site Identification

The boundary of the SBT Site is the construction footprint of the SBT Works and is shown in Figure 1, Appendix 1. Key attributes of the SBT Site are summarised in Table 3.

Table 3: Site Information

Attribute	Description
Address	215 Badgerys Creek Road, Bringelly NSW 2556
SBT Site Area	Construction footprint is approximately 5.27 ha
Title Identification Details	Part Lot 101 DP1282949. Note Lot 101 DP1282949 is referred to in this document as "the Property".
Current Land Use	Cleared vacant land
Current Land Zoning	RU4 – Primary production small lots
Adjoining Land Uses	Lot 101 DP1282949 is located within Bringelly. Low density acreage lots are located west, and further east and south. Thompsons Creek is located along the southern and eastern boundary of the Property. A large rural grazing lot is located north of the Property.

### 4.2. Site Description

The SBT Site is an active construction site and is shown in Figure D. In summary at the time of the preparation of this RAP work which has been undertaken by CPBG includes:

- Preparatory / Site Establishment Works including:
  - Perimeter Fencing
  - Topsoil Stripping
  - Site Levelling
  - Establishment of erosion and sediment controls, swale drains, the sediment basin and the diversion drain.
  - Pavements
  - Establishment site facilities
  - Installation of concrete slab and site amenities.
- Piling around the perimeter of the station box and commencement of bulk excavation of the station box to approximately 9 m below ground surface (bgs).
- Based on an instruction from Sydney Metro, topsoil/fill materials from the Medium Impact Area where excavated and disposed off-site to a licenced landfill or stockpiled on-site for subsequent disposal at a contaminated land containment facility being developed for the Sydney Metro Western Sydney Airport Surface and Civil Alignment Works (SCAW) (refer to Section 4.2.1 for further information).

- A portion of PFAS impacted soil materials have been removed in association with the removal of topsoil/fill material or in association with the site establishment works. However at the time of preparing this RAP remedial activities which specifically target the removal of PFAS impacted natural soil materials has not been undertaken.

Construction activities taking place outside the SBT Site boundary shown in Figure D are being undertaken by Sydney Metro and are not associated with the SBT Project.

#### 4.2.1. Removal of Topsoil and Fill Materials

Topsoil/fill materials in the Medium Impact Area were excavated in two main stages including:

- Stage 1: fill materials within CPBG construction disturbance footprint
- Stage 2: fill materials within the Medium Impact Area and outside the CPBG construction disturbance footprint.

In Stage 1 CPBG has advised that approximately 8,965 m<sup>3</sup> of topsoil/fill materials have been disposed off-site to an appropriately licenced landfill facility in accordance with the material classification assessment prepared by TTMP for these materials<sup>8</sup>.

Topsoil/fill materials excavated in Stage 2 are currently stockpiled on-site in two stockpiles. The location of these stockpiles is shown in Figure E (refer to Section 8.1). CPBG has advised that approximately 750 m<sup>3</sup> of material is being stored in these stockpiles.

Further information on materials removed in Stage 1 and Stage 2 is provided in Appendix 6.7.

## 5. Environmental Setting and Site History

### 5.1. Environmental Site Setting Summary

The following has been summarised from the DSI.

Table 4: Site Environmental Setting

Aspect	Description
Topography	A topographic plan and surface water drainage plan of the Property is provided in Figure 2, Appendix 1. The station box is situated at an elevation of approximately 70 m Australian Height Datum (AHD). At the northern end of the station box, the land slopes in an east-south-east direction to Thompsons Creek which is located approximately 500 m east of the Aerotropolis Station Box. At the southern end of the station box, the land slopes in a southeast direction towards Moore Gully and Thompsons Creek.
Geology	A review of the Penrith 1:100 000 scale geology map <sup>9</sup> indicates that the SBT Site is underlain by Bringelly Shale of the Wianamatta Group. The Bringelly Shale is described as shale, carbonaceous claystone, laminite, lithic sandstone, with rare coal.

<sup>8</sup> TTMP (2022) *Material Classification Assessment: Aerotropolis Bulk Excavation of Station Box in Medium Impact Area – Materials less than 1 m below ground surface*, 26 October 2022, Ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040534

<sup>9</sup> Geological Survey of Penrith 1991. *Surface geology of New South Wales - 1:1 100 000 map*. Geological Survey of New South Wales, NSW Department of Primary Industries, Maitland, Australia



Aspect	Description
	<p>Prior to the commencement of construction works, the geology of the SBT Site comprises fill material (~ 0.2m to ~ 0.5 m thick), which is underlain by residual soils comprised of Silty Clay (~ 2 m thick) derived from the weathering of the Shale bedrock. The thickness of soils varies along the alignment and is approximately 3m in the northern end, ~ 2 to ~ 4 m in the central portion of the station box, and ~ 2 m at the southern end of the station box. Soils are underlain by the Bringelly Shale.</p> <p>A geological cross-section of the SBT Site is provided in Appendix 4.</p>
Hydrogeology	<p>Groundwater at the SBT Site has been measured at approximately 66m to 72 m AHD within the Bringelly Shale. A groundwater elevation of 67 m AHD is considered typical in the vicinity of the Aerotropolis station box. Groundwater flows in a south-east to easterly direction towards Thompsons Creek (TTC, 2021)<sup>10</sup>.</p>
Registered Groundwater Bores	<p>The nearest registered groundwater bores (GW113438, GW113439, GW113440) are located within the Property and between 30 and 130 m south west of the station box. The bores were installed for monitoring purposes.</p>
Salinity	<p>A review of the map indicates that the SBT Site is mapped as having moderate salinity.</p>
Acid Sulfate Soils	<p>The Atlas of Australian Acid Sulfate Soil (ASS) compiled by CSIRO<sup>11</sup> was reviewed to assess the probability of occurrence of ASS within the SBT Site. The ASS risk plan indicates that the SBT Site is located in an area with Extremely Low Probability of Occurrence of ASS.</p>
List of Contaminated Sites Notified to the EPA	<p>A search of the List of NSW Contaminated Sites Notified to NSW EPA<sup>12</sup> (as of 8 March 2022) was carried out on 17 May 2022. The SBT Site is not recorded on the register.</p>
NSW EPA Contaminated Land Public Record	<p>A search of the NSW EPA Contaminated Land Public Record was carried out on 17 May 2022 for declaration notices, orders made by the EPA under the CLM Act 1997, voluntary management proposals approved under the CLM Act 1997, and site audit statements relating to significantly contaminated land. The search of the database revealed that the SBT Site, or properties within 250 m of the SBT Site, were not present on the contaminated land public record.</p>

## 5.2. Site History Summary

The following has been summarised from the DSI which is based on information presented in the EIS and review of historical aerial imagery available through the NSW Government Historical Imagery portal:

- The SBT Site was historically used for agricultural purposes.
- The SBT Site was acquired by the Department of Defence (Defence) and used as a Defence (RAAF<sup>13</sup>) radar receiving station from the 1950s to approximately 2005 when the station was demolished.

<sup>10</sup> TTC (2022) *Western Sydney Airport Station Boxes and Tunnels Tender, Hydrogeological Interpretative Report*.

<sup>11</sup> <http://www.asris.csiro.au/>

<sup>12</sup> <https://www.epa.nsw.gov.au/your-environment/contaminated-land/notification-policy/contaminated-sites-list>

<sup>13</sup> Royal Australian Air Force

- Historical aerial imagery shows Defence housing was present north of the main radar receiving station building in 1955.
- By 1984, a telecommunication radio station along with multiple houses were present on site. The houses on site and defence housing were demolished between 1991 and 1998.
- In 2004 selected buildings surrounding the telecommunication radio station were also demolished.
- A photograph from 2013 shows that a bushfire occurred on the southern portion of the SBT Site, surrounding some of the buildings.
- The SBT Site was vacant and not used from the mid-2000s to the 2022. Buildings and the remaining infrastructure on the SBT Site were demolished and removed in April-May 2022 as follows:
  - Demolition of buildings and removal of building footings<sup>14</sup> at the former Defence Overseas Telecommunications Radio Station Complex (OTC) site.
  - Removal of a 1,600 m<sup>3</sup> stockpile of contaminated soil located south of the buildings at the OTC.
  - Removal of three underground storage tanks (USTs) and the completion of a surface scrape of soil from the base and side walls of the tank pits. It is understood that no visual or olfactory signs of contamination were present in the tank pits.
  - Removal of a septic tank and the completion of a surface scrape of soil from the base and side walls of the tank pit. It is understood that no visual or olfactory signs of contamination were present in the tank pits.
- Completion of an emu pick following the completion of demolition activities by EnviroPacific Services. Appendix K of the GHD Investigation included asbestos Clearance Certificates for the demolition areas.

Construction of SBT Project at the SBT Site commenced by CPBG in Q4 2022. Construction activities which have taken at the SBT Site through to March 2023 are summarised in Section 4.2.

## 6. Aerotropolis Precinct Plan and Master Plan

The *Western Sydney Aerotropolis Precinct Plan, March 2022* (NSW Government, 2022) ("the APP") shows the proposed land uses within and in the immediate vicinity of the Aerotropolis Station is a 'commercial centre – mixed use' (refer to Appendix 2.1). Commercial centre – mixed use is defined in the APP as *'Mixed use environment focused on employment generating land uses, leveraging off metro/mass transit. Residential land uses provide density but do not undermine employment capacity.'*<sup>1</sup>

**Sydney Metro has further clarified to CPBG that land uses within the SBT Site to be considered in the RAP include commercial and open space as per the Master Plan provided by Sydney Metro (WPCA) on the 10 March 2023 and the Aerotropolis Architectural Design Drawing<sup>15</sup> provided on the 24 May 2023 and shown in Figure 3, Appendix 1.**

<sup>14</sup> The GHD Investigation describes the removal of building footings in Table 16

<sup>15</sup> DRG No. SWMSAEDS-SMD-AEC-AT-DRG-100200, Rev D, 12 December 2022 (included in Appendix 2.3)

Section 4.5.1 of the APP describes that land is required to support the regional stormwater network including a shift towards retaining water in the landscape through stormwater harvesting, the recycling of water in open space and street irrigation. Key objectives of the APP in regard to water management include:

- *Protect, maintain and/or restore waterways, riparian corridors, water bodies and other water dependent ecosystems.*
- *Provide a landscape-led approach to integrated stormwater management and water sensitive urban design.*
- *Establish a network of multifunctional stormwater assets that support stormwater management and contribute to broader objectives for waterway health, biodiversity, urban greening and cooling, recreation and amenity.*

From Figure 6 in the DCP (refer to Appendix 2.1) stormwater detention basins to be incorporated are located up-gradient of the SBT Site and down-gradient of the SBT Site in the Thompsons Creek Riparian Corridor. From Figure 6 in the DCP it is understood that detention basins which could be used for water harvesting will not be located in the SBT Site.

As noted in Section 8, PFAS (and potentially) other contaminants would be present in stormwater from sources within the SBT Site<sup>16</sup>, Lot 101 DP1282949 and the broader regional area. It is the responsibility of the future operator of water infrastructure to consider water quality (including the management of PFAS and potentially other contaminants) in surface water and its implications for stormwater harvesting/reuse in the area.

## 7. Pre-Construction Site Conditions

A summary of the findings of the DSI are provided in Appendix 12. The following provides a summary of the key findings of the DSI which relate pre-construction site conditions:

- soil materials in the Low Impact Areas were considered to be low risk and did not require remediation.
- fill materials within the Medium Impact Area should be considered as containing asbestos which may pose potentially unacceptable health risks for a commercial and open space land use without management/remediation.
- in the Medium Impact Area, PFAS impacted soil has been reported in multiple locations associated with the historical use of the SBT Site as a Defence radar receiving facility, which included a fire suppressant system and secondary sources including a former septic system and contaminated soil stockpile. PFAS impacted soil extends beyond the eastern boundary of the Aerotropolis site. Elevated concentrations of PFAS are predominately located within the top 1 m of soil material in these Medium Impact Area.
- PFAS has been found in groundwater which exceeds the adopted human health guidelines (drinking water guidelines) and ecological guidelines (99% species protection). PFAS has also been found to be migrating off the SBT Site via surface water in previous investigations with concentrations which exceed 95% species protection. PFAS has also been confirmed to be present in Thompsons Creek. Probable off-site sources of PFAS have also been identified in previous investigations.

---

<sup>16</sup> Note with the SBT a reduction in flux of PFAS migrating off-site via surface and groundwater pathways is expected to be achieved through a combination of removal of a portion of PFAS sources from the SBT Site which exceed the remediation criteria and the application of hardstand (or equivalent) in the commercial areas of the SBT Site which will predominately cover areas with PFAS impacted soil (refer to Section 10).

- Consideration to PFAS in soil, groundwater, and surface water beyond the boundary of the SBT Site was outside the scope of the DSI completed by TTMP.
- The DSI concluded that the SBT Site can be made suitable, as per the requirements of State Environmental Planning Policy (Resilience and Hazards) 2021, for the proposed station box.
- Remediation of the Medium Impact Area (Remediation Area) is required to make the SBT Site suitable for commercial and open space land use on account of asbestos in fill materials. Remediation of PFAS impact in soil the Medium Impact Area is also considered to be required to make the SBT Site suitable for commercial and open space land use and to reduce potential risks to off-site receptors.

## 8. Site Characterisation

### 8.1. Existing Ground Conditions

Topsoil and fill materials within the Medium Impact Area are likely to contain asbestos and have been stripped to undisturbed natural ground (natural clays). The majority of these materials have been disposed off-site to an appropriately licenced facility however approximately 750 m<sup>3</sup> of these materials remain in the Remediation Area in the locations shown in Figure E.

Within the station box fill and natural residual soil materials have been removed and excavation is currently taking place in the Bringelly Shale. The depth of excavation in the station box is approximately 9 m below ground surface (bgs). Natural materials within the Station Box from 3 m bgs to the base of the excavation within the station box were assessed as Virgin Excavated Materials (VENM) by TTMP (refer to Appendix 6.1) and accordingly do not require further consideration in this RAP.

Within the Remediation Area there remains an undisturbed area between the Medium Impact Area and the boundary of the Remediation Area. This area is shown in Figure E.



Figure E Existing Site Conditions

## 8.2. Contamination in Soil

The DSI included an assessment of soil and groundwater conditions at the SBT Site with a focus on the redevelopment of the SBT Site as a Station Box and Tunnel for the Project.

Intrusive investigation locations are shown in Figure 4A to Figure 4C in Appendix 1, and include:

1. TTMP DSI locations
2. Previous investigation locations completed for the SBT Project
3. Supplementary investigation locations completed post commencement of construction of the SBT Project including:
  - a) locations completed within the station box to assess materials as VENM or Excavated Natural Material (ENM) (refer to Appendix 6.1).
  - b) locations completed in May 2023 to further delineate natural materials with concentrations of PFAS which exceed the remediation criteria (refer to Appendix 6.5).

Tabulated soil results for items 1), 2) and 3b) are included in Appendix 5. The tabulated results in Appendix 5 include a comparison of the results with the remediation criteria referred to in Section 11.2. Tables included in Appendix 5.1 include:

- Appendix 5.1 provides the data for the SBT Site for commercial land use areas, and a comparison of these results to the remediation criteria for commercial land use.
- Appendix 5.2 provides the data for the SBT Site for open space land use, and a comparison of these results to the remediation criteria for open space land use.

Tabulated soil results for item 3 b) relate to soil materials assessed as VENM in the station box have been provided in Appendix 6.1. These results indicate such materials do not require further consideration in this RAP.

### 8.2.1. Fill Materials

#### Asbestos

The topsoil/fill materials in the stockpiles shown in Figure E potentially contain asbestos and are referred to in this RAP as **ACM Remediation Area 1** and shown in Figure 7B, Appendix 1. Based on the remediation objectives (refer to Section 9) and remediation strategy (refer to Section 11) these stockpiled materials are not suitable to be retained on-site and will be disposed off-site to a containment facility being developed for the SCAW or an appropriately licenced waste management facility.

Fill/topsoil materials are present in the area of land between the eastern most boundary of the Medium Impact Area and the SBT Site boundary. Based on the findings of the DSI and additional sampling undertaken by CPBG these materials are considered to potentially contain asbestos and therefore require excavation and removal from the site to achieve the remediation objectives. These materials are shown as **ACM Remediation Area 2**<sup>17</sup> in Figure 7A, Appendix 1.

---

<sup>17</sup> Note ACM Remediation Area 2 includes land between the eastern most boundary of the Medium Impact Area and the SBT Site boundary. ACM Remediation Area 2 includes a northern and southern portion and is separated by PFAS Remediation Area 3. Topsoil/fill materials will be removed as part of the remediation of PFAS Remediation Area 3 (refer to Section 8.2.2).

## Metals

Metal concentrations (mainly zinc, and to a lesser extent nickel and copper) exceeded the remediation criteria (ecological) in a limited number of samples from fill or other surficial soil materials (materials less than 0.3 m bgs). No further remediation or validation of these materials is proposed in this RAP noting that:

- these materials have been removed through the excavation of fill materials from these areas.
- the samples are located in an area with a commercial land use where managed landscaping is typically established in imported soil/growing mix in discrete areas such as planter boxes / garden beds.

## PFAS

A portion of PFAS impacted soil materials have been removed in association with the removal of topsoil/fill material or in association with the site establishment and construction works. However at the time of preparing this RAP remedial activities which specifically target the removal of PFAS impacted natural soil materials has not been undertaken.

## 8.2.2. Natural Soil Materials

Remediation criteria for PFOS<sup>18</sup> were exceeded in a limited number of sampling locations in the Medium Impact Area in association with historical areas of PFAS impact reported in the DSI.

Based on the data in Appendix 5.1 and Appendix 5.2, intrusive investigation locations with samples which exceed the remediation criteria are summarised in the following table, and shown in Figure 6A and Figure 6B, Appendix 1. Sample depths in Table 5 are based on pre-construction ground levels.

Table 5: Sample Locations which Exceed Remediation Criteria (PFAS)

Future Land use	Samples Location	Samples Depth (m bgs)
Commercial	SBT-BH-4258	0.1, 0.4-0.5, 0.9-1.0
	SBT-BH-4259	0.1-0.2, 0.5-0.6
	SBT-BH-4272 (Note 2)	0.1-0.2
	SBT-TP-4297	0.4-0.5
	SMWSA-GHD-BH30	0.4-0.5, 0.9-1.0
	SMWSA-GHD-BH31	0-0.1, 0.2-0.3, 0.5-0.6
	SMWSA-GHD-TP52	0-0.1, 0.5-0.6
	A2_56	0.4, 1.3
	A2_57	0.4
	A2_58	0.4
Open Space	A2_60	0.4
	SBT-BH-4267	0.5-0.6
	SMWSA-GHD-MW01	0-0.2
	SMWSA_GHD_SED01	0

Note:

1) some of the sample data reporting concentrations exceeding the remediation criteria is associated with PFAS contamination in fill material that has been removed from the site or materials which were removed for construction purposes. This has been considered in the PFAS remediation areas described in Table 6.

2) soil materials associated with the exceedance at DSI location SBT-TP-4272 were removed for construction purposes (excavation at this location was undertaken to approximately 1 m bgs during construction). Existing soil materials at location SBT-TP-4272 and in surrounding materials were investigated through intrusive sampling locations A1\_A to A1\_E in the supplementary investigation referred to in Appendix 6.5. Analytical data from these locations and reported no exceedance of the remediation criteria.

Based on the exceedances in Table 5, three areas have been determined which require remediation. These areas are shown in Figure 7A, Appendix 1 and are summarised in Table 6.

<sup>18</sup> TTMP note that all samples were below their respective human health remediation criteria and the exceedances are associated with the adopted ecological criteria.



Table 6: PFAS Remediation Areas

Remediation Area	Sample Location Exceeding Remediation Criteria	Required Excavation Depth m bgs (pre stripping ground levels)	Required Excavation Depth m bgs (post stripping ground levels, refer to Note 1)	~ Excavation Area (m <sup>2</sup> )	~ Excavation Volume (bank) (m <sup>3</sup> )	Comment (refer to Note 2 for definition of L/V, L and V)
PFAS Remediation Area 1A	SBT-BH-4259 SMWSA-GHD-BH30 SMWSA-GHD-BH31 SMWSA-GHD-TP52 A2_56 A2_58 A2_60	1	0.7 (Note 1)	552	387	The extent of material requiring remediation in this area to 1 m bgs has been delineated laterally and vertically based on the following intrusive investigation locations. <ul style="list-style-type: none"> <li>• SBT-BH-4261 (L/V)</li> <li>• C-V002 / C-V001 (L)</li> <li>• A2_55 (L/V)</li> <li>• SBT-BH-4255 (L/V)</li> <li>• SBT-BH-4254 (L/V)</li> <li>• A2_62 (L/V)</li> <li>• A2_63 (L/V)</li> <li>• A2_59 (L/V)</li> <li>• A2_65 (L/V)</li> <li>• A2_66 (L/V)</li> <li>• SBT-BH-4264 (L/V)</li> <li>• SBT-BH-4262 (L/V)</li> <li>• SMWSA-GHD-BH29 (L/V)</li> <li>• A2_61 (L/V)</li> <li>• SBT-BH-4259 (V)</li> <li>• A2_60 (V)</li> </ul>
PFAS Remediation Area 1B	SBT-BH-4258	2	1.7 (Note 1)	85	145	The extent of material requiring remediation in this area to 2 m bgs has been delineated laterally and vertically based on the following intrusive investigation locations. <ul style="list-style-type: none"> <li>• A2_57 (L/V)</li> <li>• AS_56 (L/V)</li> <li>• A2_59 (L/V)</li> <li>• A2_58 (L/V)</li> <li>• SBT-BH-4258 (V)</li> </ul>

Remediation Area	Sample Location Exceeding Remediation Criteria	Required Excavation Depth m bgs (pre stripping ground levels)	Required Excavation Depth m bgs (post stripping ground levels, refer to Note 1)	~ Excavation Area (m <sup>2</sup> )	~ Excavation Volume (bank) (m <sup>3</sup> )	Comment (refer to Note 2 for definition of L/V, L and V)
PFAS Remediation Area 2	SBT-TP-4297	1	0.7 (Note 1)	318	223	The extent of material requiring remediation in this area to 1 m bgs has been delineated laterally and vertically based on the following intrusive investigation locations. <ul style="list-style-type: none"> <li>A4_43 (L/V) to A4_50 (L/V)</li> <li>SBT-BH-4368 (L/V)</li> <li>SBT-TP-4267 (V)</li> </ul>
PFAS Remediation Area 3	SBT-BH-4267 SMWSA-GHD-MW01 SMWSA_GHD_SED01	0.5	0.2 to 0.5 (Note 1)	165	50	The extent of material requiring remediation in this area to 0.5 m bgs has been delineated laterally based on the following intrusive investigation locations. <ul style="list-style-type: none"> <li>A5_41 (L/V)</li> <li>SBT-TP-4300 (L/V)</li> <li>SBT-BH-4267 (L/V)</li> </ul>

Notes:

- 1) Within the PFAS remediation areas CPBG has advised that approximately 0.3 to 0.4 m of topsoil/fill materials have been removed. The required depth of excavation in PFAS Remediation Area 1A, 1B and 2 has assumed a stripping depth of 0.3 m. This amount has been subtracted from the depth of the required excavation based on pre-construction ground levels. PFAS Remediation Area 3 includes land which has been stripped and undisturbed land. The amount which needs to be removed from this area is approximately 0.2 m in stripped areas and 0.5 m in undisturbed areas. CPBG has survey data for these areas pre and post stripping. Prior to the commencement of excavation CPBG is to confirm the depth of materials stripped to confirm the target depth of the required excavation based on pre-construction ground levels has been achieved.
- 2) 2) L/V – location provides data to define lateral and vertical extent of remediation required; L – location provides data to define lateral extent of remediation required; V – location provides data to define vertical extent of remediation required

### 8.3. Groundwater and Surface Water

PFAS has been found in groundwater which exceeds the adopted human health guidelines (drinking water guidelines) and ecological guidelines (99% species protection). Detectable PFAS concentrations has also been found to be migrating off the SBT Site via surface water in previous investigations with concentrations which exceed 95% species protection. PFAS has also been confirmed to be present in Thompsons Creek.

Data from the DSI, and investigation completed within the Property (refer to Appendix 6.3) indicate the presence of multiple PFAS sources which are contributing to PFAS in the environment including:

- PFAS source areas within the SBT Site
- Diffuse PFAS in soil/sediment in Lot 101 DP1282949 (the Property), and within this property the potential for secondary sources of PFAS along drainage lines down-gradient of the SBT Site
- Probable off-site sources of PFAS.

PFAS is present in groundwater up and down-gradient of the SBT Site. At the Property boundary and down-gradient of the SBT Site, PFAS is likely to be present in trace concentrations in groundwater above the PFAS 99% species protection level and below the 95% species protection levels.

PFAS is present in surface water in dry and wet conditions. Higher concentrations of PFAS in surface water occur in wet conditions in surface water discharged along drainage lines from PFAS sources areas at SBT Site, and potentially in surface water.

At the time of preparing this RAP CPBG advised that there has been no requirement to dewater the bulk excavations formed for the station box.

Surface water derived from land up-gradient of the SBT Site is currently diverted around the SBT Site via the diversion drain shown in Appendix 9. CPBG has advised that surface water from the Medium Impact Area is currently collected in a sump and disposed off-site to appropriately licenced waste management facilities.

### 8.4. Conceptual Site Model

The conceptual site model (CSM) summarised in this section is based on the refined CSM presented in the DSI Report with consideration to existing site conditions and the requirement for commercial and open space land uses.

#### 8.4.1. Contamination Sources

The following sources of contamination were identified that requires further consideration:

- Asbestos in fill materials stockpiled on the SBT Site, and fill/topsoil materials in Asbestos Remediation Area 2.
- PFAS source areas with the Medium Impact Area. Based on the analytical data and existing site conditions three areas have been identified which require remediation.
- PFAS compounds detected in surface water and groundwater samples above the adopted investigation levels.

## 8.4.2. Receptors

The following sources were considered relevant to the sources of contamination identified:

- Workers involved with the SBT work, construction workers involved with the construction phase of the Sydney Metro Stations, Systems, Trains, Operations and Maintenance (SSTOM) Work Package, workers during the operational and maintenance phase of the SBT Site.
- General public including persons who could be subject to contaminated media generated during redevelopment and post construction, including those accessing the SBT Site
- Future human receptors which surround the SBT Site including residential receptors
- Ecological receptors including terrestrial and aquatic flora and fauna
- Groundwater and surface water receptors
- Domestic animals including livestock in surrounding areas.

## 8.4.3. Exposure Scenario & Risk Evaluation Discussion

Asbestos in fill/topsoil materials in the Remediation Area has the potential to pose unacceptable risk to human health in either a commercial or open space land use. Asbestos does not extend into the undisturbed, natural soil. Asbestos poses a potential unacceptable risk to human health via inhalation pathways.

PFAS within the Medium Impact Area has been identified in three main areas with concentrations which exceed the remediation criteria.

PFAS concentrations in soil are below the human health criteria for commercial and open space land use. However PFAS in soil poses potentially unacceptable risks to groundwater receptors, and terrestrial and aquatic ecological receptors primary through ingestion of contaminated media and the consumption of organisms.

PFAS detected in soil has the potential to migrate offsite either via groundwater and surface water pathways. Offsite migration of PFAS impacted water has the potential to contribute to risks to ecological receptors offsite.

## 8.4.4. Refined CSM

The following table provide a refined CSM for source-pathway-receptor linkages for the SBT Site based on a commercial or open space land use. The table includes a summary of whether complete source-pathway-receptor linkages (exposure pathways) could occur. In regard to this summary note:

- 'Likely' refers to an exposure pathway which could occur and if they occur there is potential for an unacceptable risk to the receptor (i.e. a complete exposure pathway)
- 'Potential' refers to an exposure pathway which could occur however further assessment would be required to establish whether an unacceptable risk to receptor could occur.
- 'Unlikely' refers to an exposure pathway which are considered unlikely to occur and therefore it is unlikely that there would be an unacceptable risk to receptor (i.e. an incomplete exposure pathway).
- 'Not applicable' refers to an exposure pathway which is not considered to be plausible and therefore incomplete.

Table 7: Refined Conceptual Site Model (Source-Pathway-Receptors)

Contamination Source	Contaminants of Concern	Media	Plausible Exposure Pathways	Receptors	Complete exposure pathway	
Demolition materials from Previous Buildings and Structures	Asbestos	Fill/topsoil remaining in Remediation Area in stockpiles or in Asbestos Remediation Area 2	Inhalation of fibres	Construction workers involved with the SBT work	Likely	
				Construction workers involved with the construction phase of the Sydney Metro Stations, Systems, Trains, Operations and Maintenance (SSSTOM) Work Package, workers during the operational and maintenance phase of the SBT Site.	Likely (Note 1)	
				General public including persons who could be subject to contaminated media generated during redevelopment and post-construction	Likely (Note 1)	
				General public accessing the station in the future	Likely (Note 1)	
				Terrestrial ecological receptors within the SBT Site	Not applicable	
Historical use of AFFF at former Defence facility	PFAS	Fill/soil in PFAS ACs in Medium Impact Area	Ingestion	Workers involved with the SBT work, construction workers involved with the construction phase of the Sydney Metro SSSTOM Work Package, workers during the operational and maintenance phase of the SBT Site.	Unlikely	
						Dermal contact
			Biological uptake mechanisms	General public accessing the station if the future	Unlikely	
				Terrestrial flora and fauna	Potential	
		Aquatic flora and fauna including those Thompsons Creek	Unlikely			
		Surface water from PFAS ACs	Ingestion	Dermal contact	Workers involved with the SBT work, construction workers involved with the construction phase of the SSSTOM Work Package, workers during the operational and maintenance phase of the SBT Site.	Unlikely (Note 2)
					General public including persons who could be subject to contaminated media generated during redevelopment	Unlikely
General public accessing the station if the future	Unlikely (Note 2)					
Future residents hydraulically down-gradient of PFAS sources areas	Unlikely (Note 2)					

Contamination Source	Contaminants of Concern	Media	Plausible Exposure Pathways	Receptors	Complete exposure pathway			
			Biological uptake mechanisms	Terrestrial flora and fauna within Lot 101 DP1282949	Potential			
				Aquatic flora and fauna including those Thompsons Creek	Potential (Note 3)			
				Domestic animals within the Property	Potential			
		Groundwater from PFAS ACs	Ingestion Dermal contact			Workers involved with the SBT work, construction workers involved with the construction phase of the Sydney Metro Stations, Systems, Trains, Operations and Maintenance (SSSTOM) Work Package, workers during the operational and maintenance phase of the SBT Site.	Not applicable	
						General public including persons who could be subject to contaminated media generated during redevelopment	Not applicable	
						General public accessing the station if the future	Unlikely (Note 2)	
						Future residents hydraulically down-gradient of PFAS sources areas	Unlikely (Note 2)	
						Terrestrial flora and fauna within the Property	Unlikely	
						Aquatic flora and fauna including those Thompsons Creek	Potential (Note 3)	
Domestic animals and livestock within the Property				Domestic animals and livestock within the Property	Unlikely (Note 2)			
				Terrestrial biota within Property	Consumption, bioaccumulation, biomagnification			
General public including persons who could be subject to contaminated media generated during redevelopment	Not applicable							
General public accessing the station if the future	Unlikely							
Future residents hydraulically down-gradient of PFAS sources areas	Potential							
Terrestrial flora and fauna within the Property	Potential							
Aquatic flora and fauna including those Thompsons Creek	Potential							

Contamination Source	Contaminants of Concern	Media	Plausible Exposure Pathways	Receptors	Complete exposure pathway
				Domestic animals and livestock within the Property	Potential
		Aquatic biota in Thompsons Creek	Consumption, bioaccumulation, biomagnification	Workers involved with the SBT work, construction workers involved with the construction phase of the Sydney Metro Stations, Systems, Trains, Operations and Maintenance (SSSTOM) Work Package, workers during the operational and maintenance phase of the SBT Site.	Unlikely
				General public including persons who could be subject to contaminated media generated during redevelopment	Unlikely
				General public accessing the station if the future	Unlikely
				Future residents hydraulically down-gradient of PFAS sources areas	Potential
				Terrestrial flora and fauna within the Property	Potential
				Aquatic flora and fauna including those Thompsons Creek	Potential
				Domestic animals and livestock within the Property	Potential

Notes:

- 1) Complete exposure pathway based on fill materials containing asbestos being currently located within the Remediation Area at the time the RAP has been prepared.
- 2) Receptor considered unlikely to ingest media based on use of potable water supply in area.
- 3) Receptor potentially exposed to contaminated media through migration of the media to the receptor.

## 9. Remediation Objective

The primary objective for the remediation of the SBT Site is to make it suitable for commercial and open space land use as per the configuration of the SBT Site shown in Figure 3, Appendix 1, and without any requirement for the implementation of a LTEMP.

Remediation Criteria which have been adopted for commercial and open space land use are described in Section 11.2.

While not required to achieve the remediation objective, a secondary consideration of remediation is the reduction of PFAS migrating off-site via surface water and groundwater pathways.

The area of the SBT Site requiring remediation and the subject of this RAP is the Medium Impact Area (Remediation Area) shown in Figure 3, Appendix 1.

## 10. Remediation Options

Key findings of the investigation have confirmed the presence of asbestos in fill materials in the Medium Impact Area which can pose an unacceptable risk to human health for construction workers and future site users.

The DSI has identified areas of PFAS within the Medium Impact Area (mainly within the first 1 m of soil material) which may pose a potentially unacceptable risk to groundwater receptors, and terrestrial and aquatic ecological receptors. PFAS may also poses a potential risk to future off-site residential receptors although such is dependant on land use and patterns around the consumption of home grown produce.

Remediation of the Medium Impact Area is therefore considered to be required to make the SBT Site suitable for commercial and open space use and to manage potential risk to off-site receptors.

In the 2022 RAP TTMP considered two main practicable remediation strategies for the SBT Site with consideration to programme and cost constraints which included:

- removal of contaminated soil
- on-site containment of contaminant sources to break source-pathway-receptor linkages.

Based on an option assessment, on-site contaminant beneath hard landscaping was considered as the preferred remediation strategy for the 2022 RAP. This was based on consideration of the remediation hierarchy in the ASC NEPM, and other project requirements including but not limited to programme and cost. Implementation of the 2022 RAP required the development and implementation of a Long-Term Environmental Management Plan (LTEMP) and permanent cover layer (hardstand or equivalent).

Subsequent to the approval of the 2022 RAP by the Site Auditor, Sydney Metro advised in a meeting on the 31 January 2023 that the 2022 RAP was not accepted by Sydney Metro based on the requirements of the Interface Agreement between Sydney Metro and Western Parkland City Authority (WPCA). It is understood that under the Interface Agreement, the SBT Site is to be made suitable for commercial and open space land use without any encumbrances such as the requirement for a LTEMP to be implemented.

Accordingly on-site containment of contaminant sources as a remedial strategy can no longer be considered feasible.

As such the default remediation strategy for the SBT Site is the removal of contaminated sources to make the suitable for the proposed commercial and open space areas shown in Figure 3, Appendix 1.





## 11. Remediation Strategy

### 11.1. Overview

Based on the direction from Sydney Metro the Remediation Strategy for the SBT Site is the removal of contamination sources such that the SBT Site is suitable for the commercial and open space land uses in the areas shown in Figure 3, Appendix 1.

### 11.2. Remediation Criteria

Remediation criteria for the SBT Site have been developed based on the adoption of generic Tier 1 screening criteria for these land uses based on the following guidelines:

- National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (April 2013) (ASC NEPM 2013) *Schedule B1 Guideline on Investigation Levels for Soil and Groundwater*.
- HEPA (2020) *PFAS National Environmental Management Plan Version 2.0 – January 2020*

The remediation criteria which have been developed are summarised in Appendix 3 and consider risk to human health and risk to terrestrial ecological receptors. Two sets of criteria have been developed. These include criteria for commercial land use, and separate criteria for open space land use.

The remediation criteria are considered to apply to asbestos and PFAS only.

The criteria developed for commercial land use apply to the areas of the SBT Site which are to be developed for commercial land use shown in Figure 3, Appendix 1. Similarly, the criteria developed for open space land use apply to the areas of the SBT Site which are to be developed for open space land use shown in Figure 3, Appendix 1.

Appendix 5.1 provides the data for the SBT Site for commercial land use areas, and a comparison of these results to the remediation criteria for commercial land use.

Appendix 5.2 provides the data for the SBT Site for open space land use, and a comparison of these results to the remediation criteria for open space land use.

The development of site specific risk based remediation criteria was considered but not undertaken based on program constraints.

#### 11.2.1. Surface Water and Groundwater

As noted in Section 9 a secondary consideration of remediation is the reduction of the flux of PFAS migrating off-site via surface water and groundwater pathways.

There are no soil guideline values in the PFAS NEMP which consider risk of PFAS leaching from soil to surface water and groundwater. The quantification of PFAS migrating from the SBT Site would require development of a mass flux model and require further investigation. Quantification of potential impacts to groundwater and surface water receptors would also require consideration to PFAS impacted soil materials located outside the boundary of the SBT Site in addition to probable PFAS sources which have been identified off-site in groundwater and surface water including Thompsons Creek. Such an assessment is considered to be outside the scope of the SBT Project and would require a broader study of PFAS in the regional area.



Noting that there are no applicable guidelines in the PFAS NEMP which consider the risk from PFAS leaching from soil to surface water/groundwater, it is not practicable for the SBT Project to develop site specific risk based criteria for PFAS, and PFAS is present in the receiving environment from a range of sources other than the SBT Site, no measurable remediation criteria have been proposed for surface water and groundwater in relation to PFAS or in regard to the mobilisation of PFS from soil to surface water/groundwater receptors.

Reduction in flux of PFAS migrating off-site via surface and groundwater pathways is expected to be achieved through a combination of removal of a portion of PFAS sources from the SBT Site which exceed the remediation criteria (refer to Section 8.2.2) and the application of hardstand in the commercial areas of the SBT Site which will predominately cover soil containing residual PFAS which does not exceed the remediation criteria and remains on the SBT Site following removal of PFAS impacted soil which exceeds the remediation criteria. The future development of the SBT Site in commercial land use areas will also introduce stormwater drainage that will substantially restrict runoff from infiltrating soil within the Medium Impact Area.

Under the Aerotropolis Precinct Plan stormwater infrastructure (detention basins) is to be located up and down-gradient of the SBT Site (as well as other locations shown in the Aerotropolis Precinct Plan area). It is understood that these detention basins may be used for stormwater harvesting and irrigation in the local area. It is the responsibility of the future operator of water infrastructure to consider water quality (including the management of PFAS and potentially other contaminants) in surface water and its implications for stormwater harvesting/reuse in the area.

### 11.3. Project Approvals

All relevant licences and approvals shall be obtained from the relevant authorities by CPBG (refer to Section 1.2 for further information).

### 11.4. Construction Earthworks

Spoil management will be carried out in accordance with the Project CEMP and applicable subplans including but not limited to the Project Soil and Water Management Sub-Plan (SWMP), Project Waste and Recycling Management Sub-Plan and Project Spoil Management Sub-Plan.

A Soil and Water Management Plan<sup>19</sup> (SWMP) was prepared by CPBG prior to completion of the DSI. Relevant management strategies presented in the SWMP (as outlined in Table 8) will be implemented during Preparatory Works.

Table 8: Relevant Soil Management Strategies (SWMP)

Management Strategy	SWMP Section Reference
Erosion and sediment control planning	7.4
Management of chemical and refuelling including spill management	7.8
Contamination management (including Unexpected Finds Protocol)	7.9

<sup>19</sup> CPG. NSW (Off-Airport) Soil and Water Management Sub Plan (SWMP), Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works, Rev A dated 19 May 2022



A copy of the Environment Procedures for the above management strategies are provided in Appendix 7. CPBG has also prepared a draft Erosion and Sediment Control Plan (ESCP) which shall be implemented, a copy of which is provided in Appendix 8.

Unexpected finds of potential contamination may be identified by visual (appearance) and/or olfactory (odour/stain) evidence during earthworks. If observations indicate the presence of potential contamination, the unexpected finds procedures included in Appendix 7 shall be implemented.

The roles and responsibilities of the CPBG team and the specialist consultants are detailed in Section 8 of the SWMP, and Section 9 of the SWMP discusses the systems and tools available to implement the SWMP, namely, detailed erosion and sedimentation control plans, training, reporting, review, auditing and continual improvement and keeping records.

## 11.5. Materials Requiring Remediation

### 11.5.1. Fill Materials in Medium Impact Area

As contaminant and barrier separation cannot be used as a remediation strategy for the SBT Site, the remedial strategy that complies with the requirements of the Interface Agreement will require the removal of the contaminated materials from the SBT Site.

Accordingly, Sydney Metro has issued an instruction to CPBG to excavate and remove all fill materials from the Medium Impact Area. Fill materials with or potentially containing asbestos which are to be removed from the Remediation Area include:

- Stockpiled material in Asbestos Remediation Area 1
- Topsoil/fill materials in Asbestos Remediation Area 2.

Materials which have been stockpiled are to be disposed at a containment facility being developed for the SCAW or an appropriately licenced waste management facility. Sydney Metro has advised CPBG that the containment facility at SCAW is expected to be completed in 2023. No further information on this facility has been made available for the preparation of this RAP. Topsoil/fill materials are only to be disposed to appropriately licenced waste management facilities.

When removing the stockpiles CPBG is scrape and remove 0.1 m of the underlying natural material to confirm that the natural ground which underlies the stockpile and has been in direct contact with the stockpiled material has been removed. Validation sampling is to be undertaken beneath this stockpile in accordance with the requirements in Section 13.

TTMP note fill materials/disturbed natural ground between eastern most boundary of the Medium Impact Area and the Lease Boundary has not been disturbed. Based on the findings of the DSI and additional sampling undertaken by CPBG fill and/or disturbed natural ground between the boundary of the Medium Impact Area and SBT Site Boundary should be considered as potentially containing asbestos. These materials are shown in Figure 7A, Appendix 1 as **Asbestos Remediation Area 2**.

Fill/disturbed natural ground from **Asbestos Remediation Area 2** are to be stripped to a typical depth of 0.2 m bgs or a minimum of 0.1 m below the base of fill materials) and disposed off-site in accordance with NSW waste guidelines.



### 11.5.2. Materials with PFAS Requiring Remediation

Natural materials containing PFAS which require remediation are summarised in Section 8.2 and shown in Figure 7A, Appendix 1.

These materials are to be excavated and disposed of off-site to an appropriately licenced waste management facility.

CPBG has survey data for the PFAS Remediation Areas pre- and post-stripping. Prior to the commencement of excavation CPBG is to confirm the depth of materials which has been stripped from these areas such that the target depth of the required excavation based on pre-construction ground levels is achieved (refer to Table 6 in Section 8.2.2). This information and survey data to validate that the materials requiring remediation is to be included in the Validation Report.

### 11.6. Bulk Excavation with the Station Box

Materials generated during the bulk excavation of the Station Box from 3 m bgs have been assessed as VENM and are to be beneficially reused at the FS01 site at Western Sydney Airport or another location approved by the recipient of the material.

### 11.7. Material Movement in Medium Impact Area

If required for construction, undisturbed natural materials excavated from the Medium Impact Area which do not exceed the remediation criteria can be re-used in the Medium Impact Area and are not be re-used in the Low Impact Area or in areas of open space land use.

### 11.8. Asbestos Management Plan

Excavation of topsoil and fill materials from the Aerotropolis site are to managed under an Asbestos Management Plan<sup>20</sup> (AMP), which will outline controls to mitigate health risks to workers and occupants of neighbouring land. The Project AMP will be implemented during the SBT Works.

### 11.9. Construction Water Management

Temporary drains (excluding the diversion drain) and the sediment basin are to be constructed around the project worksite and will be pass through or be located in PFAS ACs (refer to Appendix 10).

Temporary drains within the Medium Impact Area are to be stabilised to prevent erosion and slope instability.

Consideration could also be made to lining the sediment basin with a low permeability liner.

Sediment materials removed from drains and the basins will need to be assessed prior to off-site disposal in accordance with Section 12.

<sup>20</sup> CPBG. Asbestos Management Plan, Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works. Ref: SMWSASBT-CPG -1NL-NL000-SF-PLN-000024 (Rev A, dated 2 February 2022)



Construction water generated during the SBT Works is to be treated to comply with Planning Condition E129 or an Environmental Protection License (EPL) approved by the NSW EPA.

## 11.10. Waste Management

Where offsite disposal of spoil is required, such spoil shall be assessed and managed in accordance with the Waste and Recycling Management Procedure (included in Appendix 7), which includes classification in accordance with the NSW EPA Waste Classification Guidelines (2014) and Addendum to the Waste Classification Guidelines (2014 Part 1: Classifying Waste (NSW EPA, 2016)).

The Material Classification Report will be consistent with the recommended format in Contaminated Land Guidelines: Consultants Reporting on Contaminated Land (NSW EPA, 2020).

Where sampling is required to confirm the waste classification of surplus soil, this will be undertaken in accordance with the ASC NEPM 2013 and the NSW EPA Sampling Design Guidelines (2022).



## 12. Validation of Remediation

### 12.1. Validation Objective

The intent of the validation works is to collect suitable and adequate data to assess whether the remediation objectives have been achieved.

### 12.2. Data Quality Objectives and Data Quality Indicators

The data quality objectives (DQOs) and Data Quality Indicators (DQIs) for the validation of remediation are presented in Appendix 10.

### 12.3. Validation Methodology

#### 12.3.1. Fill Materials in Remediation Area

Following removal of fill/disturbed natural materials in Remediation Area 1 and Remediation Area 2 (including stockpiled materials), the area where fill materials was removed is to be inspected to confirm that fill materials and disturbed natural materials have been removed and exposed ground is undisturbed natural ground. The inspection is to be undertaken by an appropriately qualified contaminated land consultant with experience in identifying fill materials and asbestos containing materials. The following records are to be kept of the inspection:

- area inspected
- date inspected
- representative photographs of the natural ground observed.

Following the removal of stockpiled soil materials validation samples are to be collected in accordance with the requirements in the following table.

Table 9: Asbestos Remediation Area 1 Stockpile Validation Samples

Activity	Detail / Comments
Investigation method	Validation samples are to be collected from soil materials following removal of the stockpiles in Asbestos Remediation Area 1.
Sampling Frequency	Soil samples will be collected from ground surface (i.e. 0-0.1 m bgs) following the removal of the stockpiles at a frequency of 1 sample per 100 m <sup>2</sup> or a minimum of three samples per stockpile. Samples are to be set out in systematic sampling pattern. Soil sampling methods to be undertaken in accordance with Table 11.



### 12.3.2. PFAS Remediation Areas

Existing data is considered to be sufficient for validation purposes in the following PFAS Remediation Areas:

- PFAS Remediation Area 1A
- PFAS Remediation Area 1B
- PFAS Remediation Area 2

Accordingly no further validation sampling is considered to be required for these areas.

Validation sampling is considered to be required for PFAS Remediation Area 3 based on the requirements in the following table.

Table 10: PFAS Excavation Validation Samples

Activity	Detail / Comments
Investigation method	Validation samples are to be collected in circumstances where the extent of material requiring remediation is not fully defined by existing data.
Sampling Frequency	Soil samples will be collected from the wall and floor of the excavation at a frequency of 1 sample per 100 m <sup>2</sup> of the floor of the excavation (0-0.1 m bgs), and one sample per 20 m <sup>2</sup> for excavation walls (and a minimum of one sample per excavation wall). Samples are to be set out in systematic sampling pattern. Soil sampling methods to be undertaken in accordance with Table 11.

### 12.3.3. Sampling Methods

Table 11: Sampling Methods

Activity	Sampling Methods
Soil Sampling Containers	Soil samples for PFAS analysis will be placed in PFAS specific sample containers provided by the laboratory. Soil samples will also be collected in clean acid washed glass jars supplied by the laboratory and sealed with a Teflon-lined lid for subsequent analysis for waste classification purposes if required.
Sample collection	Each soil sample will be collected with new nitrile gloves were used to reduce the potential for cross contamination.
Soil Logging	Soil samples will be logged by a suitably qualified and experienced TTC scientist in accordance with TTC's relevant Standard Operating Practice (SOP), Field Description of Soils, in Schedule B2 of the ASC NEPM 2013. Presence or absence of anthropogenic material and contamination (i.e. odours or staining) will recorded on the soil logs.
Sample Handling and Transportation	The samples will be placed into ice chilled coolers and dispatched to NATA accredited laboratories for analysis under chain of custody (COC) control.
Laboratory Analysis	Soil samples are to be analysed for the PFAS Extended Suite at the Standard LOR.
QA/QC Samples	To measure the accuracy and precision of the data generated by the field and laboratory procedures for this assessment, quality assurance / quality control (QA/QC) samples will be collected in accordance with Table 14 and the DQI's set forth in Appendix 10.



Table 12: Field and Laboratory QA/QC

Item	Acceptable Limit
Analysis of blind (intra-laboratory) duplicates and split (inter-laboratory) duplicates.	<p>Rate of 1:10 primary soil samples for the same analysis of primary samples;</p> <p>Calculation of relative percentage differences between primary and duplicate samples.</p> <p>RPD results for soil samples:</p> <ul style="list-style-type: none"> <li>No Limit (where the average concentration is 0-10 x laboratory limit of reporting (LOR));</li> <li>50% (where the average concentration is 10-20 x laboratory LOR); and</li> <li>30% (where the average concentration is &gt; 20 x laboratory LOR).</li> </ul> <p>RPDs will be considered where a concentration is greater than 10 times the LOR.</p>
Analysis of rinsate blanks	<p>Where non-disposable equipment is used, at least one (1) sample per batch of soil sampling or material type where the source and sampling methods are consistent; and</p> <p>Results less than the laboratory LOR.</p>
Analysis of laboratory prepared trip blanks	<p>At least one (1) sample per batch for soil samples submitted.</p> <p>Results less than the laboratory LOR.</p>
Analysis of laboratory blanks, surrogates, reference and control samples	<p>The laboratories will be required to conduct their own internal quality program for assessment of the repeatability of the analytical procedures and instrument accuracy under their NATA accreditation. This will include analysis of laboratory blank samples, duplicate samples, spike samples, control samples and surrogate spikes. The laboratory QA/QC procedures and results will be described within the laboratory reports.</p> <p>The laboratory internal QA/QC sample results will be reviewed for comparison with the laboratory's NATA guidelines and Schedule B3 of the ASC NEPM 2013.</p>
Laboratories and methods used	NATA accredited for the method. Methods should be in accordance with amended ASC NEPM 2013.
Holding times	Samples should be analysed within recommended holding times.
Sample LORs	Results less than the adopted assessment criteria; justify/quantify if different.

### 12.3.4. Survey of Remediation Areas

CPBG is to survey the extent of excavations undertaken to confirm that the material requiring excavation has been removed. Survey data is to be included in the Validation Report.

## 13. Imported Material

### 13.1.1. Overview

CPBG will need to import material to construct the piling platform, and reinstate remediation excavations.

Imported material shall be assessed in accordance with the Materials Reuse and Importation Procedure (included in Appendix 7) to ensure suitability for use.

TTMP recommends that site won or quarried VENM is used where possible to reduce the risk of importing waste/contamination from other construction sites or in recycled products.





Imported material will be required to be suitable (from a contamination perspective) for the proposed land use. Imported soil/aggregate will be required to be classified as excavated natural material (ENM) or VENM, or other product having a suitable resource recovery exemption published by the NSW EPA.

Prior to importation, the CPBG Environmental Coordinator needs to assess whether the material is suitable for use at the SBT Site. To confirm the material is suitable for use, the following would be required:

- The CPBG Environmental Coordinator conducts a detailed review of documentation provided by the material supplier to check whether the material complies with a suitable resource recovery exemption (RRE) and order.
- Where adequate documentation is provided by the material supplier and/or generator to demonstrate the material is suitable for use, the CPBG Environmental Coordinator will complete periodic inspections to check the material is consistent with the descriptions provided in the documentation. If considered necessary, the CPBG Environmental Coordinator will also undertake a site visit of the source sites to check the material is consistent with information in the documents provided by the material supplier/generator.
- In the event that the documentation is not adequate to demonstrate the material is suitable for use or may potentially be suitable for use pending further assessment (such as for recycled/processed products supplied under a resource recovery order/exemption, and VENM/ENM from another construction site), the CPBG Environmental Coordinator will collect representative samples for laboratory analysis to assess whether the material is suitable for use. Sampling and analysis should be carried out prior to import for validation. CPBG can carry out validation checks at the source site for due diligence where practical or if there is limited space on site.

Site won, bedrock or quarried, imported VENM will be exempt from sampling and analysis if documentation confirming the VENM status can be provided by the supplier/generator. Commercially quarried material which is extracted and sold from a quarry is exempt from a VENM certificate provided that the supplier can confirm the source/quarry of the material and the quarry has an Environment Protection Licence (EPL) issued by the NSW EPA for extractive purposes.

Recycled or processed products that are not VENM, or ENM from other sources will require sampling and analysis to be carried out to assess their suitability for use at the SBT Site, and may also need to comply with a general or specific RRE for reuse.

### 13.1.2. Visual Inspections

Imported materials will be visually inspected periodically during importation by a CPBG representative or the competent Environmental Consultant to check that the material is consistent with that described in the source documentation, and for the presence of potential contamination.

### 13.1.3. Sampling and Field Screening

Where sampling is required to be carried out to assess imported materials, fieldwork will be undertaken by competent Environmental Consultant following written field procedures based on industry accepted standard practice and the ASC NEPM 2013 and the NSW EPA Sampling Design Guidelines (2022).

Samples will be collected from stockpiles during importation of the soil by the competent Environmental Consultant. Soil samples will be collected using a hand tools or excavator depending on the dimensions of the stockpile.



A photo-ionisation detector (PID) with 10.6 eV lamp may be used to screen soil samples for the potential presence of volatile organic compounds (VOCs).

Between each sampling location, new nitrile gloves shall be used to reduce the potential for cross contamination to occur.

Samples collected will be identified by a unique sample identifier. The sample identifier will be included on all sample jars and associated paperwork including field sheets and chain of custody forms.

#### 13.1.4. Sample Storage and Preservation

Samples shall be placed into laboratory prepared and supplied sample containers that are appropriate for the COPC.

For analysis of VOCs, samples will be collected as rapidly as possible with minimal headspace where practicable, attempting to minimise volatile losses. Samples shall be submitted as soon as possible to the laboratories to prevent loss while in storage or transit and analysed within recommended holding times.

Where analysis of samples for PFAS is required, the sampler will consider the guidance within the PFAS NEMP (HEPA, 2020)

Sample containers shall be placed directly into an ice filled cooler and transported to the laboratories under chain of custody protocol. All samples are required to be documented as received by the laboratory chilled and intact.

#### 13.1.5. Sampling Equipment Decontamination Procedures

Non-disposable sampling equipment (e.g. trowel, shovel etc.) will be decontaminated between each sampling location using the following approach or similar depending on the equipment used:

- Scrub all surface of the equipment with a wire brush to remove soil and/or gross contamination.
- Scrub the equipment in a bucket filled with a solution of phosphate and PFAS free detergent (e.g. Liquinox), using a brush that can aid the removal of soil attached to sampling equipment.
- Rinse the equipment in clean potable water.



### 13.1.6. Equipment Calibration

Equipment will be calibrated as per the manufacturer's instructions.

The PID will be bump tested at the commencement of each day of sampling and if necessary, during the day in accordance with the procedure provided by the supplier.

Calibration certificates will be retained and provided within the Validation Report.

### 13.1.7. Field Quality Control Samples

The following types of field quality control samples will be collected:

- Intra-laboratory and inter-laboratory duplicates at a minimum rate of 5% (i.e. 1 duplicate per 20 primary samples)
- Rinsate blanks, where non-disposable sampling equipment is used
- Trip blank and trip spike samples prepared by the laboratory.

Field duplicate soil samples will be collected from soil immediately adjacent to the primary sample by placing approximately equal portions of the primary sample into two sample jars. Samples shall be labelled so as to conceal their relationship to the primary sample from the laboratory.

Rinsate blanks will consist of pre-preserved bottles filled with laboratory prepared water that is passed over decontaminated field equipment and then collected in containers used for the sampling process. Rinsate blanks shall be preserved in a similar manner to the original samples.

Trip blank and trip spike samples will be prepared by the primary laboratory during soil validation sampling, carried to the field unopened and subjected to the same preservation methods as the primary field samples.

### 13.1.8. Laboratory Analysis

Selected soil samples will be analysed by ISO/IEC 17025 certified laboratories with National Association of Testing Authorities (NATA) accredited methods for the analytes outlined in the following table. The analytical suite will be determined by the contaminated land consultant based on the source and characteristics of the material. The sampling and analysis of the material should be undertaken during importation of the material to validate what is being supplied is suitable for use. Samples should be collected by the competent Environmental Consultant.

Table 13: Proposed Laboratory Analysis for Imported Soil Materials

Type	Rate (Per source)	Analysis
VENM (not quarry supplied)	<ul style="list-style-type: none"> <li>• &lt;200 m<sup>3</sup>: 1/25m<sup>3</sup> with a minimum of 3 samples</li> <li>• 200m<sup>3</sup> – 2,500m<sup>3</sup>: 1/25m<sup>3</sup>: 10 samples with consideration of the 95% upper confidence limit of contaminant concentrations*.</li> <li>• &gt;2,500m<sup>3</sup>: 1/250m<sup>3</sup></li> <li>• other frequency as agreed with the Site Auditor</li> </ul>	Source dependant although may include TRH, BTEX, PAH, OCP, OPP, PCB, PFAS, metals and asbestos.



Type	Rate (Per source)	Analysis
ENM	As per Table 1 of the NSW EPA current ENM Order 2014	As per Table 4 of the NSW EPA current ENM Order 2014 (metals, electrical conductivity, pH, TRH, BTEX, PAHs, metals, foreign materials), PFAS, OCP, OPP, PCB and asbestos.
Other Soil/aggregate Materials supplied in accordance with an appropriate NSW EPA resource recovery order/exemption	<ul style="list-style-type: none"> <li>&lt;200 m<sup>3</sup>: 1/25m<sup>3</sup> with a minimum of 3 samples</li> <li>200m<sup>3</sup> – 2,500m<sup>3</sup>: 1/25m<sup>3</sup>: 10 samples with consideration of the 95% upper confidence limit (UCL) of contaminant concentrations*.</li> <li>&gt;2,500m<sup>3</sup>: 1/250m<sup>3</sup></li> <li>other frequency as agreed with the Site Auditor</li> </ul>	Source dependant although may include TRH, BTEX, PAH, OCP, OPP, PCB, PFAS, metals and asbestos.

TRH: Total recoverable hydrocarbons

BTEX: Benzene, toluene, ethylbenzene and xylene

PAH: Polycyclic aromatic hydrocarbons

OCP/OCP: Organochlorine pesticides/ organophosphate pesticides

PCB: Polychlorinated biphenyls

Metals: Arsenic, cadmium, chromium, lead, nickel, zinc, mercury and copper

PFAS: Perfluoroalkyl and Polyfluoroalkyl Substances

\* 95% UCL does not apply to asbestos.

### 13.1.9. Quality Assurance and Control

Project specific quality assurance/quality control (QA/QC) procedures shall be implemented to improve transparency, consistency, comparability, completeness, and confidence in the data collected.

The following data quality indicators (DQIs) shall be adopted.

Table 14: DQIs for Assessment of Imported Material with Sample Analysis

Item	Acceptable Limit
Analysis of blind (intra-laboratory) duplicates and split (inter-laboratory) duplicates.	<p>Rate of 1:20 (5%) primary soil samples for the same analysis of primary samples;</p> <p>Calculation of relative percentage differences between primary and duplicate samples.</p> <p>RPD results for soil samples:</p> <ul style="list-style-type: none"> <li>No Limit (where the average concentration is 0-10 x laboratory limit of reporting (LOR));</li> <li>50% (where the average concentration is 10-20 x laboratory LOR); and</li> <li>30% (where the average concentration is &gt; 20 x laboratory LOR).</li> </ul> <p>RPDs will be considered where a concentration is greater than 10 times the LOR.</p>
Analysis of rinsate blanks	<p>Where non-disposable equipment is used, at least one (1) sample per batch of soil sampling or material type where the source and sampling methods are consistent; and</p> <p>Results less than the laboratory LOR.</p>



Item	Acceptable Limit
Analysis of laboratory prepared trip blanks	At least one (1) sample per batch for soil samples or material type where the source and sampling methods are consistent where volatiles are analysed; and Results less than the laboratory LOR.
Analysis of laboratory prepared trip spikes	At least one (1) sample per batch for soil samples or material type where the source and sampling methods are consistent where volatiles are analysed; and Results within 60-120% recovery.
Analysis of laboratory blanks, surrogates, reference and control samples	The laboratories will be required to conduct their own internal quality program for assessment of the repeatability of the analytical procedures and instrument accuracy under their NATA accreditation. This will include analysis of laboratory blank samples, duplicate samples, spike samples, control samples and surrogate spikes. The laboratory QA/QC procedures and results will be described within the laboratory reports.  The laboratory internal QA/QC sample results will be reviewed for comparison with the laboratory's NATA guidelines and Schedule B3 of the ASC NEPM 2013.
Laboratories and methods used	National Association of Testing Authorities accredited for the method. Methods should be in accordance with amended ASC NEPM 2013.
Holding times	Samples should be analysed within recommended holding times.
Sample LORs	Results less than the adopted assessment criteria; justify/quantify if different.

### 13.1.10. Imported Material Assessment Reporting

A letter report will be prepared to document the assessment carried out and confirm, or otherwise, the suitability of the imported material for use at the SBT Site. A separate report will be prepared for each source site and separate batch of soil.

## 14. Validation Report

At the completion of the SBT Works, a Validation Report will be prepared in general accordance with NSW EPA 2020 and the ASC NEPM 2013, documenting the works completed within the SBT Site. This report shall contain information including:

- Information demonstrating compliance with appropriate regulations and guidelines.
- Information demonstrating compliance with this RAP.
- Validation completed as per the requirements of Section 11, Section 12 and Section 13
- Any variations to the strategy undertaken during the implementation of the remedial works.
- Details of the source, classification and suitability of all imported materials.
- Details of any environmental incidents and/or unexpected finds of contamination occurring during the course of the SBT Works and the actions undertaken in response to these incidents.
- Details on waste classification, tracking and off-site disposal (including environment protection licence (EPL) details).



- Details on the reuse of materials on site and/or offsite within the FS01 site, if any. This is to include the location of where materials have been cut and reused on the SBT Site.
- Details of importation of VENM/ENM/ENM
- On-site material tracking to demonstrate validation of remediation works such that the site has been made suitable for the proposed land uses.
- Survey data of remediation areas post-remediation to demonstrate the required remediation extents have been achieved.
- Clear statement of the suitability of the SBT Site that is the subject of the validation report, for the commercial and open space land uses shown in Figure 3, Appendix 1.

The Validation Report is to be submitted to the Site Auditor for review upon completion.

## 15. Conclusion

The remediation strategy required by Sydney Metro to mitigate risks from asbestos and PFAS materials is the removal of contamination sources such that the SBT Site is suitable for commercial and open space land use as per the configuration of the SBT Site shown in Figure 3, Appendix 1.

Fill materials in the Medium Impact Area potentially contain asbestos and are to be removed from the SBT Site.

Reduction in flux of PFAS migrating off-site via surface and groundwater pathways is expected to be achieved through a combination of removal of PFAS-impacted soil, introduction of hardstand pavement and stormwater drainage in commercial land use areas that will substantially reduce infiltration through soils containing residual levels of PFAS.

Based on the implementation of this RAP and the intended land use of the SBT Site, TTMP considers that potential risks from asbestos and PFAS contamination can be adequately mitigated to make the SBT Site suitable for generic commercial and open space land uses as shown in Figure 3, Appendix 1.



## APPENDIX 1 Figures





- LEGEND**
- Aerotropolis Core Station Site Layout
  - Tunnel Alignment
  - Tunnel Alignment - Chainage
  - Tunnel Alignment - Cross Passage
  - Cadastral Boundary
  - Property Boundary
  - SBT Site Boundary
  - Station Box / Shaft

**SOURCE**  
 Site boundaries from Tetra Tech Coffey.  
 Station box, layouts and alignment supplied by CPBG.  
 Cadastre and property boundary from DFSI.  
 Aerial imagery from Nearmap (capture date 19-01-2019).

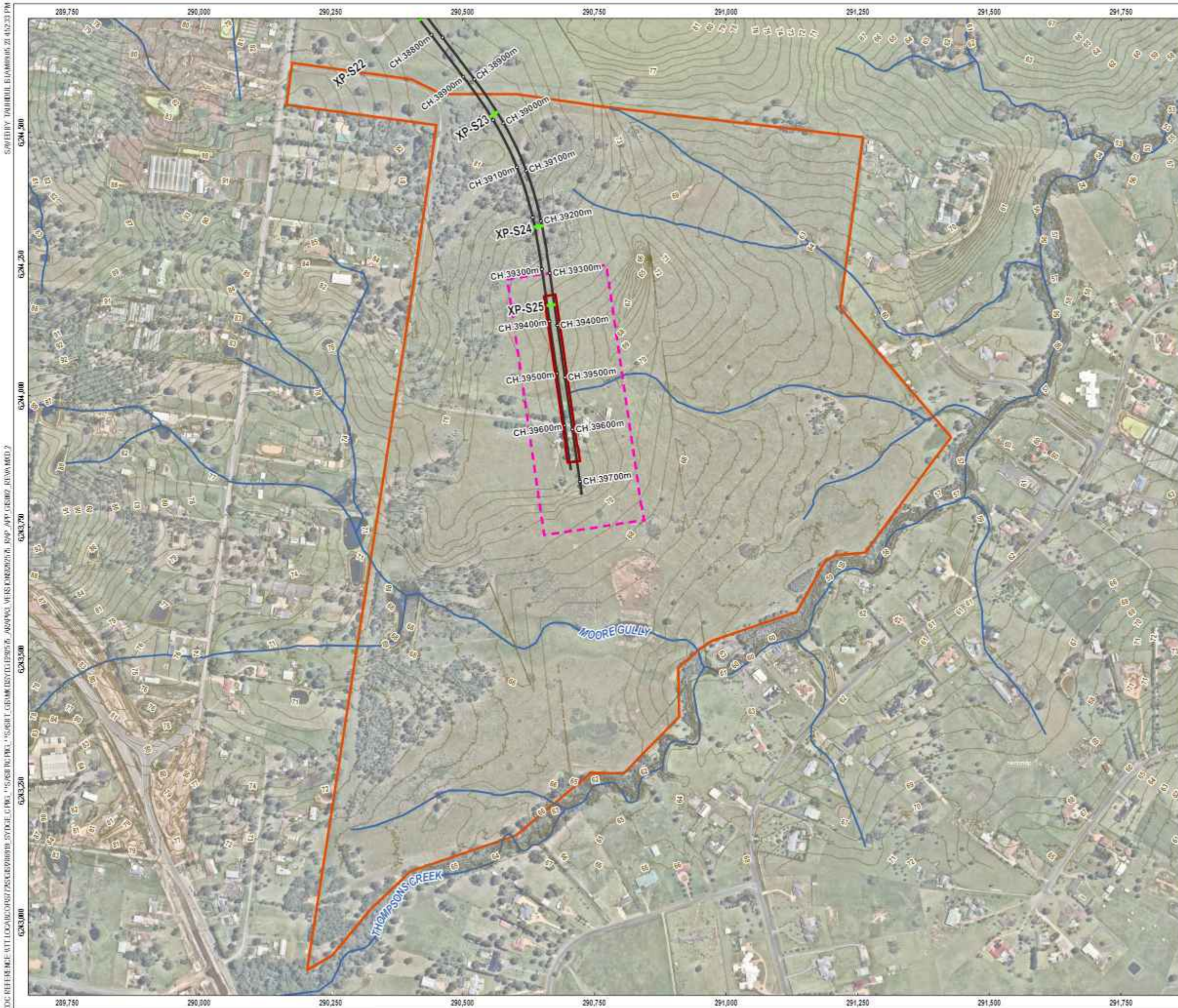
SCALE 1:4,500  
 PAGE SIZE: A3  
 PROJECTION: GDA2020 MGA Zone 56

CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 1**  
 Site Property Plan  
 Aerotropolis Core Station

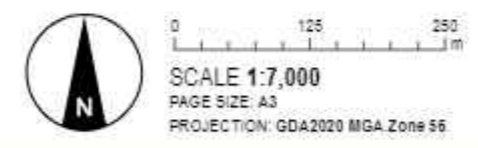






- LEGEND**
- Elevation Contour (mAHD)
  - Tunnel Alignment
  - Tunnel Alignment - Chainage
  - Tunnel Alignment - Cross Passage
  - Non-perennial Watercourse
  - Property Boundary
  - SBT Site Boundary
  - Station Box / Shaft

**SOURCE**  
 Site boundaries and elevation from Tetra Tech Coffey.  
 Station box, layouts and alignment supplied by CPBG.  
 Cadastre and watercourses from DFSI.  
 Aerial imagery from Nearmap (capture date 19-01-2019).

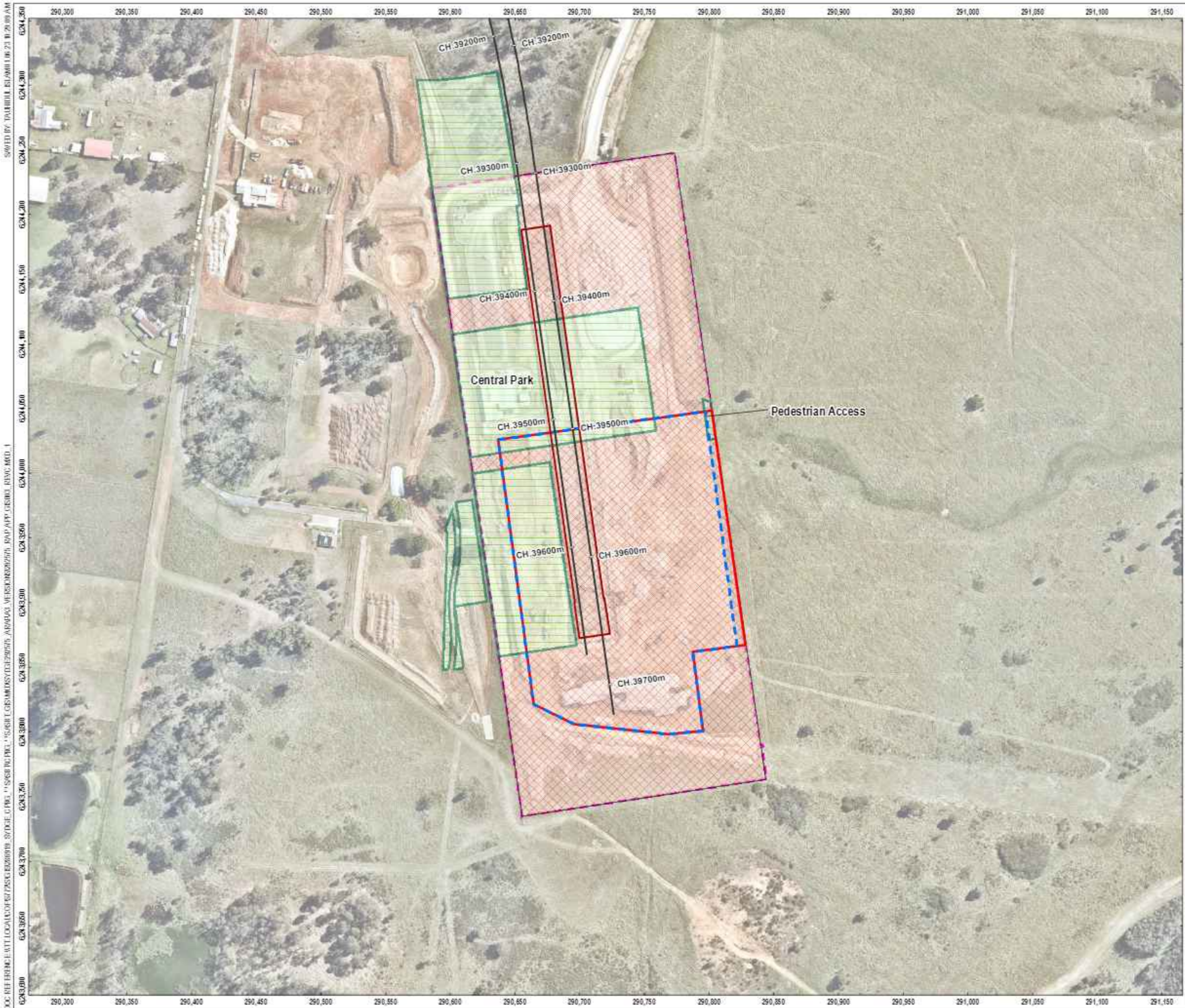


CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 2**  
 Topography and Surface Water  
 Aerotropolis Core Station

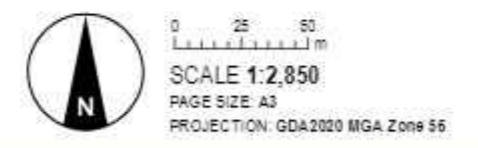
DOC REFERENCE: WTT.LOCAL\COFF\754\GIS\00010101.SYDGE\_CFM3\_151610101.PK1\_151610101.GBK\151610101.DWG\151610101\_VERS1\K00012101\_RAP\_APP\_GIS\02\_REVA\_MXD.7  
 SAVED BY: DAVID HUI BLAMHUIS ON 04/23/23 PM

DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.



- LEGEND**
-  Tunnel Alignment - Chainage
  -  Tunnel Alignment - Cross Passage
  -  Tunnel Alignment
  -  Medium Impact Area
  -  RAP Boundary
  -  SBT Site Boundary
  -  Open Space Land Use
  -  Commercial Land Use

**SOURCE**  
 Groundwater monitoring wells compiled by Tetra Tech Coffey.  
 Alignment buffer from Tetra Tech Coffey.  
 Alignment supplied by CPBG.  
 Cadastre, roads, and watercourses from DFSI.  
 Aerial imagery from Nearmap (capture date 18-03-2023).



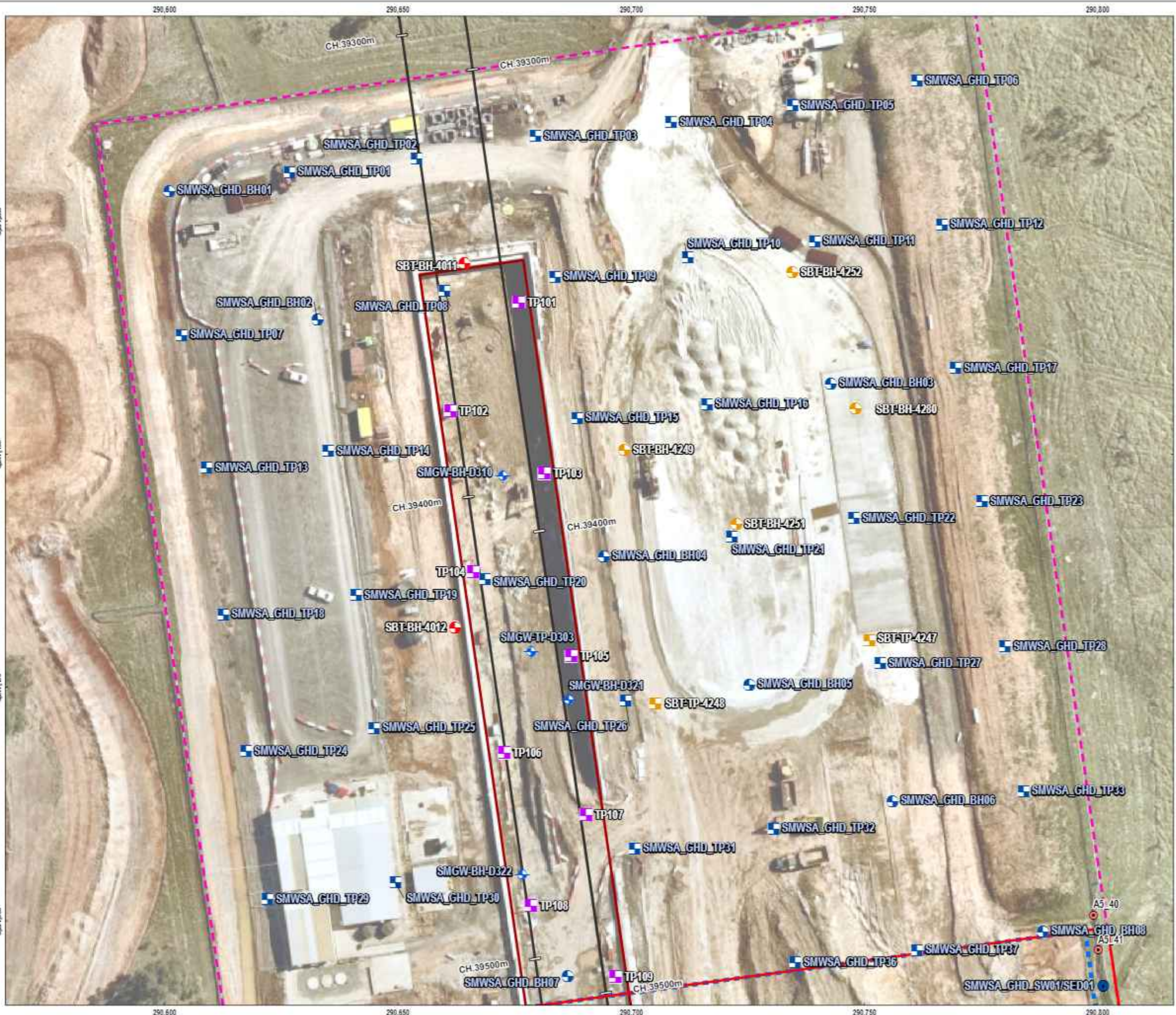
CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 3**  
 Future Land Uses Within SBT Site

DOC REFERENCE: \\TETRA\GEO\754\GIS\2023\06\01\754-SYDGE292575\_RAP\_F003\_GIS\_REV0.DWG  
 DRAWN BY: TETRA\GEO\754\GIS\2023\06\01\754-SYDGE292575\_RAP\_F003\_GIS\_REV0.DWG

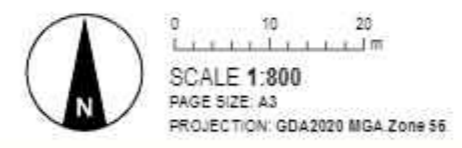
DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLIC USE.

DOC REFERENCE: \\IT.LOC\B205177\AS\G5000000\SYD\_AE\_CPM2\_15765010.PKG\_15765010.GENM.DWG (29/05/23) 15:43:17, G:\MKT\DESIGN\292575\_292575\_RAP\_GED004A\_PWA.MXD, II  
 S:\EED\Y\DAVID\0161\BAMBOO\06\_23\_23\_20 PM



- ### LEGEND
- Supplementary PFAS Test Pit
  - Supplementary Test Pit for ENM Assessment
  - Contaminated Land Location**
  - Borehole
  - Test Pit
  - Geotechnical/Hydrogeological Location**
  - Borehole
  - GHD Investigations (2022)**
  - Borehole
  - Test Pit
  - Monitoring Well
  - Surface Water Sample
  - Existing Investigation Location**
  - Borehole
  - Test Pit
  - Tunnel Alignment
  - Tunnel Alignment - Chainage
  - SBT Site Boundary
  - Remediation Area
  - Medium Impact Area
  - Station Box / Shaft

**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD and Golder-Douglas.  
 Station box, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 05-03-2023).

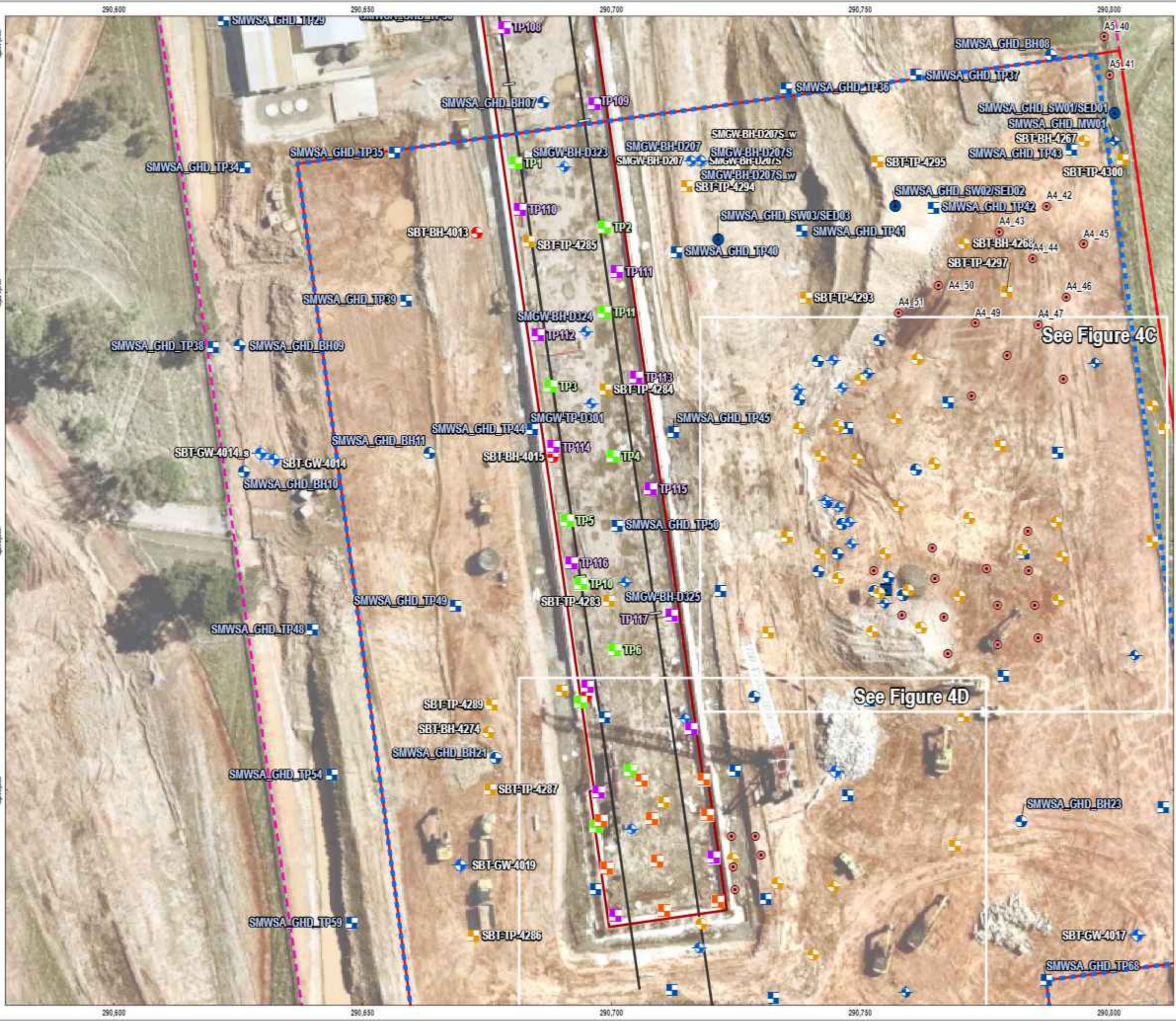


CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS  
**FIGURE 4A**

**Aerotropolis Sampling Locations**

**TETRA TECH COFFEY**

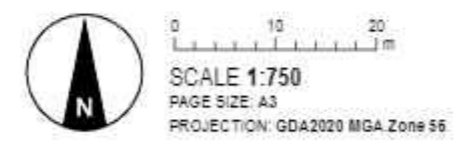
DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.



**LEGEND**

- Supplementary PFAS Test Pit
- ENM Assessment Test Pit February 2023
- PFAS Delineation Test Pit February 2023
- ENM Assessment Test Pit December 2022
- Contaminated Land Location
- Borehole
- Test Pit
- Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well
- GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- SBT Site Boundary
- Medium Impact Area
- Remediation Area
- Station Box / Shaft

**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD and Golder-Douglas.  
 Station box, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 05-03-2023).



CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

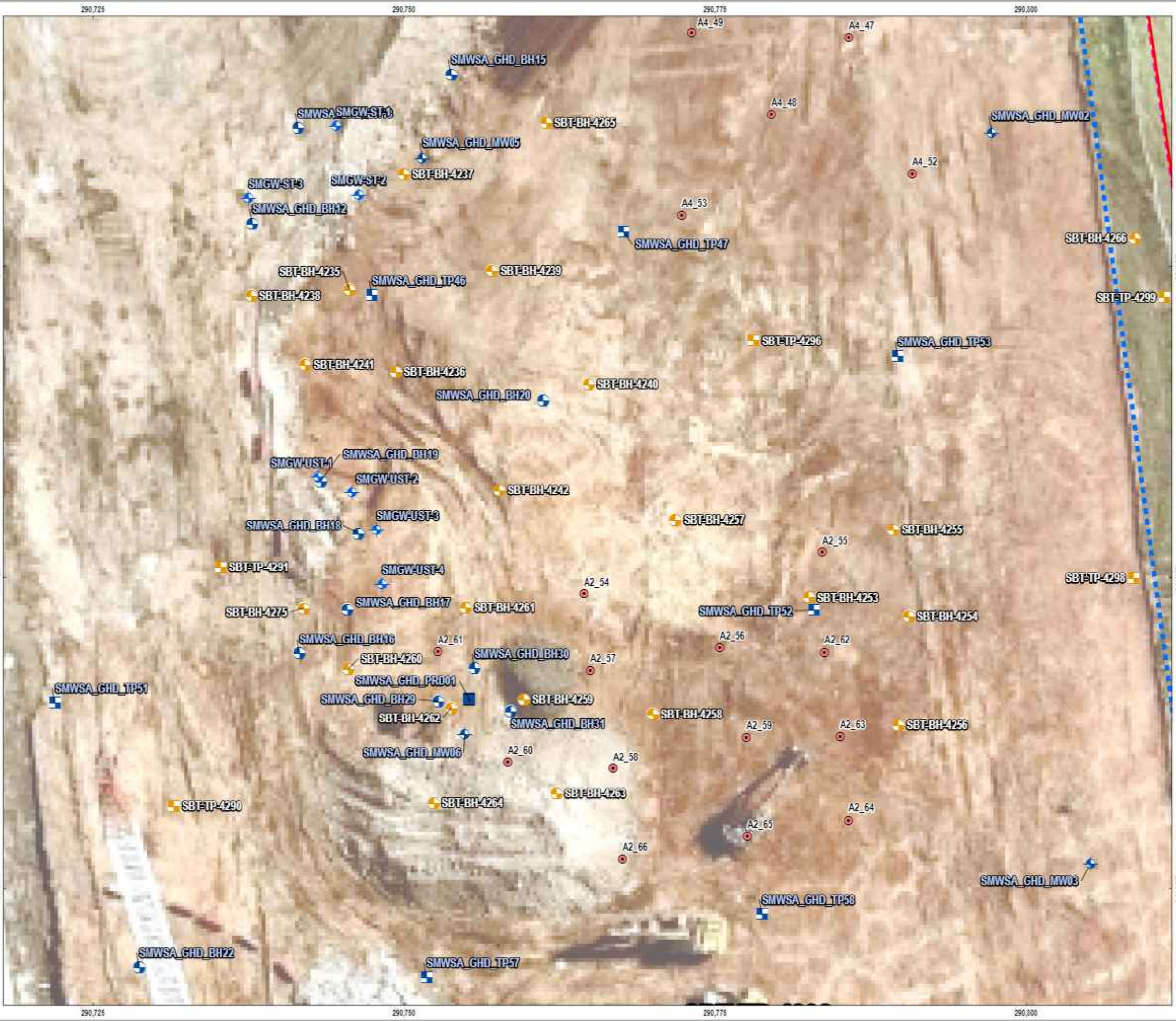
**FIGURE 4B**

**Aerotropolis Sampling Locations**



SWIFT BY: T00H00L E1AM 1105 21 11:41:25 AM

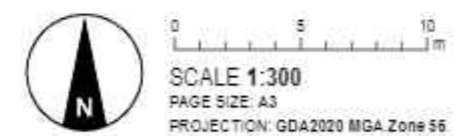
DOC REFERENCE: WTT.LOCAL\00157754\3659\0000101.SYDGE.CFM3\_11545810101.PKL\_11545810101.GRAB.DSYDGE292575\_RAP\_GSDM4\_P1WA.MXD.1



**LEGEND**

- Supplementary PFAS Test Pit
- Contaminated Land Location
- Borehole
- Test Pit
- GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Other
- Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment - Chainage
- ▭ SBT Site Boundary
- ▭ Medium Impact Area
- ▭ Remediation Area
- ▭ Station Box / Shaft

**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD and Golder-Douglas.  
 Station box, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 05-03-2023).



CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 4C**

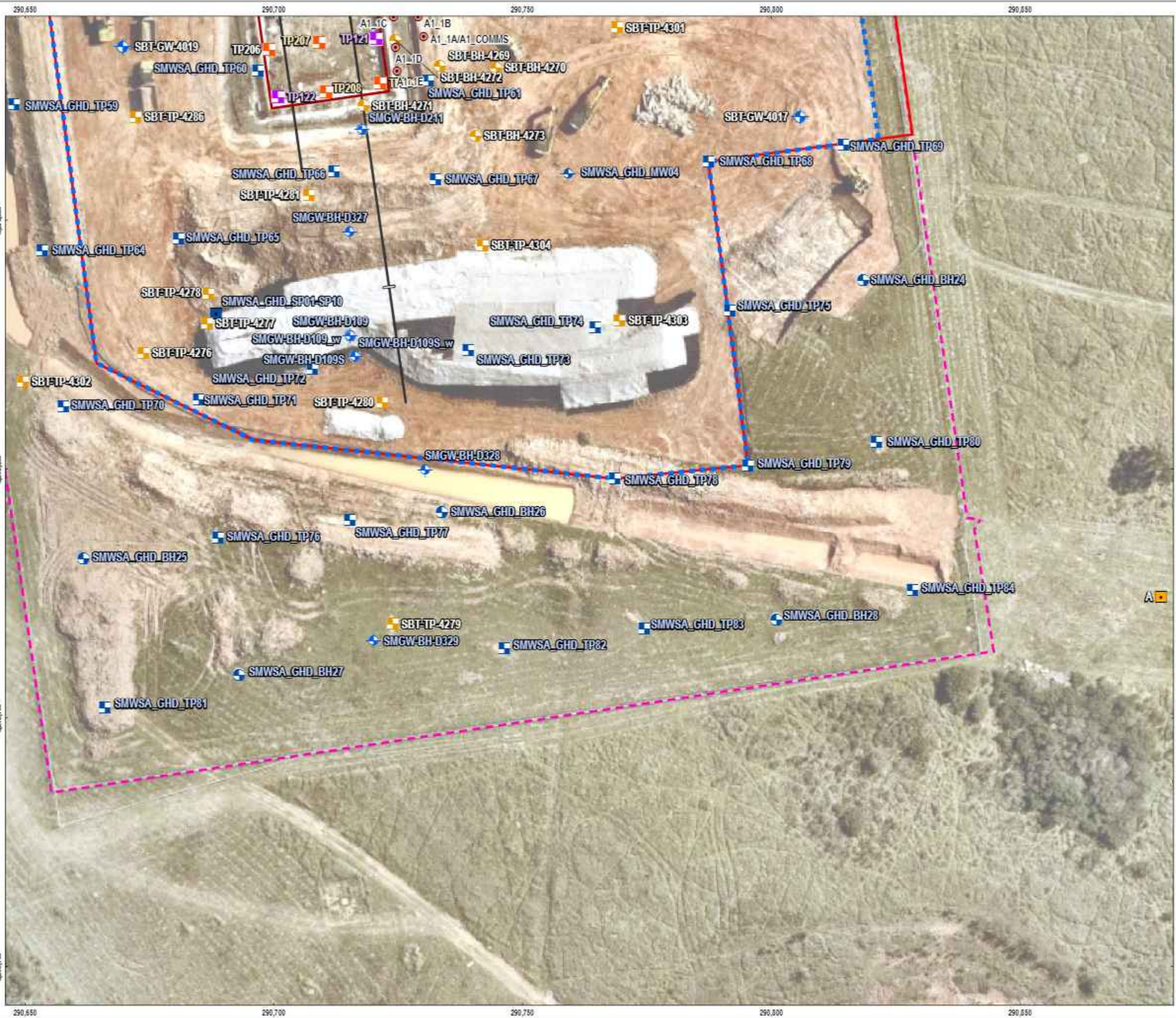
**Aerotropolis Sampling Locations**



DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.



SCAFFOLD BY: TOUNHILL\_EJLAM\_1105\_21\_112121.AM  
 DOC REFERENCE: WTT\_LOCAL\00517755\GSD\000001\_SYDGE\_CPM2\_11545810101\_PKL\_11545810101\_GBAW\_DSYD1292575\_11545810101\_RAP\_GSD004\_REV.A.MD.7



**LEGEND**

- ENM Assessment Test Pit February 2023
- PFAS Delineation Test Pit February 2023
- Contaminated Land Location
- Borehole
- Test Pit
- Hand Sample
- Geotechnical/Hydrogeological Location
- Monitoring Well
- GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Other
- Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- SBT Site Boundary
- Medium Impact Area
- Remediation Area
- Station Box / Shaft

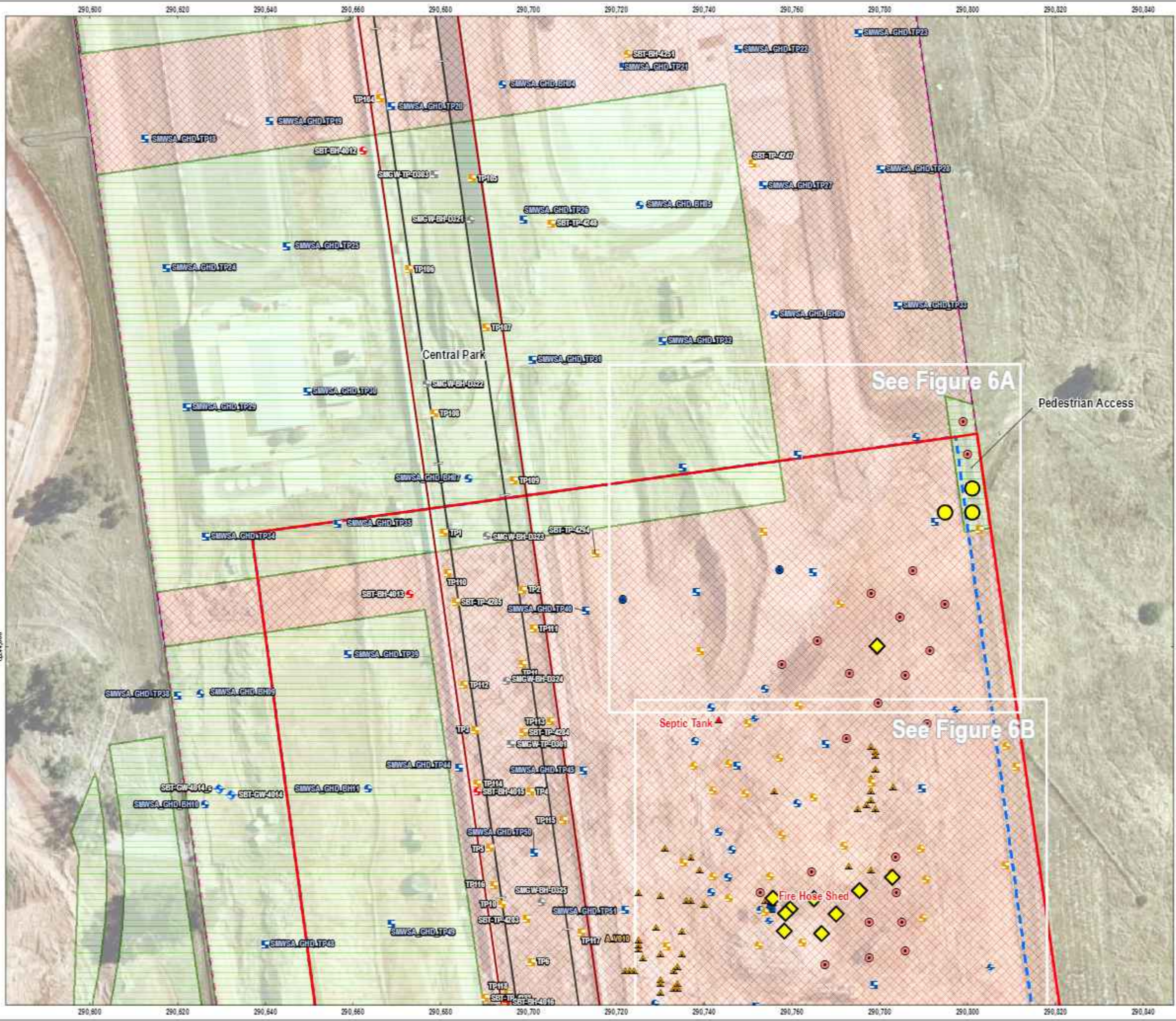
**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD and Golder-Douglas.  
 Station box, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 05-03-2023).

SCALE 1:750  
 PAGE SIZE: A3  
 PROJECTION: GDA2020 MGA Zone 56

CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS  
**FIGURE 4E**  
 Aerotropolis Sampling Locations

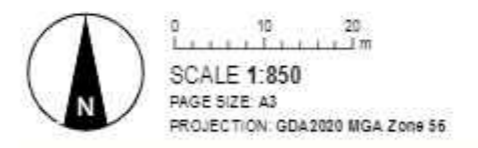


DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.



- LEGEND**
- |  |                                    |
|--|------------------------------------|
| ▲ Historic Site Location                           | GHD Investigations (2022)          |
| ● Sample Location Exceeds PFAS                     | ⊕ Borehole                         |
| ⬠ Remediation Criteria for Open Space Land Use     | ⊖ Test Pit                         |
| ● Sample Location Exceeds PFAS                     | ⊕ Monitoring Well                  |
| ⬠ Remediation Criteria for Commercial Land Use     | ⊖ Surface Water Sample             |
| ● Supplementary PFAS Test Pit                      | ⊕ Other                            |
| ⬠ Additional Contaminated Land Location            | ▲ Post-demolition Sample           |
| ⊕ Borehole   | — Tunnel Alignment - Chainage      |
| ⊖ Test Pit   | — Tunnel Alignment - Cross Passage |
| ⊕ Monitoring Well                                  | — Tunnel                           |
| ⊖ Surface Water Sample                             | ⊕ Medium Impact                    |
| ⊕ Hand Sample                                      | ⊖ RAP Boundary                     |
| ⬠ Additional Geotechnical/Hydrogeological Location | ⊖ SBT Site Boundary                |
| ⊕ Borehole   | ⊖ Open Space Land Use              |
| ⊖ Monitoring Well                                  | ⊖ Commercial Land Use              |
| ▲ Cone Penetration Test                            |                                    |
| ⊕ Downhole Seismic                                 |                                    |
| ⊖ Hydrofracture In-situ Stress Test                |                                    |

**SOURCE**  
 Groundwater monitoring wells compiled by Tetra Tech Coffey.  
 Alignment buffer from Tetra Tech Coffey.  
 Alignment supplied by CPBG.  
 Cadastre, roads, and watercourses from DFSI.  
 Aerial imagery from Nearmap (capture date 18-03-2023).



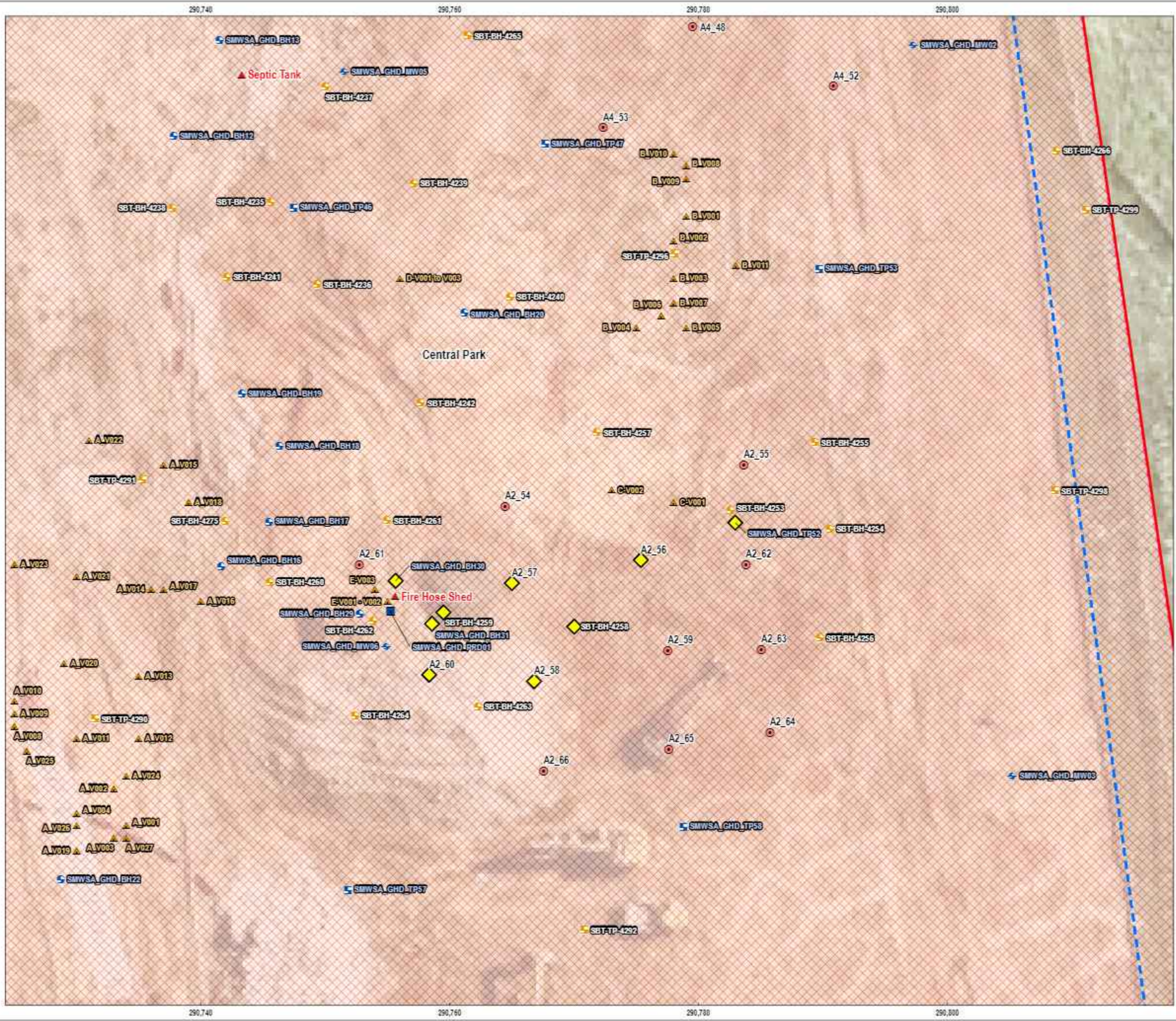
CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 6**  
**PFAS Exceedances**



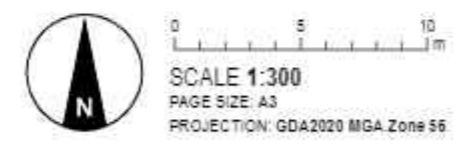






- LEGEND**
- ▲ Historic Site Location
  - Sample Location Exceeds PFAS Remediation Criteria for Open Space Land Use
  - ◆ Sample Location Exceeds PFAS Remediation Criteria for Commercial Land Use
  - Supplementary PFAS Test Pit
  - Additional Contaminated Land Location: Borehole, Test Pit, Monitoring Well, Surface Water Sample, Hand Sample
  - Additional Geotechnical/Hydrogeological Location: Borehole, Monitoring Well, Cone Penetration, Downhole Seismic, Hydrofracture In-situ Stress Test
  - GHD Investigations (2022): Borehole, Test Pit, Monitoring Well, Surface Water Sample, Other
  - ▲ Post-demolition Sample
  - Tunnel Alignment-Chainage
  - Tunnel Alignment-Cross Passage
  - Tunnel
  - Medium Impact
  - Remediation Area
  - SBT Site Boundary
  - Open Space Land Use
  - Commercial Land Use

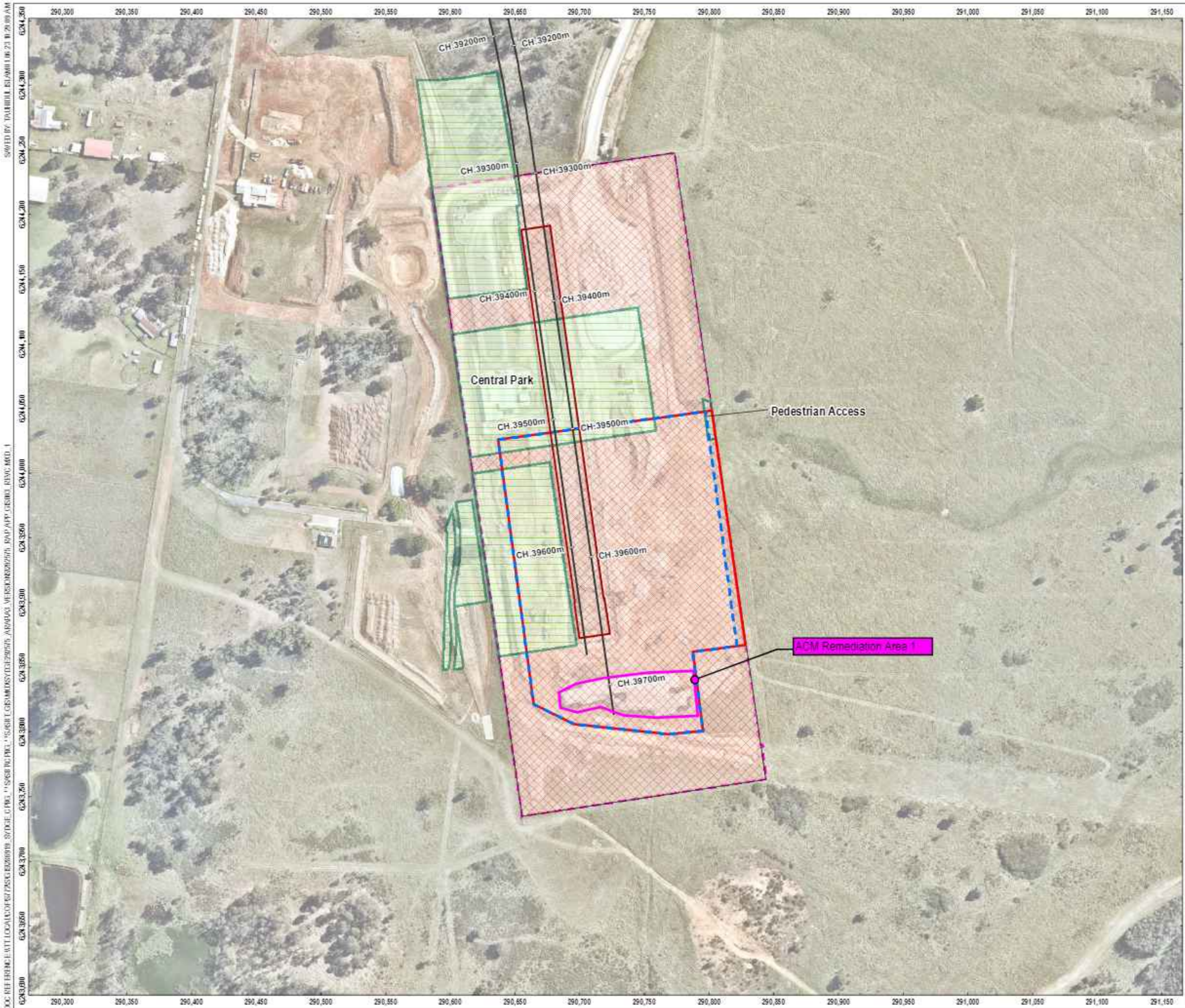
**SOURCE**  
 Groundwater monitoring wells compiled by Tetra Tech Coffey.  
 Alignment buffer from Tetra Tech Coffey.  
 Alignment supplied by CPBG.  
 Cadastre, roads, and watercourses from DFSI.  
 Aerial imagery from Nearmap (capture date 18-03-2023).



CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS  
**FIGURE 6B**  
**PFAS Exceedances**

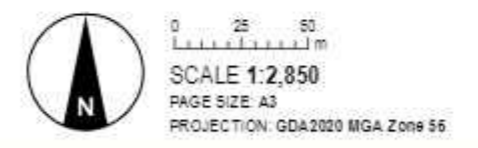






- LEGEND**
-  Tunnel Alignment - Chainage
  -  Tunnel Alignment - Cross Passage
  -  Tunnel Alignment
  -  Medium Impact Area
  -  RAP Boundary
  -  SBT Site Boundary
  -  Open Space Land Use
  -  Commercial Land Use

**SOURCE**  
 Groundwater monitoring wells compiled by Tetra Tech Coffey.  
 Alignment buffer from Tetra Tech Coffey.  
 Alignment supplied by CPBG.  
 Cadastre, roads, and watercourses from DFSI.  
 Aerial imagery from Nearmap (capture date 18-03-2023).



CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 7B**  
 Remediation Areas

DOC REFERENCE: \\WTT.LOC\A\01\677545\G\_E292575\_01\SYDGE292575\_RAP\_F003\_GIS\_REV0\_1  
 DRAWN BY: TAUBHILL\_EJL\AMH106.23.10.20.09.AM

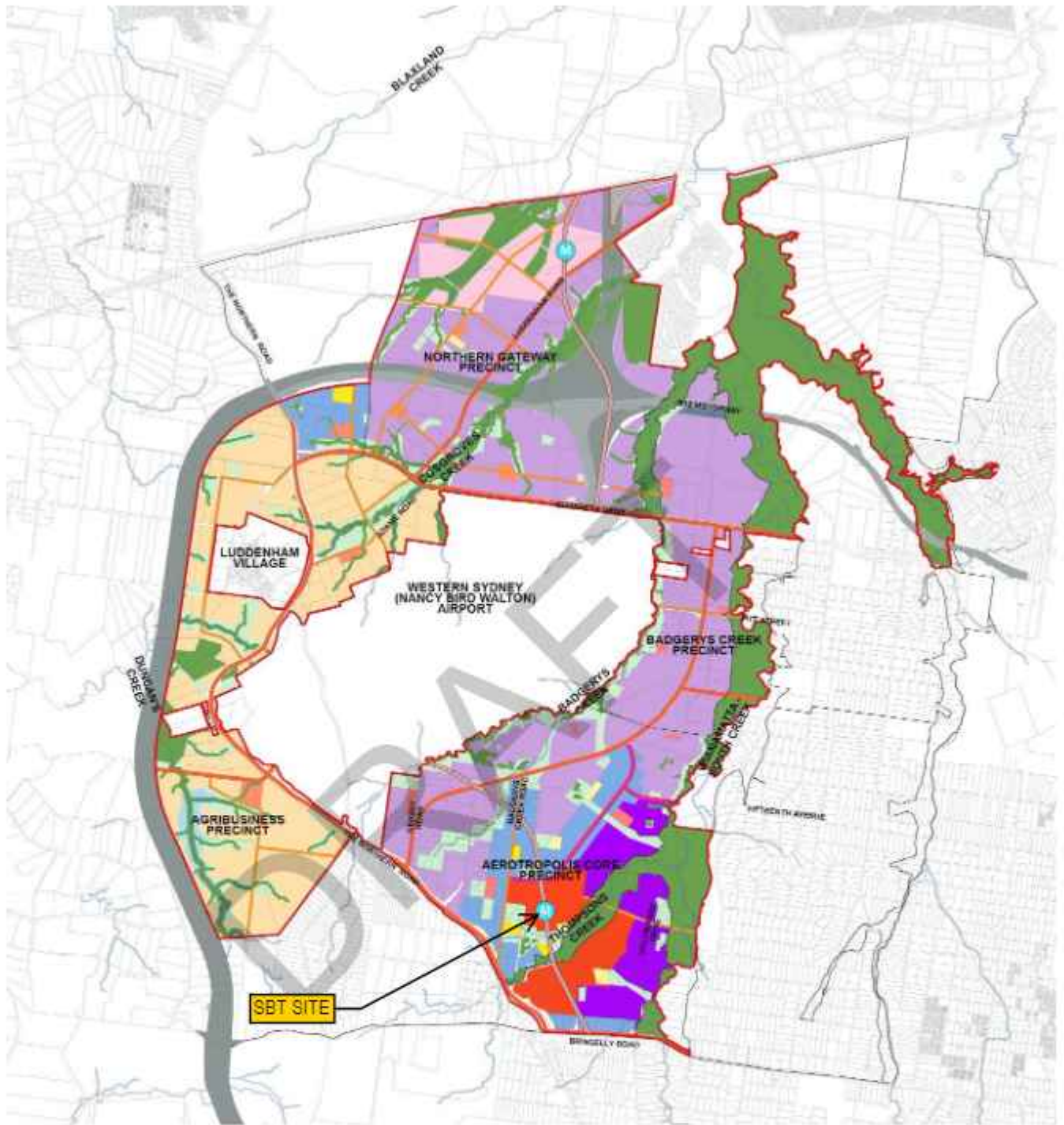
DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLIC USE.

## APPENDIX 2 Precinct and Master Plan



## Appendix 2.1 Precinct Plans

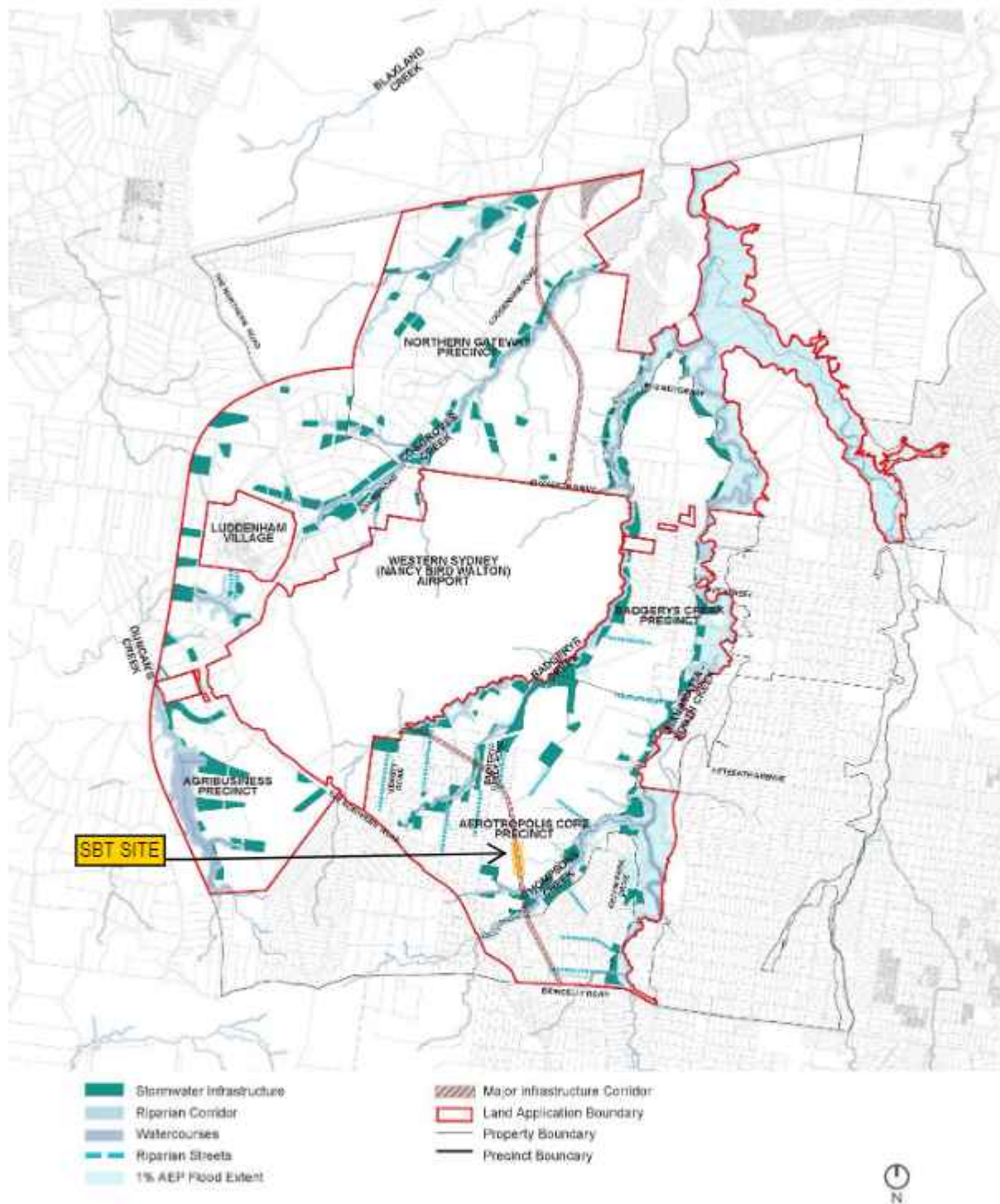




- |                               |                                   |                               |
|-------------------------------|-----------------------------------|-------------------------------|
| Commercial centre - mixed use | Specialised centre mixed use      | Major Infrastructure Corridor |
| Local/Neighbourhood Centre    | Open Space / Stormwater Land      | M12 motorway                  |
| Business and enterprise       | Environment and Recreation        | Outer Sydney Orbital          |
| Mixed use residential         | Primary arterial road             | East West Rail Link           |
| Agribusiness                  | Primary arterial road (rapid bus) | Metro Station                 |
| Enterprise and light industry | Sub-arterial                      | Land Application Boundary     |
| Education                     |                                   | Watercourses                  |
| Special Infrastructure        |                                   | Property Boundary             |
|                               |                                   | Precinct Boundary             |



Figure 3 Land Use and Structure Plan



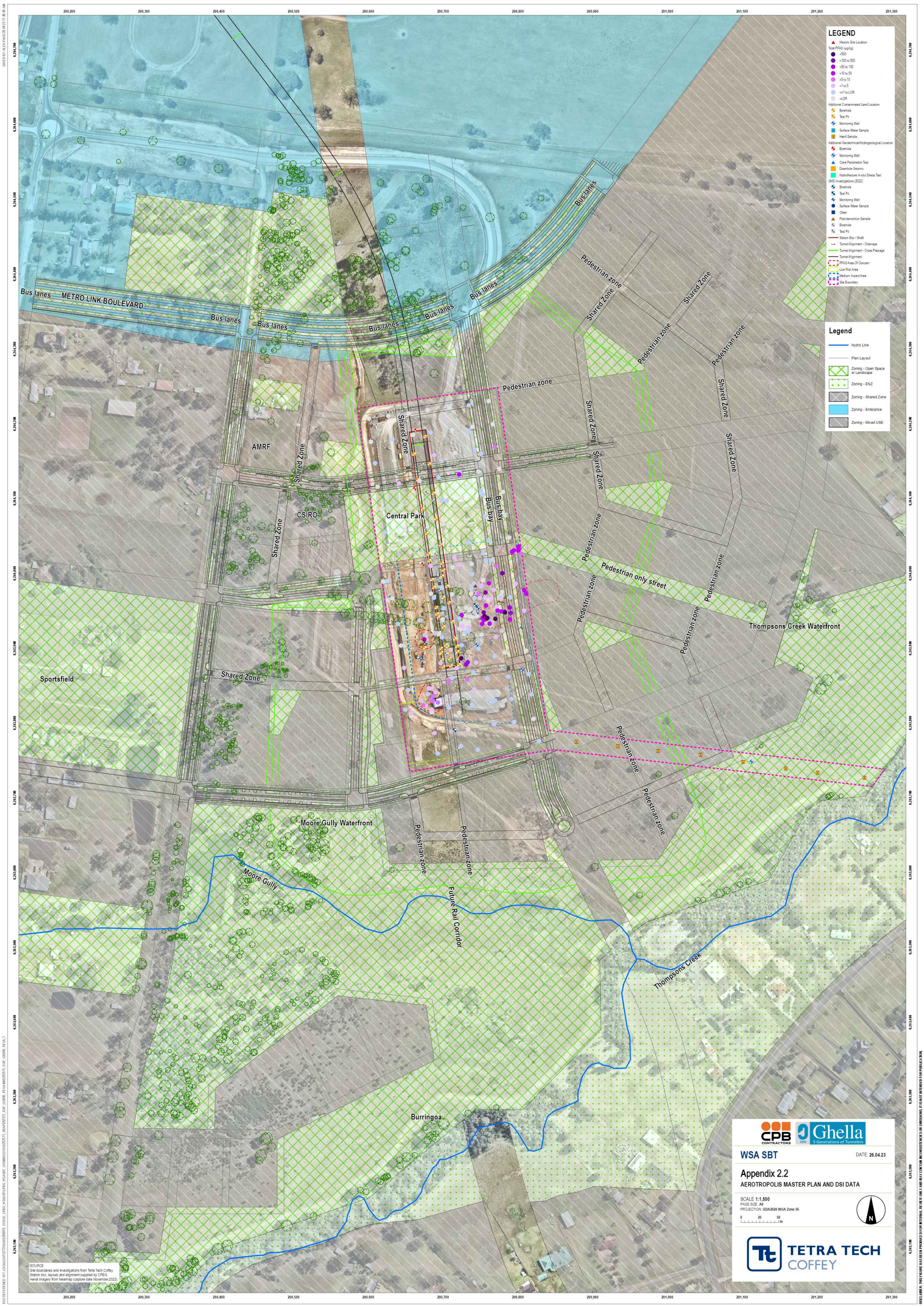
**Figure 6 Total Water Cycle Management**

**Notes on Figure 6:**  
**Stormwater Infrastructure:** Under Section 4.5.1 of the Western Sydney Aerotropolis Precinct Plan (APP) the polygons referred to as stormwater infrastructure are multifunctional detention basins to be used as part of a regional stormwater management strategy and recycled water network.  
**Riparian Streets:** Under Section 4.5.2 of the APP riparian streets will include natural drainage channels and integrated with riparian corridors and watercourses.  
**Riparian Corridors:** Section 4.5.2 of the APP states "The protection, restoration and maintenance of riparian corridors, including waterways and water dependent ecosystems is essential in achieving the cultural, social and biodiversity aspirations as well as tree canopy targets of the Western Parkland City."



## Appendix 2.2 Master Plan





**LEGEND**

- ▲ Historic Site Location
- Total PFAS (µg/L)
- <500
- >100 to 500
- >50 to 100
- >10 to 50
- <5 to 10
- <1 to 5
- ≤1 to LOR
- <LOR
- Additional Contaminated Land Location
- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Hand Sample
- Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well
- Core Penetration Test
- Downhole Seismic
- Hydrofracture In-situ Stress Test
- GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- ▲ Post-demolition Sample
- Borehole
- Test Pit
- Basin Box / Shaft
- Tunnel Alignment - Chaining
- Tunnel Alignment - Cross Passage
- Tunnel Alignment
- PFAS Area Of Concern
- Low Risk Area
- Medium Impact Area
- Site Boundary

**Legend**

- Hydro Line
- Plan Layout
- ▨ Zoning - Open Space or Landscape
- ▨ Zoning - ENZ
- ▨ Zoning - Shared Zone
- ▨ Zoning - Enterprise
- ▨ Zoning - Mixed USE

SOURCE  
Site boundaries and investigations from Tetra Tech Coffey Station box, layouts and alignment supplied by CPB.  
Aerial imagery from Neimap (capture date November 2022)




**WSA SBT** DATE: 26.04.23

**Appendix 2.2**  
**AEROTROPOLIS MASTER PLAN AND DSI DATA**

SCALE 1:1,500  
 PAGE SIZE: A0  
 PROJECTION: ODA2020 MGA Zone 56





DISCLAIMER: THIS FIGURE HAS BEEN PROVIDED BY OUR CLIENTS. WE DO NOT WARRANT THE ACCURACY OF THE INFORMATION. IT IS NOT INTENDED FOR PUBLIC RELEASE.

## Appendix 2.3 Aerotropolis Architectural Drawing





ST MARYS

PRECINCT LEGEND

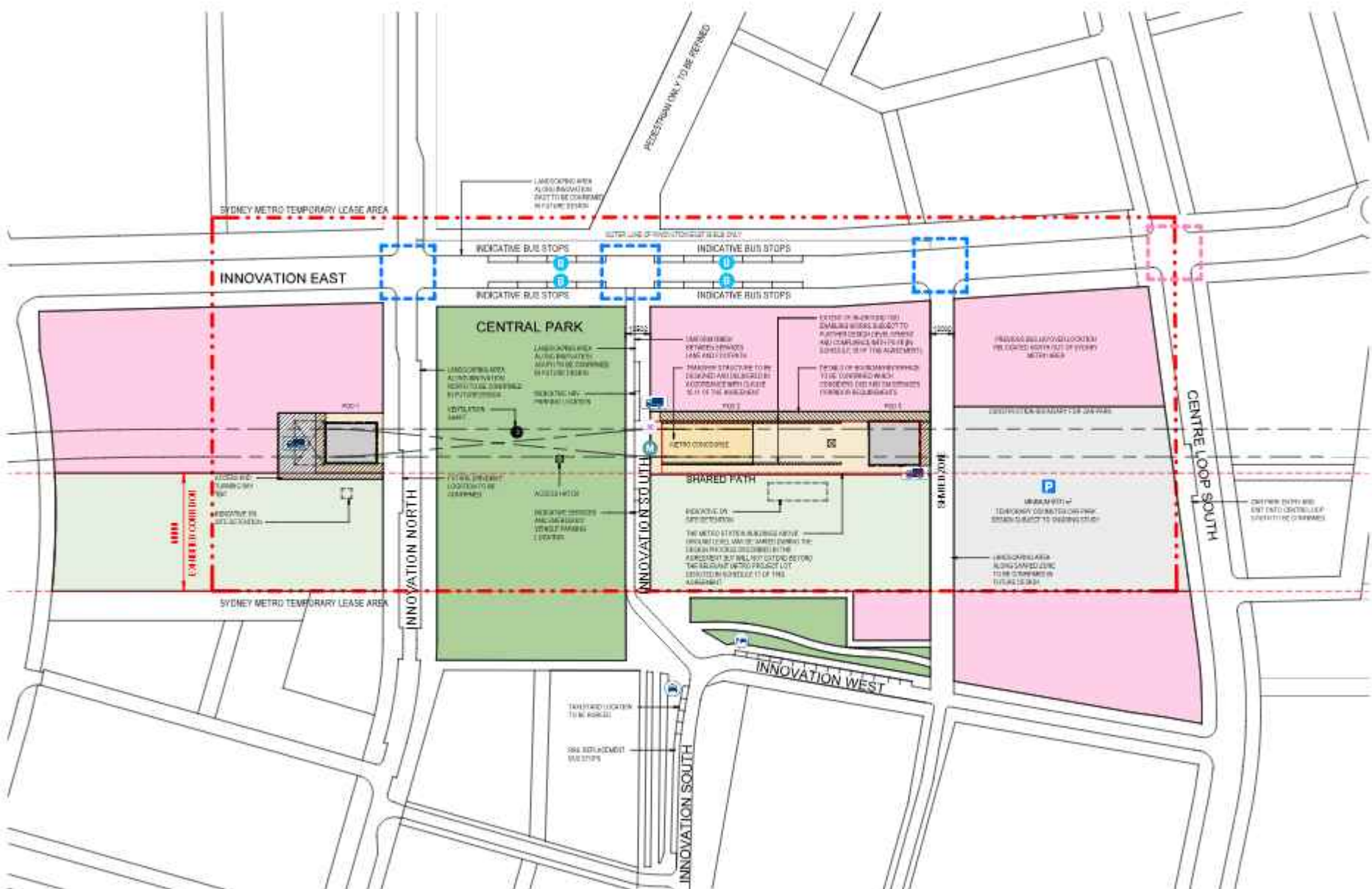
- METRO STATION ENTRY
- BUS STOP
- BUS LANEWAY
- PARK & RIDE
- BIKE RIDE
- TOWNHALL (LOAD BAY TO BE ACCESSIBLY COMPLIANT)
- VEHICLE PARKING
- STATION ENTRY
- LOADING ZONE
- TRACKS CENTER LINE
- SYDNEY METRO TEMPORARY LEASE AREA
- SYDNEY METRO PROJECT SITE SECURITY FENCE
- PHYSICAL OR SIGNAGED FUTURE ROAD/STREET CLOSURE
- FUTURE ASSUMED INTERSECTION/STREET
- STATION PLAZA
- LANDSCAPE AREA (TREE PLANTING)
- LANDSCAPE AREA (BIKEWAY)
- CAR PARKING AT STAGE
- DEVELOPMENT

STATION LEGEND

- FUTURE CONSTRUCTION
- ASPHALT
- METAL
- BRICK/STONE
- HIGH RAINFALL ZONE FOR THE SUBSTATION
- EXISTING
- EXISTING CONCRETE

NOTES

1. SITE COLOURS BASED ON AN EARLY NORTH SURVEY. LOCALS COULD BE DIFFERENT. PLEASE REFER TO THE SURVEY FOR THE CORRECT COLOUR VALUE.
2. ALL ALLEGATIONS TO CHANGE TO BE MADE TO THE DESIGN TEAM ON THE DATE OF THE DESIGN REVIEW MEETING.
3. ALL ALLEGATIONS TO CHANGE TO BE MADE TO THE DESIGN TEAM ON THE DATE OF THE DESIGN REVIEW MEETING.
4. PROPOSED STATION ENTRY SUBJECT TO LOCAL COUNCIL APPROVALS, SECURITY & COMPLIANCE WITH REQUIREMENTS.
5. ALL ALLEGATIONS TO BE MADE TO THE DESIGN TEAM ON THE DATE OF THE DESIGN REVIEW MEETING.
6. STRUCTURAL WORKS SHALL BE NOTIFIED TO THE LOCAL COUNCIL PRIOR TO COMMENCEMENT OF WORK.
7. SITE AND STATION PRELIMINARY PLAN. ALL DIMENSIONS SHALL BE AS SHOWN UNLESS OTHERWISE SPECIFIED.
8. SHALL TO CONSULT WITH LOCAL COUNCIL PRIOR TO COMMENCEMENT OF WORK.
9. ALL ALLEGATIONS TO BE MADE TO THE DESIGN TEAM ON THE DATE OF THE DESIGN REVIEW MEETING.
10. ALL ALLEGATIONS TO BE MADE TO THE DESIGN TEAM ON THE DATE OF THE DESIGN REVIEW MEETING.
11. ALL ALLEGATIONS TO BE MADE TO THE DESIGN TEAM ON THE DATE OF THE DESIGN REVIEW MEETING.



OFFICIAL FOR INFORMATION

UNCONTROLLED COPY FOR INFORMATION ONLY

SYDNEY METRO WESTERN SYDNEY AIRPORT		SITE PRELIMINARY DESIGN	
ARCHITECTURAL DESIGN		SHEET 1 OF 1	
DATE: 13/08/2024		DRAWN BY: [Name]	
CHECKED BY: [Name]		DATE: 13/08/2024	

NSW GOVERNMENT  
 SYDNEY METRO  
 architectus

DESIGNED BY: [Name]	DATE: 13/08/2024
CHECKED BY: [Name]	DATE: 13/08/2024
DRAWN BY: [Name]	DATE: 13/08/2024
SCALE: 1:500	PROJECT NO: [Number]

SYDNEY METRO WESTERN SYDNEY AIRPORT	
ARCHITECTURAL DESIGN	
SITE PRELIMINARY DESIGN	
SHEET 1 OF 1	
DATE: 13/08/2024	
DRAWN BY: [Name]	
CHECKED BY: [Name]	
DATE: 13/08/2024	

## APPENDIX 3 Remediation and Assessment Criteria



## Introduction

The SBT Site is to be redeveloped for commercial and open space land use. Remediation criteria for the SBT Site have been developed based on the adoption of generic Tier 1 screening criteria for these land uses based on the following guidelines:

- National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (April 2013) (ASC NEPM 2013) *Schedule B1 Guideline on Investigation Levels for Soil and Groundwater*.
- HEPA (2020) *PFAS National Environmental Management Plan Version 2.0 – January 2020*

The remediation criteria which have been adopted for each land use are summarised in the following sections and are considered to apply to asbestos and PFAS only.

Noting that the DSI did not include assessment criteria for open space land use, assessment criteria for other chemicals of concern (metals, PAH, TRH/BTEXN, etc.) for open space land use have also been included in this appendices. Assessment criteria for these chemicals of concern for a commercial land use from the DSI have also been included for completeness.

## Remediation Criteria

### Commercial Land Use

Table I and Table II summarise the adopted criteria for protection of human health and ecological receptors for commercial land use.

Table I: Human Health Remediation Criteria Commercial Landuse

Potential Contaminant	Adopted Criteria
<ul style="list-style-type: none"> <li>• Per- and poly-fluoroalkyl substances (PFAS)</li> </ul>	PFAS NEMP HIL-D
<ul style="list-style-type: none"> <li>• Asbestos</li> </ul>	ASC NEPM HIL-D

Table II: Ecological Criteria for Commercial Land Use (mg/kg)

Potential Contaminant	Adopted Criteria	Assumption
PFOS	0.14	<p>Ecological criteria adopted from the PFAS NEMP in soil include:</p> <ul style="list-style-type: none"> <li>• direct exposure (all land uses)</li> <li>• indirect exposure for intensively developed sites with no secondary consumers and minimal potential for indirect exposure.</li> </ul> <p>The most conservative of these ecological guidelines has been adopted as the remediation criteria.</p>
PFOA	10	<p>Ecological criteria adopted from the PFAS NEMP in soil include:</p> <ul style="list-style-type: none"> <li>• direct exposure (all land uses)</li> </ul> <p>There is no PFAS NEMP criteria for PFOA and ecological indirect exposure.</p>



## Open Space Land Use

Table III and Table IV summarise the adopted criteria for protection of human health and ecological receptors for open space land use.

Table III: Human Health Remediation Criteria for Open Space Land use

Potential Contaminant	Adopted Criteria
<ul style="list-style-type: none"> <li>PFAS</li> </ul>	PFAS NEMP HIL-C
<ul style="list-style-type: none"> <li>Asbestos</li> </ul>	ASC NEPM HIL-C

Table IV: Ecological Remediation Criteria for Open Space Land use (mg/kg)

Potential Contaminant	Adopted Criteria	Assumption
PFOS	0.01	<p>Ecological criteria adopted from the PFAS NEMP in soil include:</p> <ul style="list-style-type: none"> <li>direct exposure (all land uses)</li> <li>indirect exposure with secondary consumers.</li> </ul> <p>The most conservative of these ecological guidelines has been adopted as the remediation criteria.</p> <p>The application of the PFAS NEMP indirect exposure guideline with secondary consumers is considered to be consistent with the intent of the PFAS NEMP which notes this guideline is intended to apply to open space areas where birds, small mammals and/or reptiles may be present which consume plants and/or soil based organisms, and the area of the open space is sufficient large and/or connected to other features such as waterways and drainage networks which may also attract wildlife.</p> <p>The two open space areas included in the Master Plan include the Central Park which is approximately 1.76 ha and a pedestrian only street which is approximately 0.85 ha in size and is connected to a major riparian corridor (Thompsons Creek). It is reasonable to expect that the local authority will include plants (native trees/shrubs, flowering plants, etc.) in open space areas which will attract birds and other wildlife to these areas. The riparian corridor is located approximately 400 m from the open space areas.</p>
PFOA	10	<p>Ecological criteria adopted from the PFAS NEMP in soil include:</p> <ul style="list-style-type: none"> <li>direct exposure (all land uses)</li> </ul> <p>There is no PFAS NEMP criteria for PFOA and ecological indirect exposure.</p>



## Assessment Criteria

### Commercial Land Use

Table 3.A and Table 3.B summarise the adopted assessment criteria from the DSI for the protection of human health and buried infrastructure<sup>21</sup>.

Table 3.A Adopted Human Health and Buried Infrastructure Criteria

Potential Contaminant	Assessment Criteria
<ul style="list-style-type: none"> <li>Metals</li> <li>Polycyclic Aromatic Hydrocarbons (PAHs)</li> </ul>	ASC NEPM Health-based investigation levels commercial/industrial (HIL-D). Section 3.2.4 of Schedule 7 of the ASC NEPM defines commercial/industrial land use as being predominately covered in hardstand with some limited areas of landscaping/lawns.
<ul style="list-style-type: none"> <li>Total Recoverable Hydrocarbons (TRH)</li> <li>Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) Compounds</li> <li>Naphthalene (N)</li> </ul>	<p>The most conservative of the following guidelines has been selected (refer to Table 3.B):</p> <ul style="list-style-type: none"> <li>NEPM HSL Vapour intrusion (commercial/Industrial) &lt;1 m SAND</li> <li>NEPM Management Limits (commercial, coarse).</li> <li>CRC Care Soil Health Screening Levels for Direct Contact (commercial/industrial) (note these guidelines are also protective of intrusive maintenance workers)</li> </ul>

Table 3.B Summary of Adopted Human Health and Buried Infrastructure Criteria for TRH and BTEXN for commercial land (mg/kg)

Potential Contaminant	HSL-D	Management Limits	Direct Contact	Adopted Criteria
Benzene	3	N/A	430	3
Toluene	NL	N/A	99,000	99,000
Ethylbenzene	NL	N/A	27,000	27,000
Xylenes	230	N/A	81,000	230
Naphthalene	NL	N/A	11,000	11,000
F1 TRH C6-C10	260	700	26,000	260
F2 TRH >C10-C16	NL	1,000	20,000	1000
F3 TRH >C16-C34	N/A	3,500	27,000	3500
F4 TRH >C34-C40	N/A	10,000	38,000	10,000

<sup>21</sup> The ASC NEPM Management Limits have been adopted in regard to buried infrastructure.





Assessment criteria from the DSI which were for the protection of ecological receptors for commercial land use are summarised in Table 3.C.

Table 3.C: Ecological Criteria for Commercial Land use (mg/kg)

Potential Contaminant	Adopted EIL	Assumption
Zinc	410	Based on the sum of the Aged Contamination Limits (ACL) and Ambient Background Concentration (ABC) where: <ul style="list-style-type: none"> <li>ACL = 360 mg/kg (CEC of 5 meq/100g and pH of 6)</li> <li>ABC = 52 mg/kg (arithmetic mean of sample results)</li> </ul>
Copper	170	Based on the sum of the ACL and ABC where: <ul style="list-style-type: none"> <li>ACL = 140 mg/kg (CEC of 5 meq/100g)</li> <li>ABC = 29 mg/kg (arithmetic mean of sample results)</li> </ul>
Chromium III	675	Based on the sum of the ACL and ABC where: <ul style="list-style-type: none"> <li>ACL = 660 mg/kg (&gt; 10% clay content was assumed)</li> <li>ABC = 17 mg/kg (arithmetic mean of sample results)</li> </ul>
Nickel	68	Based on the sum of the ACL and ABC where: <ul style="list-style-type: none"> <li>ACL = 55 mg/kg (CEC of 5 meq/100g)</li> <li>ABC = 13 mg/kg (arithmetic mean of sample results)</li> </ul>
Lead	1,800	Based on the generic EIL for commercial/industrial land
Arsenic	160	Based on the generic EIL for commercial/industrial land
DDT	640	
Naphthalene	370	
TRH C6-C10	215	Based on the generic ESL for commercial/industrial land
TRH >C10-C16	170	
TRH >C16-C34	2,500	Based on the generic ESL for commercial/industrial land and coarse soils
TRH >C34-C40	6,600	Based on the generic ESL for commercial/industrial land and coarse soils
Benzene	95	Based on the generic ESL for commercial/industrial land and coarse soils
Toluene	135	Based on the generic ESL for commercial/industrial land and coarse soils
Ethylbenzene	185	Based on the generic ESL for commercial/industrial land and coarse soils
Xylenes	95	Based on the generic ESL for commercial/industrial land and coarse soils
Benzo(a)pyrene	72	Based on Canadian Soil Quality Guideline for Commercial/Industrial Land



## Open Space Land Use

Open space land use within the SBT Site was not considered in the DSI. Table 3.D and Table 3.E summarise the adopted assessment criteria for protection of human health and buried infrastructure for areas within the SBT Site with open space land use.

Table 3.D Human Health ILs for Soil and Sediment

Potential Contaminant in Soil	Adopted Criteria
<ul style="list-style-type: none"> <li>Metals</li> <li>Polycyclic Aromatic Hydrocarbons (PAHs)</li> </ul>	ASC NEPM Health-based investigation levels open space (HIL-C). Section 3.2.3 of Schedule 7 of the ASC NEPM defines open space land use as parks, playgrounds, playing fields, recreational areas which are fully accessible to the general public.
<ul style="list-style-type: none"> <li>Total Recoverable Hydrocarbons (TRH)</li> <li>Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) Compounds</li> <li>Naphthalene (N)</li> </ul>	<p>The most conservative of the following guidelines has been selected (refer to Table 3.B):</p> <ul style="list-style-type: none"> <li>NEPM HSL Vapour intrusion (open space) &lt;1 m SAND</li> <li>NEPM Management Limits (open space, coarse grained soils).</li> <li>CRC Care Soil Health Screening Levels for Direct Contact (open space).</li> </ul>

Table 3.E Summary of Adopted Human Health and Buried Infrastructure Criteria for TRH and BTEXN for open space land

Chemical	HSL-C	Management Limits	Direct Contact	Adopted Criteria
Benzene	NL	N/A	120	120
Toluene	NL	N/A	18,000	18,000
Ethylbenzene	NL	N/A	5,300	5,300
Xylenes	NL	N/A	15,000	15,000
Naphthalene	NL	N/A	1,900	1,900
TRH C6-C10	NL	700	5,100	700
TRH >C10-C16	NL	1,000	3,800	1,000
TRH >C16-C34	N/A	2,500	5,300	2,500
TRH >C34-C40	N/A	10,000	7,400	7,400



Assessment criteria which have been adopted for the protection of ecological receptors for open space use are summarised in Table 3.F.

Table 3.F Ecological Criteria for Open Space Land use (mg/kg)

Potential Contaminant	Adopted EIL	Assumption
Zinc	282	Based on the sum of the Aged Contamination Limits (ACL) and Ambient Background Concentration (ABC) where: <ul style="list-style-type: none"> <li>ACL = 230 mg/kg (CEC of 5 meq/100g and pH of 6)</li> <li>ABC = 52 mg/kg (arithmetic mean of sample results)</li> </ul>
Copper	124	Based on the sum of the ACL and ABC where: <ul style="list-style-type: none"> <li>ACL = 95 mg/kg (CEC of 5 meq/100g)</li> <li>ABC = 29 mg/kg (arithmetic mean of sample results)</li> </ul>
Chromium III	417	Based on the sum of the ACL and ABC where: <ul style="list-style-type: none"> <li>ACL = 400 mg/kg (&gt; 10% clay content was assumed)</li> <li>ABC = 17 mg/kg (arithmetic mean of sample results)</li> </ul>
Nickel	43	Based on the sum of the ACL and ABC where: <ul style="list-style-type: none"> <li>ACL = 30 mg/kg (CEC of 5 meq/100g)</li> <li>ABC = 13 mg/kg (arithmetic mean of sample results)</li> </ul>
Lead	1100	Based on the generic EIL for commercial/industrial land
Arsenic	100	Based on the generic EIL for commercial/industrial land
DDT	180	
Naphthalene	170	
TRH C6-C10	180	
TRH >C10-C16	120	Based on the generic ESL for commercial/industrial land
TRH >C16-C34	1300	
TRH >C34-C40	5600	Based on the generic ESL for commercial/industrial land and fine soils
Benzene	65	Based on the generic ESL for commercial/industrial land and fine soils
Toluene	105	Based on the generic ESL for commercial/industrial land and fine soils
Ethylbenzene	125	Based on the generic ESL for commercial/industrial land and fine soils
Xylenes	45	Based on the generic ESL for commercial/industrial land and fine soils
Benzo(a)pyrene	0.7	Based on Canadian Soil Quality Guideline for Commercial/Industrial Land



## APPENDIX 4 Geotechnical Cross-Section



**LEGEND**

	CORE LOSS		GW - Well Graded GRAVEL
	ASPHALT		INTERBEDDED SILTSTONE & SANDSTONE
	CH - High Plasticity CLAY		MH - High Plasticity SILT
	CH-MH - High Plasticity CLAY to High Plasticity SILT		ML - Low Plasticity SILT
	CI - Medium Plasticity CLAY		Organic
	CI-CH - Medium to High Plasticity CLAY		OL - Low Plasticity ORGANIC CLAYS and SILTS
	CL - Low Plasticity CLAY		SANDSTONE
	CL-CI - Low to Medium Plasticity CLAY		SC - Clayey SAND
	CL-ML - Low Plasticity CLAY to Low Plasticity SILT		SHALE
	CLAYSTONE		SILTSTONE
	CONCRETE		SILTSTONE & SANDSTONE
	CONGLOMERATE		SM - Silty SAND
	FILL		SP - Poorly Graded SAND
			SP-SC - Poorly Graded SAND to Clayey SAND
			SW - Well Graded SAND
			SW-SC - Well Graded SAND to Clayey SAND
			SP - Poorly Graded SAND
			GP - Poorly Graded GRAVEL




**SOIL CONSISTENCY/RELATIVE DENSITY**

VS	- VERY SOFT
S	- SOFT
F	- FIRM
St	- STIFF
Vst	- VERY STIFF
H	- HARD
Fb	- FRIABLE
VL	- VERY LOOSE
L	- LOOSE
MD	- MEDIUM DENSE
D	- DENSE
VD	- VERY DENSE




**PROJECT UNITS**

T	- TOPSOIL
T/F	- TOPSOIL/FILL
F	- FILL
A	- ALLUVIUM
R	- RESIDUAL SOIL
SS (Class #)	- LOCAL SANDSTONE CLASSIFICATION
SH (Class #)	- LOCAL SHALE CLASSIFICATION

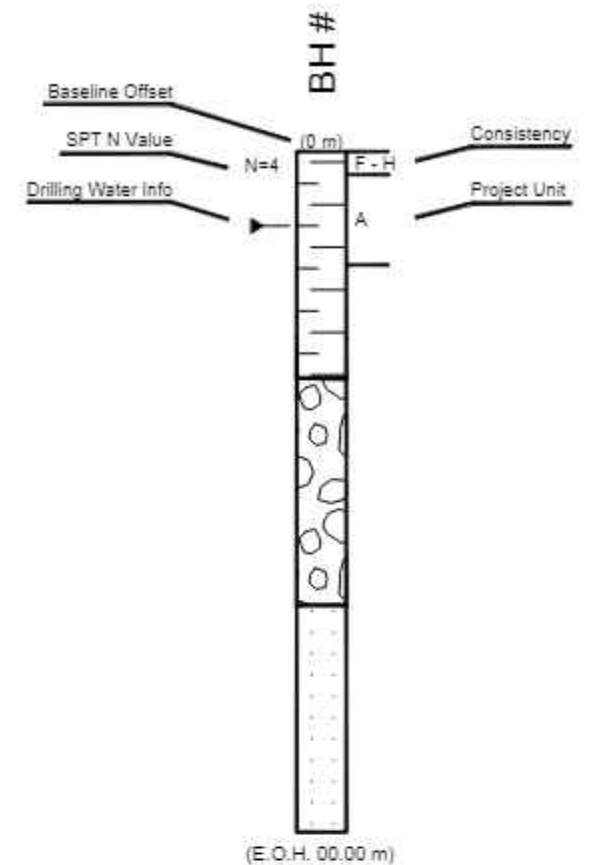
**SOIL LEGEND**

	ZONE S1 - FILL
	ZONE S2 - ALLUVIUM
	ZONE S3 - RESIDUAL SOILS





**ROCK LEGEND**

	ZONE R1 - TYPICALLY CLASS V/IV BRINGELLY SHALE
	ZONE R2 - TYPICALLY CLASS III BRINGELLY SHALE
	ZONE R3 - TYPICALLY CLASS II OR BETTER BRINGELLY SHALE

**POST LEGEND**





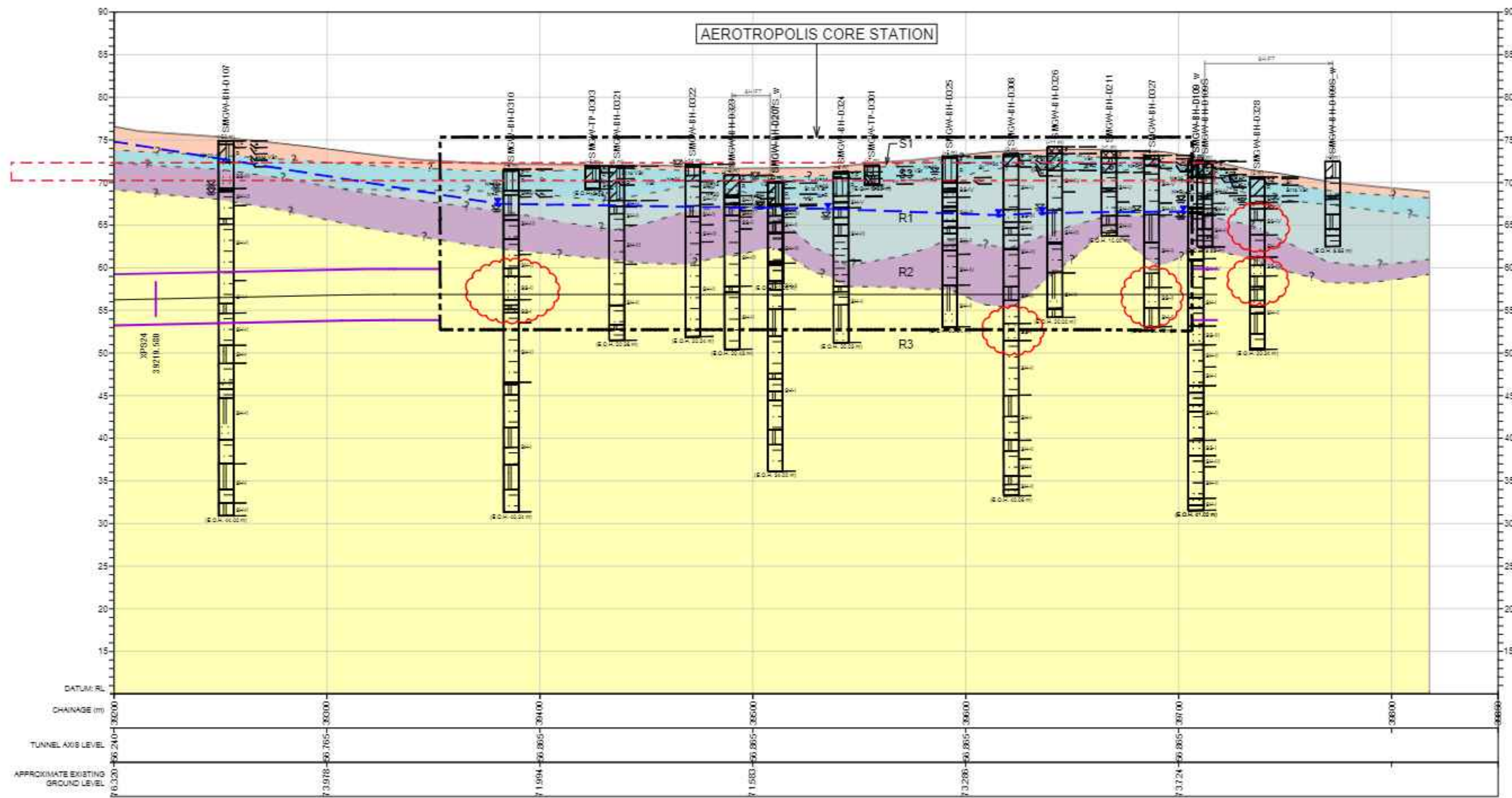
**LEGEND**

	EXISTING GROUND SURFACE
	INFERRED GEOLOGICAL BOUNDARY
	APPROXIMATE INTERFACE BETWEEN SH-V & SH-IV
	SANDSTONE RECORDED ON BOREHOLE LOGS

1. SITE-SPECIFIC INVESTIGATION DATA IS INCOMPLETE AND PROVIDED IN DRAFT FORMAT FOR SOME LOCATIONS.
2. NO GUARANTEE CAN BE GIVEN AS TO THE VALIDITY, NATURE AND CONTINUITY OF THE VARIOUS SUBSURFACE FEATURES SHOWN.
3. INFERRED SUBSURFACE CONDITIONS BETWEEN BOREHOLES HAVE BEEN CREATED FROM 3D INTERPOLATION AND/OR EXTRAPOLATION OF DISCRETE TEST HOLE DATA. AS SUCH THE CONDITIONS SHOWN ARE AN INTERPRETATION AND MUST BE CONSIDERED AS A GUIDE ONLY.
4. LOCAL VARIATIONS OR ANOMALIES IN GROUND CONDITION CAN OCCUR IN THE NATURAL ENVIRONMENT, PARTICULARLY BETWEEN DISCRETE TEST HOLE LOCATIONS.
5. FOR DETAILS AND PRECISE LOCATIONS OF PARTICULAR BOREHOLES, REFERENCE SHOULD BE MADE TO THE ORIGINAL LOGS FROM SOURCE DOCUMENTS.
6. GROUND SURFACE SHOWN IS BASED ON THE LIDAR PROVIDED ON FOUNDATION SPATIAL DATA (ELVIS) FROM GEOSCIENCE AUSTRALIA (2019) WITH THE EXCEPTION OF THE WSI AREA WHICH IS BASED ON CLIENT PROVIDED DATA.
7. THE BEDROCK HAS GENERALLY BEEN CATEGORISED BASED ON A SIMPLIFIED VERSION OF THE PELLIS (2019) METHOD. HERE CLASS V AND IV HAVE BEEN COMBINED IN A SINGLE ROCK UNIT AND CLASS I AND II HAVE ALSO BEEN COMBINED AS A SINGLE UNIT.
8. ROCK ZONES ARE DENOTED AS "TYPICALLY CONTAINING...". DESIGNERS SHOULD NOTE THAT EACH ROCK ZONE MAY CONTAIN AREAS OF HIGHER AND LOWER ROCK CLASSIFICATION AND ACCOUNT FOR SUCH VARIATION IN THEIR DESIGN.
9. POSITIONS OF TUNNELS, STATION BOXES, DIVE STRUCTURES AND SERVICE SHAFTS ARE INDICATIVE ONLY.
10. FOR GEOTECHNICAL CROSS-SECTIONS, POSITION '0' ON THE X-AXIS REFERS TO DISTANCE FROM THE SOUTHBOUND TUNNEL ALIGNMENT.
11. DISTANCE BELOW BOREHOLE INDICATES APPROXIMATE OFFSET FROM SECTION LOCATION IN METRES.

100mm AT FULL SIZE

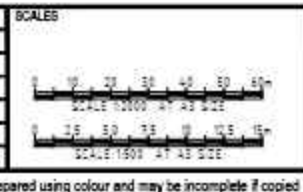
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REV.</th> <th>BY</th> <th>DATE</th> <th>DESCRIPTION</th> <th>APPD.</th> </tr> </thead> <tbody> <tr> <td>T</td> <td>AV</td> <td>30/07/2021</td> <td>FOR REV SUBMISSION</td> <td>TC</td> </tr> <tr> <td>B</td> <td>AV</td> <td>30/07/2021</td> <td>FOR REV SUBMISSION</td> <td>TC</td> </tr> </tbody> </table>			REV.	BY	DATE	DESCRIPTION	APPD.	T	AV	30/07/2021	FOR REV SUBMISSION	TC	B	AV	30/07/2021	FOR REV SUBMISSION	TC	<p><b>SCALES</b></p>		<p><b>NOTE:</b> PLEASE REFER TO NOTES ON THE LEGEND PAGE</p>			
REV.	BY	DATE	DESCRIPTION	APPD.																			
T	AV	30/07/2021	FOR REV SUBMISSION	TC																			
B	AV	30/07/2021	FOR REV SUBMISSION	TC																			
<p>A3 Original    Co-ordinate System: Zone 56    Height Datum: A.H.D.    This sheet may be prepared using colour and may be incomplete if copied</p>			<p>NOTE: Do not scale from this drawing.    ALT. DRG No    Alternate Document Number</p>		<p><b>CLIENT</b></p> 		<p><small>The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown hereon for any purpose other than the Sydney Metro Project.</small></p> <p><b>SERVICE PROVIDERS</b></p> 																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DRAWN</td> <td>Annette Wilson</td> <td>5 July 2021</td> </tr> <tr> <td>DESIGNED</td> <td>Wendy Wieg</td> <td>5 July 2021</td> </tr> <tr> <td>DRG CHECK</td> <td>Troy Credin</td> <td>7 July 2021</td> </tr> <tr> <td>DESIGN CHECK</td> <td>Ching Dai</td> <td>7 July 2021</td> </tr> <tr> <td>APPROVED</td> <td>Troy Credin</td> <td>7 July 2021</td> </tr> </table>			DRAWN	Annette Wilson	5 July 2021	DESIGNED	Wendy Wieg	5 July 2021	DRG CHECK	Troy Credin	7 July 2021	DESIGN CHECK	Ching Dai	7 July 2021	APPROVED	Troy Credin	7 July 2021	<p><b>Sydney Metro Western Sydney Airport SBT</b> SBT South GEOTECHNICAL LEGEND PAGE</p>		<p><b>STATUS: FOR TENDER SUBMISSION</b>    SHEET 01 OF 01</p>		<p>DRG No: WSA5BTT-0211-006-DRG-COFF-GE-0001    REV.    RevT</p>	
DRAWN	Annette Wilson	5 July 2021																					
DESIGNED	Wendy Wieg	5 July 2021																					
DRG CHECK	Troy Credin	7 July 2021																					
DESIGN CHECK	Ching Dai	7 July 2021																					
APPROVED	Troy Credin	7 July 2021																					



ESTIMATED PERCENTAGE OF ROCK CLASS AT TUNNEL LEVEL	80% SH+ OR BETTER (GS+40), 10% SH+ (GS+40)	NOT APPLICABLE	80% SH+ (GS+40), 10% SH+ (GS+30), 10% SH+ OR BETTER (GS+40)
APPROXIMATE RQD AT TUNNEL LEVEL	+20%	NOT APPLICABLE	80 - 100%
APPROXIMATE UCS RANGE AT TUNNEL LEVEL	17 - 9 MPa	NOT APPLICABLE	17 - 25 MPa
ESTIMATED ABRASIVITY AT TUNNEL LEVEL	MEDIUM	NOT APPLICABLE	LOW TO MEDIUM

10cm AT FULL SIZE

REV.	BY	DATE	DESCRIPTION	APPRO.
T	AV	22/07/2021	FOR REV SUBMISSION	TC
B	AV	20/07/2021	FOR REV SUBMISSION	TC



**NOTES:**  
REFER TO NOTES ON THE LEGEND PAGE

**NOTE:** Do not scale from this drawing.

ALT. DRG No Alternate Document Number



**CLIENT**

**SERVICE PROVIDERS**

DRAWN	Annette Wilson	5 July 2021
DESIGNED	Wendy Kemp	5 July 2021
DRG CHECK	Tray Credit	7 July 2021
DESIGN CHECK	Ching Dai	7 July 2021
APPROVED	Tray Credit	7 July 2021

**Sydney Metro Western Sydney Airport SBT**  
 SBT South  
 GEOTECHNICAL  
 SOUTHERN LONG SECTION  
 CH33200 - CH36050

**STATUS:** FOR TENDER SUBMISSION

**SHEET 11 OF 11**

**DRG No:** WSASBT-0211-006-DRG-COFF-GE-0012

**REV.** RevT

## APPENDIX 5 Relevant Summary Tables of Analytical Results (DSI)



## Appendix 5.1 Commercial Areas





## Appendix 6.2 GHD Groundwater Data

### Summary

The GHD (2022) *Groundwater Monitoring Factual Report, 9 November 2022* includes groundwater monitoring data for the Aerotropolis site undertaken in 2021 and 2022, and was provided to TTMP in April 2023.

Groundwater sampling locations undertaken by GHD and the data for Aerotropolis is included in Appendix 6.2.

Groundwater sampling was undertaken from three monitoring wells. These included:

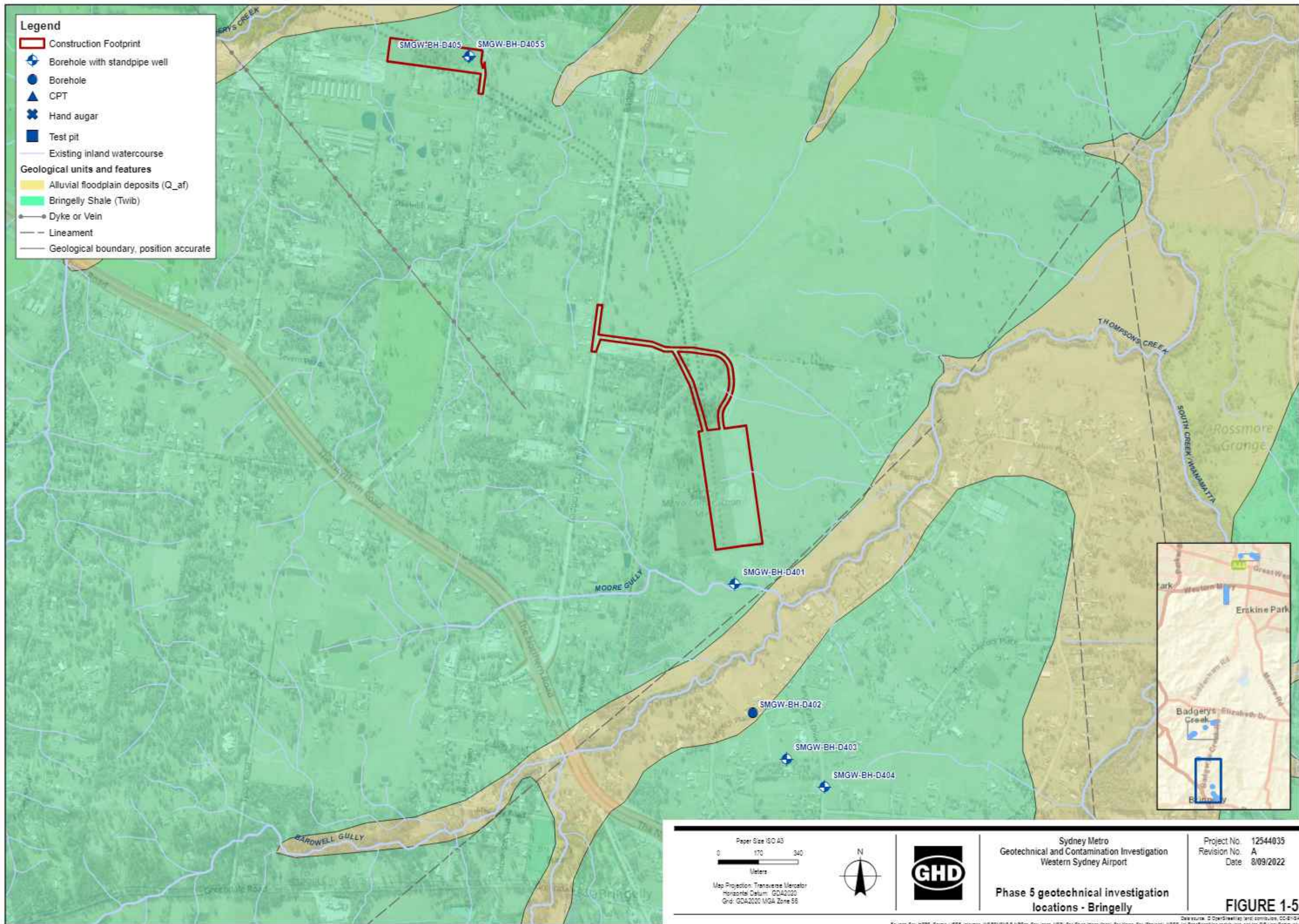
- one monitoring well (SMGW-BH-D401) located 180 m south of the SBT Site adjacent to Moore Gully
- two monitoring wells (SMGW-BH-D403 and SMGW-BH-D404) located approximately 1 km south of the SBT Site and south of Thompsons Creek.
- one monitoring well located at the Bringelly Shaft (SMGW-BH-D405)

PFOS was detected in an intra-laboratory duplicate sample from SMGW-BH-D401 with a concentration of PFOS of 0.88 µg/l which exceeded the PFAS NEMP 2.0 criteria for 95% species protection. PFOS however was not detected in the primary sample.

As shown in Figure 5, Appendix 1, groundwater from the SBT site flows in an easterly direction towards Thompsons Creek. PFAS detected in SMGW-BH-D401 is considered to be cross-gradient from the SBT site and PFAS present in the sample detected likely to be derived from a source other than the SBT Site.

PFAS was not detected in groundwater samples collected from SMGW-BH-D403 and SMGW-BH-D404.





Sydney Metro  
Geotechnical and Contamination Investigation  
Western Sydney Airport

**Phase 5 geotechnical investigation locations - Bringelly**

Project No. 12544035  
Revision No. A  
Date 8/09/2022

**FIGURE 1-5**

Source: GHD, HSRP, Geotech, USGS, Inmap, (ACR) (WIT) R (N) (C) (S) (L) (T) (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LL) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MM) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NN) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YY) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)

## Appendix 6.3 Bradfield Investigation

### Introduction

The ERM (2022) *Detailed Site Investigation Bradfield City Centre, 11 October 2022* ("the Bradfield DSI") provides an investigation of land within Lot 101 DP1282949 with the exception of the SBT Site<sup>22</sup>. This report was provided to CPBG by Sydney Metro for consideration in the development of this RAP. The following provides a summary of the data as it relates to the SBT Site.

### Soil and Sediment Sampling Data

Soil and sediment sampling sites from the Bradfield DSI are shown in Appendix 6.3.1 and Appendix 6.3.2 respectively.

In the Bradfield DSI soil and sediment samples PFAS was detected in one of the sampling sites located along Moore Gully (AL\_TP86) and not detected in the remaining soil/sediment investigation locations. It should be noted that the laboratory limit of report (LOR) used by the primary laboratory was 5 or 10 µg/kg.

Trace concentrations of PFAS were detected in the majority of soil sampling sites and all sediment sampling sites in ERM (2021) *Aerotropolis Core Precinct Targeted Site Investigation, 21 May 2021* ("Bradfield 2021 Investigation"). The sampling sites in this investigation targeted the southern portion of Lot 101 DP1282949 and used a different primary laboratory which had an analytical method with a LOR for PFAS of 0.2 or 0.5 µg/kg (refer to Appendix 6.3.1 and Appendix 6.3.2). The concentrations reported in the Bradfield 2021 Investigation are generally consistent with the concentrations reported in TTMP investigation locations A to H (refer to Appendix 6.5) which also reported trace concentrations of PFAS.

The highest concentration of PFAS reported in soil samples in the Bradfield 2021 Investigation locations was BH211 which is located approximately 40 m east the SBT Site<sup>23</sup> (in the Bradfield investigation area) and down-gradient of source area denoted as PFAS AC\_B. PFOS+PHFxs at this sampling location has a concentration of 0.0191 mg/kg which exceeded the adopted human health and ecological guidelines.

SED6 (2022) and SED-6 (2021) (refer to Appendix 6.3.2) appear to be the nearest sediment sampling sites within Lot 101 DP128949 which are located along overland flow paths down-gradient of PFAS AC\_A and PFAS AC\_B. Trace concentrations of PFAS were reported in SED-6 2021 (located approximately 570 m east of the SBT Site) and were non-detectable in 2022<sup>24</sup>.

In the Bradfield 2021 Investigation and in comparison to sample site SED-6, higher concentrations of PFAS were reported in sediment sampling locations located up-gradient of the SBT Site on the eastern boundary of Lot 101 DP1282949 (SED-4), drainage channels located north and cross-gradient of the SBT Site (SED-7 and SED-2), and down-gradient of the SBT Site in Thompsons Creek<sup>25</sup> (SED-3).

<sup>22</sup> Lot 101 DP1282949 is a 94.56 hectare (ha) property. The SBT Site occupies the central portion of this property and is approximately 5.3 ha in area.

<sup>23</sup> In Appendix 6.4 BH211 is shown in the figure reproduced from the ERM report as being located inside the SBT Site boundary. It should be noted that the SBT Site boundary has changed since 2021 and BH211 is located approximately 40 m east (outside) of the SBT Site.

<sup>24</sup> Note the difference is considered to be attributed to the use of the higher LOR in the Bradfield DSI

<sup>25</sup> Note SED-3 would also receive PFAS from other diffuse sources of PFAS in Lot 101 DP1282949, and PFAS sources located up-gradient of the SBT Site including probable off-site sources.



Soil and sediment data from the 2021 and 2022 Bradfield investigations suggest that diffuse sources of PFAS are present in soil/sediment over Lot 101 DP1282949. Sediment data from 2021 shows that probable sources of PFAS are also considered to likely occur up-gradient of Lot 101 DP1282949 and the SBT Site.

### Surface Water Data

Surface water sampling events were completed for the Bradfield DSI and Bradfield 2021 investigations on the 21/6/2022 and the 29/4/2022 respectively. The sampling sites from these investigations are shown in Appendix 6.3.3. Rainfall from weather stations nearest to the Aerotropolis site (refer to Figure E) was obtained and is included in Appendix 6.3.3. The following is noted from the rainfall data:

- 21/6/2022 Sampling Event: 1.6 to 3 mm was recorded on the 20/6/2022 and no rainfall was recorded from the 7/6/2022 to the 19/6/2022. On the 21/6/22 one (1) mm of rainfall was recorded at weather station 67015 however no rainfall was recorded at weather station 67018 which is closer to the SBT Site (Aerotropolis).
- 29/4/2021 Sampling Event: 0.6 mm rainfall was recorded at the nearest weather station (67018) in the 14-days prior to sampling, and no rainfall was recorded at weather station (67015).

Based on the absence or limited amount of rainfall which occurred these surface water sampling events are considered to be more representative of surface water sampling during dry periods.

In the 21/6/2022 sampling event PFAS (PFOS) was detected in surface water sampling sites SW2 (down-gradient of the SBT Site), and SW9/SW10 (cross-gradient of the SBT Site and located on Moores Gully) with concentrations marginally above the LOR (below the PFAS NEMP 95% and above the PFAS NEMP 99% guidelines) (refer to Appendix 6.3.3).

Similar concentrations were reported in surface water samples collected on the 29/4/21 with positive detections for PFAS being reported in SW2 (north and cross-gradient of the SBT Site) and SW3 located down-gradient of the SBT Site. PFOS and PFOA concentrations were below the PFAS NEMP 95% and above the PFAS NEMP 99% guidelines.



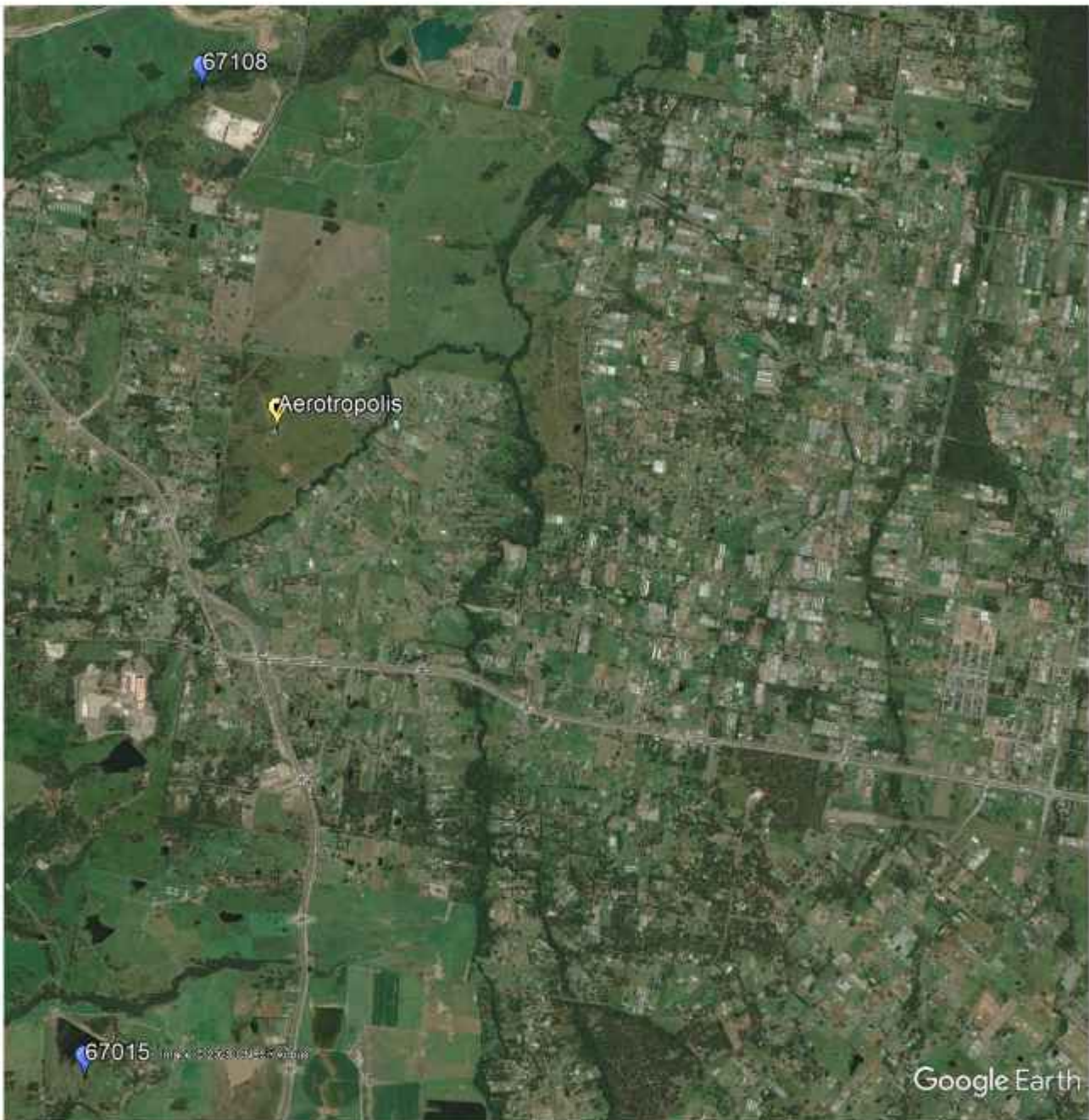


Figure E Weather Stations (Rainfall Gauges)

Surface water sampling was undertaken by GHD at the SBT Site and down-gradient of PFAS AC\_A. Sampling was undertaken on the 1 March 2022. Rainfall in the 14-days prior to the sampling event was recorded as 155 mm at weather station 67108 and 211 mm at 67015. Including the day of sampling and 2-days prior to sampling 52 mm was recorded at 67108 and 63 mm at 67015. Accordingly, the sampling event undertaken by GHD can be considered to a sampling event undertaken during wet weather. PFAS (PFOS) was reported in SW01 located at the SBT Site boundary with a concentration of 0.28 µg/l which exceeded the PFAS NEMP 2.0 95% guidelines (refer to Appendix 6.3.3). PFOA had a concentration of 0.01 µg/l which was below the NEMP 2.0 95% guidelines and above the PFAS NEMP 2.0 99% guidelines. Non-detect for PFAS were reported in surface water samples (SW02 and SW03) which were located up-gradient of PFAS source areas within the SBT Site.



The available surface water data shows that PFAS is present in surface water and is likely attributed to diffuse on-site sources in soil in Lot 101 DP1282949, PFAS impact at the SBT Site and sources up-gradient of Lot 101 DP1282949 (and the SBT Site). Available data indicates that higher concentration of PFAS in surface water are likely to occur in periods of rainfall.

### Groundwater Data

Groundwater sampling events were completed for the Bradfield DSI and Bradfield 2021 Investigations on the 24/6/2022 and the 7/5/2021 respectively. Groundwater sampling locations and analytical data for PFAS is provided in Appendix 6.3.4.

PFAS was not detected in the groundwater samples collected on the 24/6/2022 which included MW10 and MW11 which are located down-gradient of the SBT Site. Similarly PFAS was not detected in groundwater samples collected on the 7/5/2021 which included MW205 which is located down-gradient of PFAS AC\_B.

Perfluorobutane sulfonic acid (PFBS) was detected in MW202 in an inter-laboratory duplicate sample in 2021 but was not detected in the primary/intra-laboratory duplicate samples.

PFAS was detected in all of the groundwater samples collected by TTMP (refer to Section 8.2) however a lower LOR was adopted for this investigation in comparison to the Bradfield DSI and Bradfield 2021 Investigations. This included monitoring well locations which were up-gradient and cross-gradient of the SBT Site.

The highest concentration reported was in MW01 which is located along the drainage line down-gradient of the SBT Site (and PFAS AC\_A) and had PFHxS + PFOS concentration which exceeded the PFAS NEMP 2.0 drinking water guidelines, and PFOS concentrations which exceeded PFAS NEMP 2.0 99% protection levels and below PFAS NEMP 2.0 95% protection levels.

### Closing Comments

In summary data from the Bradfield investigations in-conjunction with investigations undertaken for the SBT Site infer there is the presence of multiple PFAS sources which are contributing to PFAS in the environment including:

- PFAS source areas within the SBT Site
- Diffuse PFAS in soil/sediment in Lot 101 DP1282949 (i.e. the Property), and within this property the potential for secondary sources of PFAS along drainage lines down-gradient of the SBT Site
- Probable off-site sources of PFAS.

PFAS is present in groundwater up and down-gradient of the SBT Site. At the Lot 101 DP1282949 property boundary and down-gradient of the SBT Site, PFAS is likely to be present in trace concentrations in groundwater above the PFAS 99% species protection level and below the 95% species protection levels.

PFAS is present in surface water in dry and wet conditions. Higher concentrations of PFAS in surface water occur in wet conditions in surface water discharged along drainage lines from PFAS sources areas at SBT Site, and potentially in surface water.

There is currently insufficient data to assess differences in PFAS concentrations in surface water and groundwater in the environment under wet and dry weather conditions, and the relative contribution of the PFAS sources in the area to PFAS concentrations in surface water and groundwater in the receiving environment.



## Appendix 6.3.1 Bradfield Investigation Soil Data



BH213	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0022	0.0002	0.0002	0.0002

MW205	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.2	0.0007	<0.0001	<0.0001	<0.0001

MW205	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.2	0.0002	0.0002	0.0002	0.0002

BH211	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0201	0.0191	0.0179	0.0012

MW202	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.2	0.0002	0.0002	0.0002	<0.0001

BH210	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0002	0.0002	0.0002	<0.0001

MW204	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.2	0.0003	0.0003	0.0003	<0.0001

BH204	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0023	0.0023	0.0023	0.0002

BH218	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0002	0.0002	0.0002	<0.0001

BH219	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0004	0.0004	0.0004	0.0001

BH207	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.1	0.0002	0.0002	0.0002	<0.0001

BH202	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.0091	0.0014	0.0014	0.0011	0.0002

TP217	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.2	0.0039	0.0035	0.0035	0.0003

TP205	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.2	0.0002	0.0002	0.0002	<0.0001

TP206	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.3	0.0012	0.0012	0.0007	0.0005

TP207	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	1.0	0.0027	0.0024	0.0021	0.0003
	2.2	0.0005	0.0005	0.0002	0.0003

TP205	Depth (m)	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.5	0.0074	0.0052	0.0059	0.0004
	1.5	0.0011	0.0009	0.0004	0.0005

- Legend**
- 210 Bargeys Creek Road (Municipal Land)
  - Adjacent Residential Land
  - Vetro Licensed Area Boundary
  - Corridor (Lot)
  - Watercourse
  - Groundwater Monitoring Well (0m deep)
  - Groundwater Monitoring Well (20m deep)
  - Soil Bore (0.5m deep)
  - Test Pit
  - Surface Water Sample
  - Sediment Sample

Analyte	PFAS			
	Sum of PFAS	Sum of PFHxS and PFOS	PFOS	PFHxS
UHL	ng/g	ng/g	ng/g	ng/g
EDL	0.0002	0.0002	0.0002	0.0002
PERM 1994 P1				
PERM 1994 H1.A				
PERM 1994 H1.B				
PFAS NEMP 2008 Ecological/Industrial exposure			1	
PFAS NEMP 2008 Ecological/Industrial exposure			0.01	
PFAS NEMP 2008 Public open space (HLC)			1	
PFAS NEMP 2008 Residential with garden/accessible soil (HLC)			0.01	0.01

**ERM (2021) Investigation – Analytical Results Exceedances of Screening Criteria - Soil**

Drawing No: 0571-600-TS\_0005\_00.indd | MPCA Aerotropolis Targeted Site Investigation

Date: 17/05/2021 | Drawing Size: A4

Drawn By: GC | Reviewed By: JB | Client: Warrnambool City Authority

Source: ERM OFS - OGD6/D708 | Warrnambool Facility - Dec 2020

This figure may be based on third party data or data which has not been verified by ERM and it may not be 100% correct. ERM is not responsible for the accuracy or completeness of the data and ERM does not warrant its accuracy.

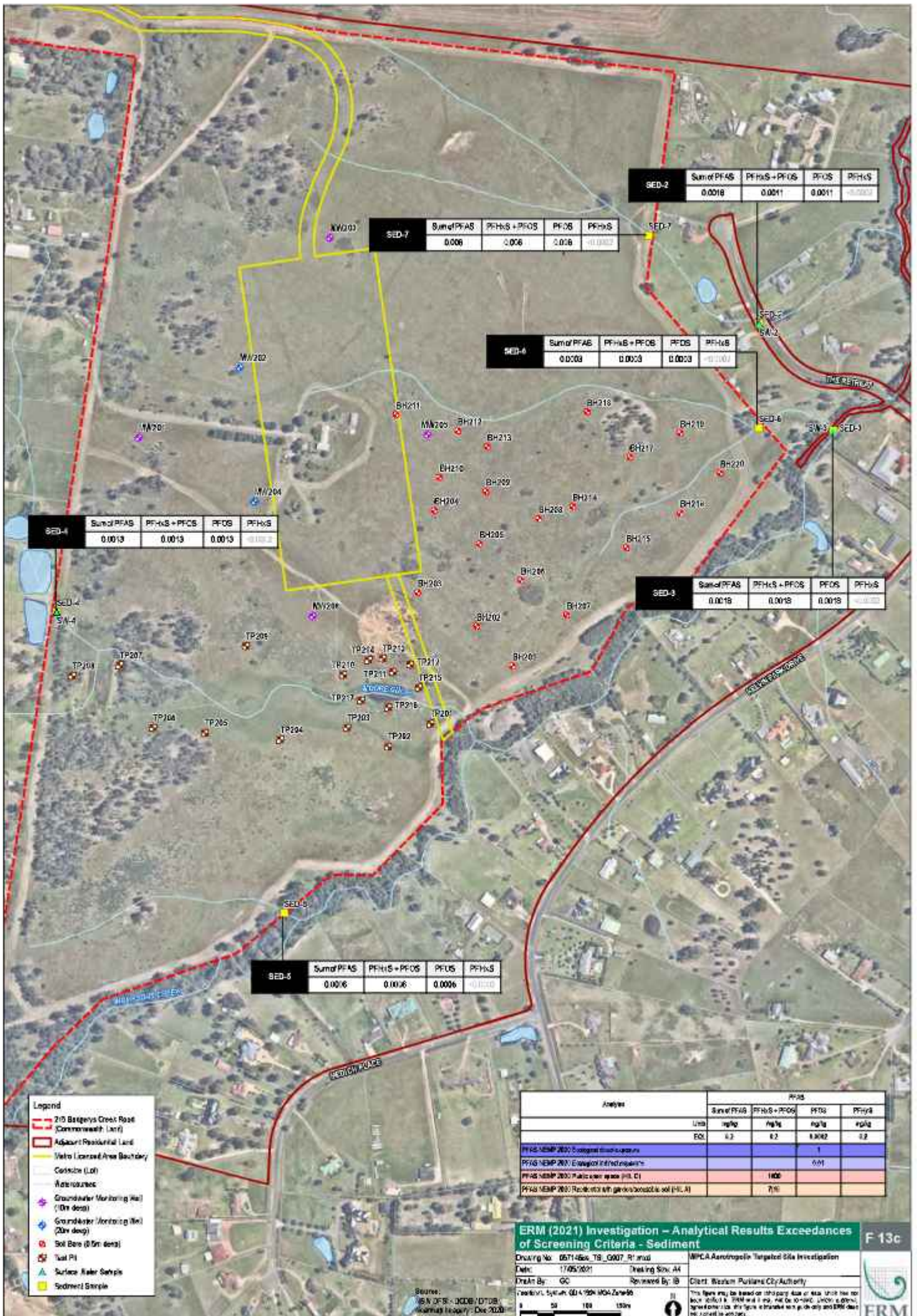
**F 13a**

**ERM**



## Appendix 6.3.2 Bradfield Investigation Sediment Data





SED-2	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.0018	0.0011	0.0011	<0.0003

SED-7	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.006	0.006	0.006	<0.0003

SED-6	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.0008	0.0008	0.0008	<0.0003

SED-4	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.0013	0.0013	0.0013	<0.0003

SED-3	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.0018	0.0018	0.0018	<0.0003

SED-5	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
	0.0006	0.0006	0.0006	<0.0003

- Legend**
- 210 Bargeys Creek Road (Commonwealth Land)
  - Adjacent Residential Land
  - Metro Licensed Area Boundary
  - Colicote (Lot)
  - Atrios/Artec
  - Groundwater Monitoring Well (0m deep)
  - Groundwater Monitoring Well (20m deep)
  - Soil Bore (0.5m deep)
  - Test Pit
  - ▲ Surface Water Sample
  - Sediment Sample

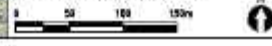
Analysis	PFAS				
	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS	PFAS
	µg/g	µg/g	µg/g	µg/g	µg/g
EQ	0.2	0.2	0.002	0.2	0.2
PFAS NEMP 2020: Integrated discharge system			1		
PFAS NEMP 2020: Exchange of feedwaters			0.01		
PFAS NEMP 2020: Public water supply (PIL C)		100			
PFAS NEMP 2020: Residential with general domestic use (PIL A)		7%			

**ERM (2021) Investigation – Analytical Results Exceedances of Screening Criteria - Sediment**

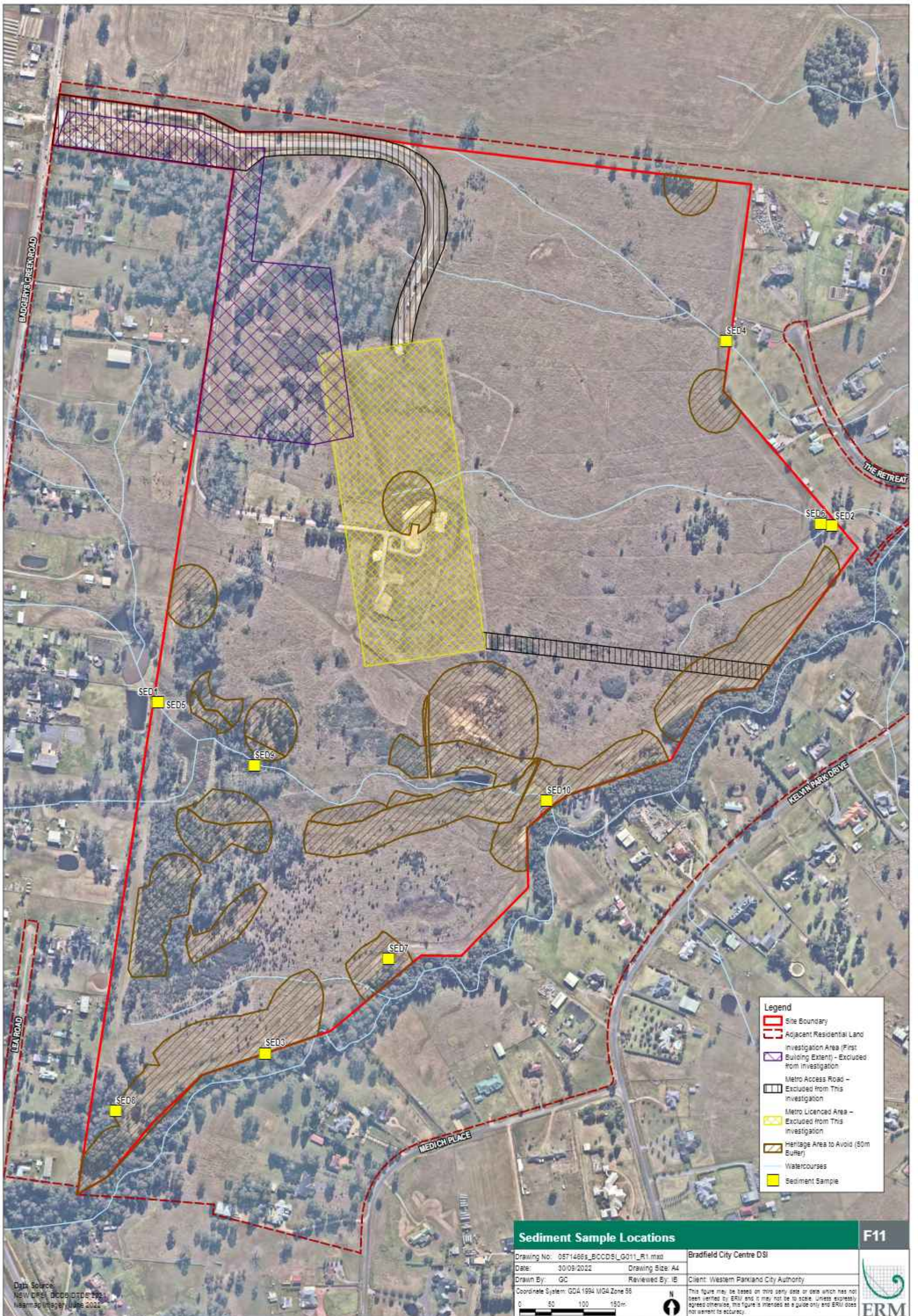
Drawing No: 0571466k\_TS\_0007\_R1.mxd  
 Date: 17/05/2021  
 Drawn By: GC  
 Reviewed By: JB  
 MPCA Aerotropolis Targeted Site Investigation  
 Drawing Size: A4  
 Client: Western Piedmont City Authority



Source: BSA OFS - OGD/DTDB  
 Remedial Strategy - Dec 2020



This figure may be based on the party data or data which has not been verified by ERM and it may not be 100% correct. ERM is not responsible for any errors or omissions in this figure or any data derived therefrom.



**Legend**

- Site Boundary
- Adjacent Residential Land
- Investigation Area (First Building Extent) - Excluded from Investigation
- Metro Access Road - Excluded from This Investigation
- Metro Licenced Area - Excluded from This Investigation
- Heritage Area to Avoid (50m Buffer)
- Watercourses
- Sediment Sample

Sediment Sample Locations		F11
Drawing No: 0571466s_BCCDS_LG011_R1.mxd	Bradfield City Centre DSI	
Date: 30/09/2022	Drawing Size: A4	
Drawn By: GC	Reviewed By: IB	Client: Western Parkland City Authority
Coordinate System: GDA 1994 MGA Zone 56		
<div style="display: flex; align-items: center; gap: 5px;"> <span>0</span> <span>50</span> <span>100</span> <span>150m</span> </div>	<span style="font-size: 2em;">N</span> <span style="font-size: 1.5em;">↑</span>	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Data Source:  
 NEW DELI, DCDB, DTDR 192  
 Naarmap imager, June 2021

## Appendix 6.3.3 Bradfield Investigation and GHD Surface Water Data





**Legend**

- 270 Bulldogs Creek Plant (Contaminated Area)
- Adjacent Licensed Area
- Mobile Licensed Area Boundary
- Cadastre (LAL)
- Watercourse
- Groundwater Monitoring Well (10m dia)
- Groundwater Monitoring Well (30m dia)
- Soil Core (0.5m dia)
- Top Soil
- Surface Water Sample
- Subsoil Sample

**F 12**

**ERM (2021) Investigation - Sampling Locations**

**WFOA Aeromagnetics Targeted Site Investigation**

Client: Western Piedmont City Authority

Drawing No: 02716006, 101, 02018, 21, final

Date: 17/09/2021

Drawn By: JGC

Reviewed By: JB

Drawing Size: A3

Scale: 1:500

North Arrow

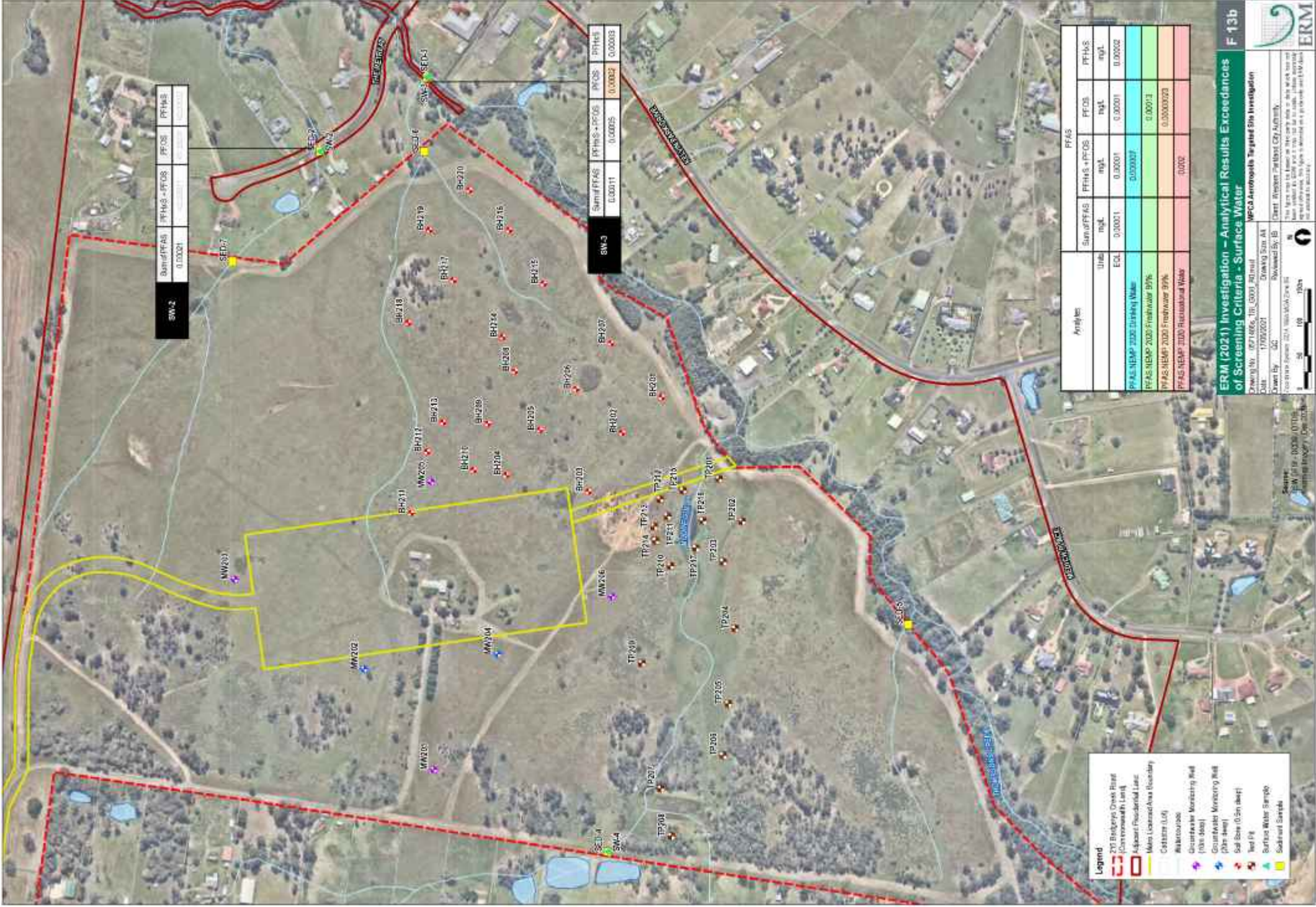
Scale Bar: 0, 50, 100, 200m

Sources: [www.cadastre.gov.za](#), [www.western-piedmont.gov.za](#)

© 2021 ERM Group (Pty) Ltd. All Rights Reserved.



This report is based on the data collected by the client and the data provided by the client. ERM is not responsible for the accuracy of the data provided by the client. ERM is not responsible for the accuracy of the data provided by the client.



SW-2	Sum of PFAS	PFHx3 + PFOS	PFOS	PFHx5
	0.00021			

SW-3	Sum of PFAS	PFHx3 + PFOS	PFOS	PFHx5
	0.00011	0.00005	0.00002	0.00003

Analytes	PFAS			
	Sum of PFAS	PFHx3 + PFOS	PFOS	PFHx5
Unit	ng/L	ng/L	ng/L	ng/L
EOL	0.0001	0.00001	0.00001	0.00002
PFAS NEMP 2020 Drinking Water		0.00007		0.0001
PFAS NEMP 2020 Freshwater 99%				0.0000020
PFAS NEMP 2020 Freshwater 99%				0.000
PFAS NEMP 2020 Recreational Water				0.000

**Legend**

- 270 Bishops Creek Plant (Construction) Limit
- Adjacent Parcel/Field Limit
- Miles Local Area Boundary
- Cell Size (US)
- Watercourse
- Geotrack Monitoring Well (10x 40x)
- Groundwater Monitoring Well (20x 40x)
- Soil Core (0.5m dia)
- Soil Core (0.5m dia)
- Top 10
- Surface Water Sample
- Subsided Sample

**ERM (2021) Investigation - Analytical Results Exceedances of Screening Criteria - Surface Water**

WFOA Anonymous Targeted Site Investigation

Client: Western Piedmont City Authority

Drawing No: 02716005, 101 (000) 02.mxd

Date: 17/09/2021

Drawn By: GC

Reviewed By: JB

Drawing Size: A1

Scale: 1:5000

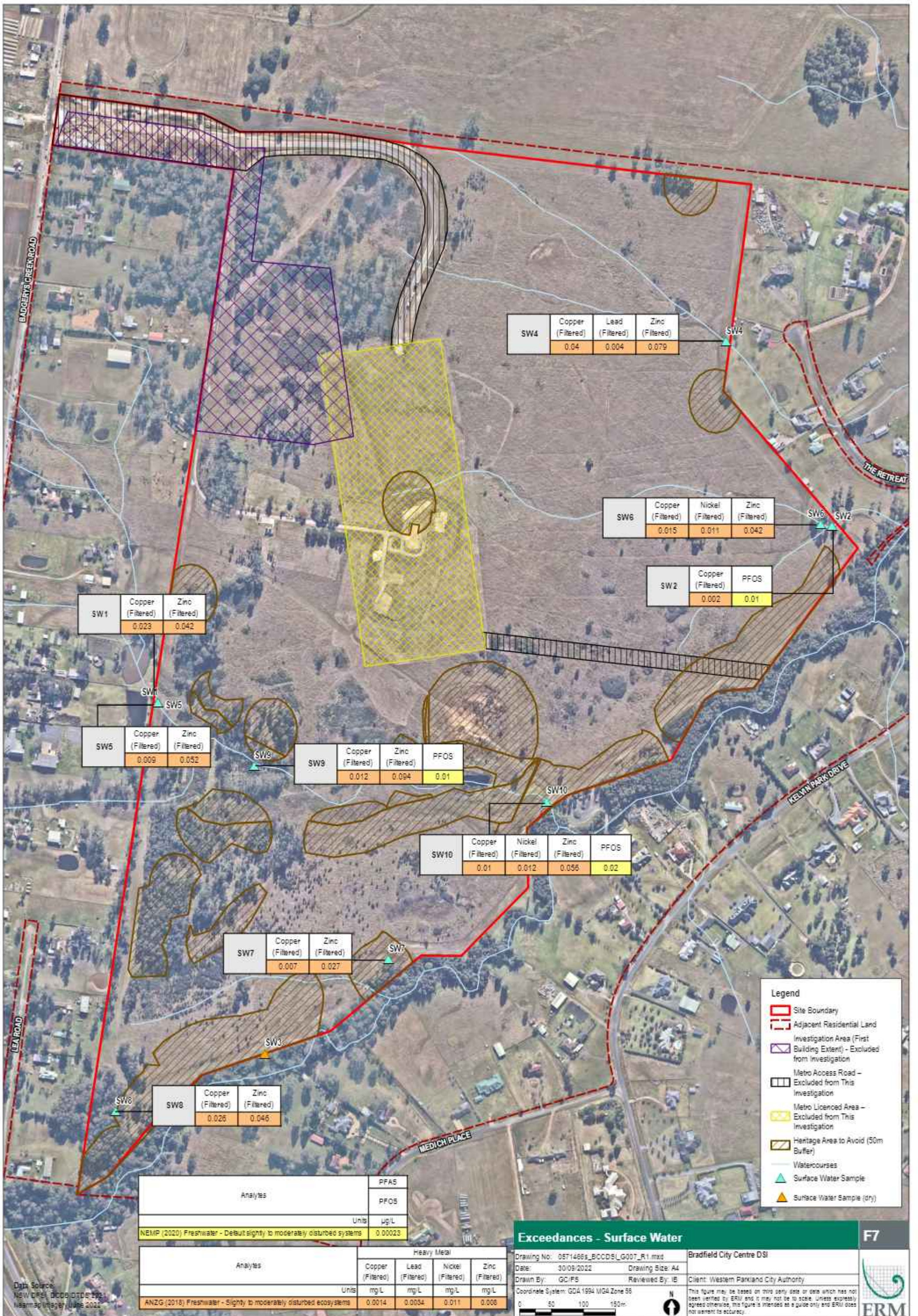
North Arrow

Scale: 0 50 100 150m

Source: ESRI/ArcGIS, Google Earth, 09/09/2019

Page: 1 of 1

ERM Logo



SW4	Copper (Filtered)	Lead (Filtered)	Zinc (Filtered)
	0.04	0.004	0.079

SW6	Copper (Filtered)	Nickel (Filtered)	Zinc (Filtered)
	0.015	0.011	0.042

SW2	Copper (Filtered)	PFOS
	0.002	0.01

SW1	Copper (Filtered)	Zinc (Filtered)
	0.023	0.042

SW5	Copper (Filtered)	Zinc (Filtered)
	0.009	0.052

SW9	Copper (Filtered)	Zinc (Filtered)	PFOS
	0.012	0.094	0.01

SW10	Copper (Filtered)	Nickel (Filtered)	Zinc (Filtered)	PFOS
	0.01	0.012	0.056	0.02

SW7	Copper (Filtered)	Zinc (Filtered)
	0.007	0.027

SW8	Copper (Filtered)	Zinc (Filtered)
	0.026	0.046

- Legend**
- Site Boundary
  - Adjacent Residential Land
  - Investigation Area (First Building Extent) - Excluded from Investigation
  - Metro Access Road - Excluded from This Investigation
  - Metro Licenced Area - Excluded from This Investigation
  - Heritage Area to Avoid (50m Buffer)
  - Watercourses
  - Surface Water Sample
  - Surface Water Sample (dry)

Analytes	PFAS	
	Units	µg/L
NEMP (2020) Freshwater - Default slightly to moderately disturbed systems		0.00023

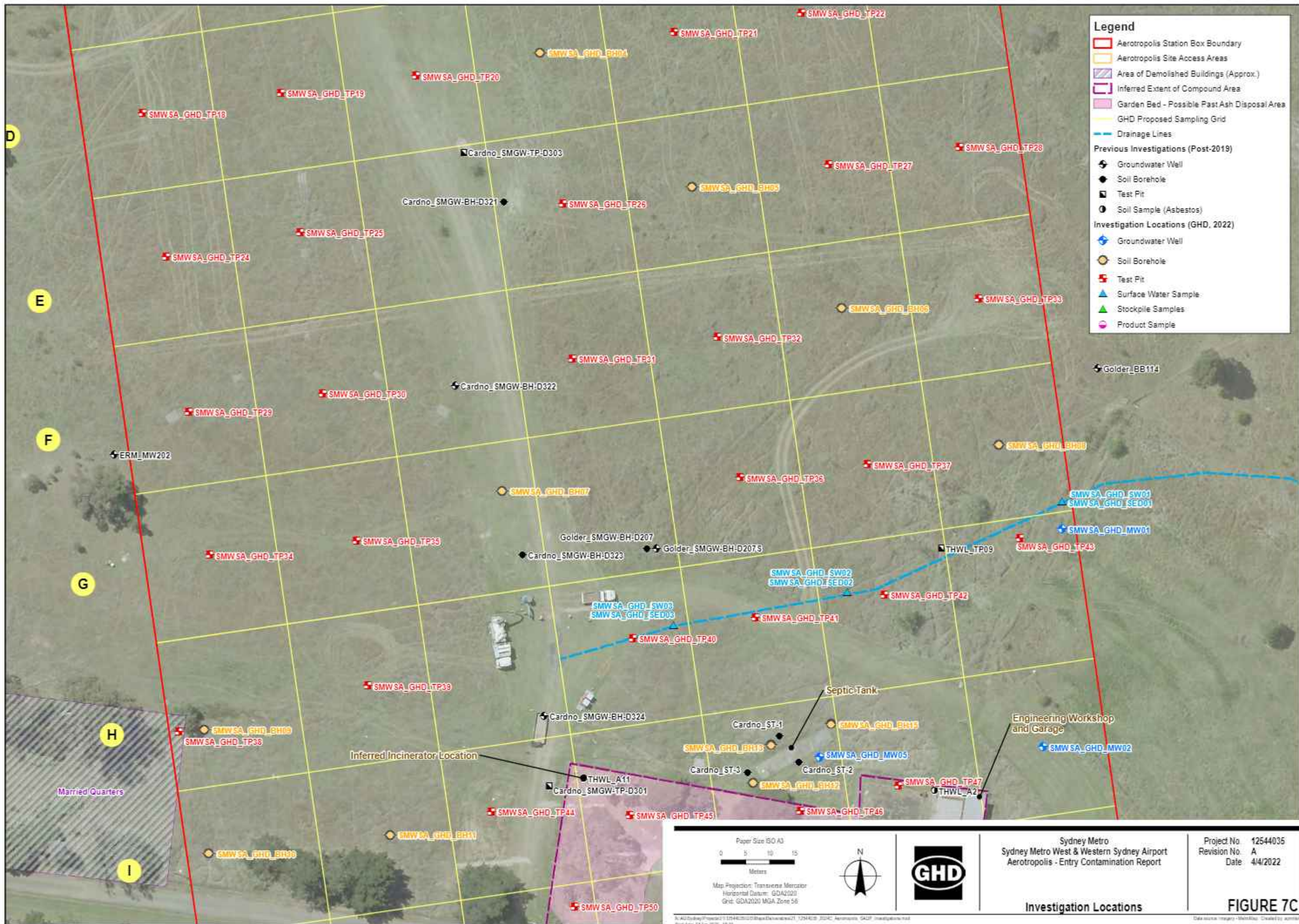
Analytes	Heavy Metal			
	Copper (Filtered)	Lead (Filtered)	Nickel (Filtered)	Zinc (Filtered)
Units	mg/L	mg/L	mg/L	mg/L
ANZG (2018) Freshwater - Slightly to moderately disturbed ecosystems	0.0014	0.0054	0.011	0.008

**Exceedances - Surface Water**

Drawing No: 0571466s_BCCDSL_G007_R1.mxd Date: 30/09/2022 Drawn By: GC/FS Coordinate System: GDA 1994 MGA Zone 56	Drawing Size: A4 Reviewed By: IB Client: Western Parkland City Authority	<b>F7</b> Bradfield City Centre DSI 
---	--	--

This figure may be based on this early data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Data Source: NEW DEL. DCDB DTP 192, Naarmap imager, June 2021



**Legend**

- Aerotropolis Station Box Boundary
- Aerotropolis Site Access Areas
- Area of Demolished Buildings (Approx.)
- Inferred Extent of Compound Area
- Garden Bed - Possible Past Ash Disposal Area
- GHD Proposed Sampling Grid
- Drainage Lines

**Previous Investigations (Post-2019)**

- Groundwater Well
- Soil Borehole
- Test Pit
- Soil Sample (Asbestos)

**Investigation Locations (GHD, 2022)**

- Groundwater Well
- Soil Borehole
- Test Pit
- Surface Water Sample
- Stockpile Samples
- Product Sample

Paper Size ISO A3

0 5 10 15  
Meters

Map Projection: Transverse Mercator  
Horizontal Datum: GDA2020  
Grid: GDA2020 MGA Zone 56

N



Sydney Metro  
Sydney Metro West & Western Sydney Airport  
Aerotropolis - Entry Contamination Report

Project No. 12544035  
Revision No. A  
Date 4/4/2022

Investigation Locations

FIGURE 7C

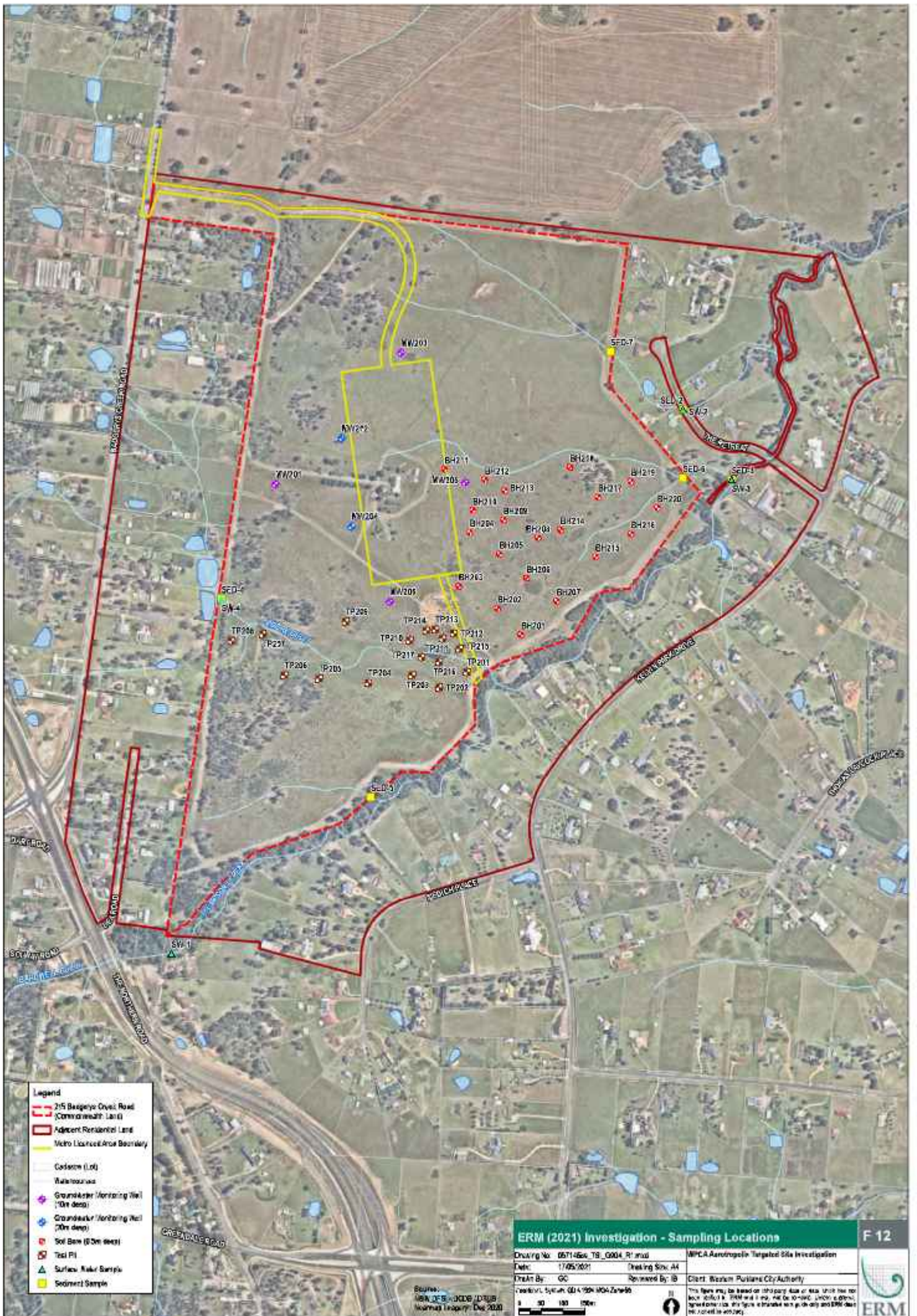
S:\40 Sydney\Projects\12544035\03 Maps\Drawings\71\_72\A3\03\_Aerotropolis\_GADP\_Investigation.mxd  
Print Date: 04 Apr 2022 - 10:38

Data source: Imagery - Sentinel-2. Created by: admin



## Appendix 6.3.4 Bradfield Investigation Groundwater Data



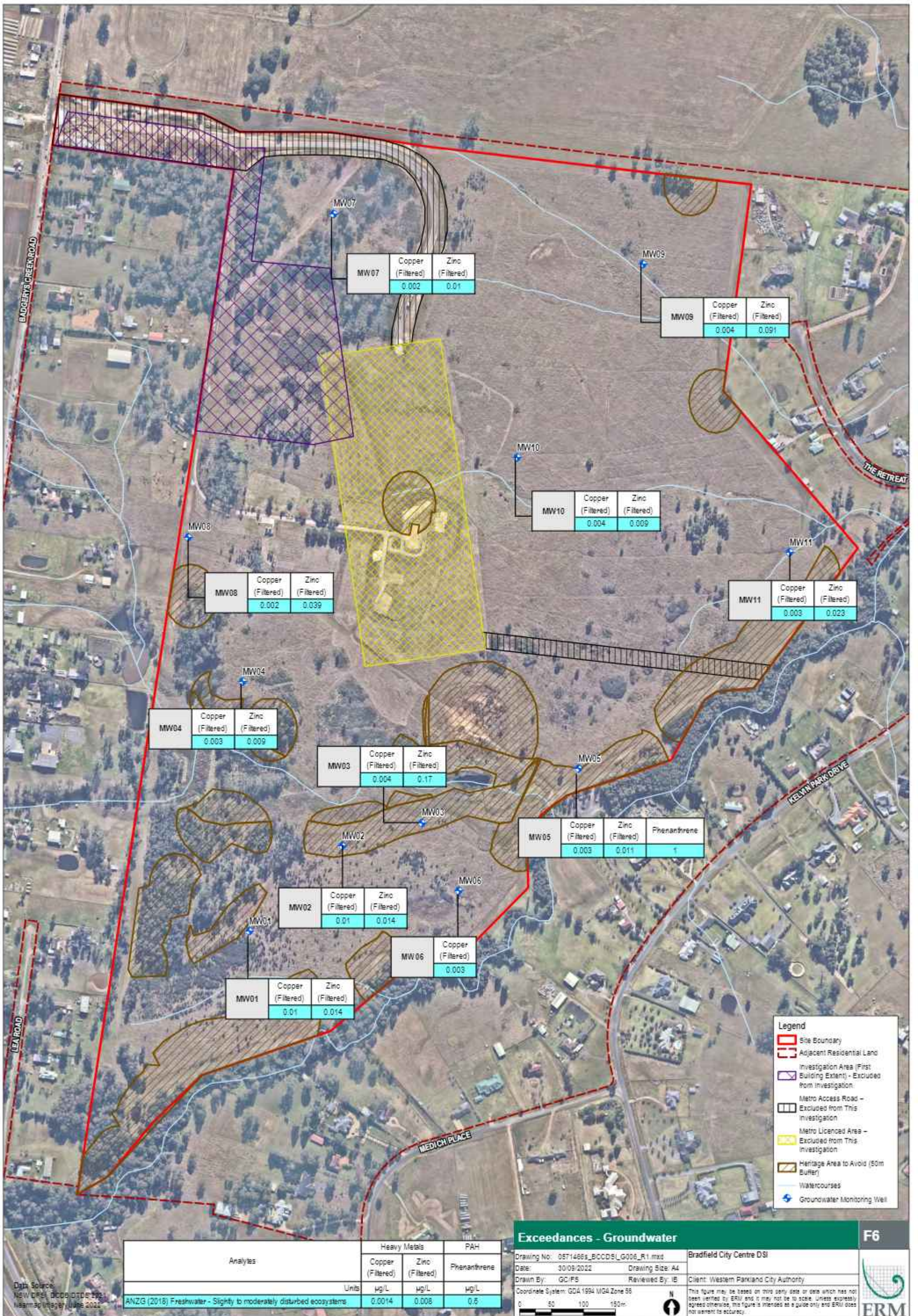


- Legend**
- - - 215 Beagyo Oval Road (Commercial) Land
  - Adjacent Residential Land
  - Micro Licenced Area Boundary
  - Cadastre (Lot)
  - Railtoomina
  - ◆ Groundwater Monitoring Well (0m deep)
  - ◆ Groundwater Monitoring Well (20m deep)
  - Soil Bore (0.5m deep)
  - Test Pit
  - ▲ Surface Risk Sample
  - Sediment Sample

ERM (2021) Investigation - Sampling Locations		F 12
Drawing No: 0571456c_TS_G004_R1.mxd	MPCA Aerotropolis Targeted Site Investigation	
Date: 17/05/2021	Drawing Size: A4	
Drawn By: GC	Reviewed By: JB	
Client: Western Pittsburg City Authority		
This figure may be based on third party data or data which has not been collected by ERM and it may not be 100% correct. ERM is not responsible for any errors or omissions which may appear in this drawing.		

Source: **IGN OF SA 4000S (DTR)**  
 National Topography, Dec 2020





MW07	Copper (Filtered)	Zinc (Filtered)
	0.002	0.01

MW09	Copper (Filtered)	Zinc (Filtered)
	0.004	0.091

MW10	Copper (Filtered)	Zinc (Filtered)
	0.004	0.009

MW11	Copper (Filtered)	Zinc (Filtered)
	0.003	0.023

MW08	Copper (Filtered)	Zinc (Filtered)
	0.002	0.039

MW04	Copper (Filtered)	Zinc (Filtered)
	0.003	0.009

MW03	Copper (Filtered)	Zinc (Filtered)
	0.004	0.17

MW05	Copper (Filtered)	Zinc (Filtered)	Phenanthrene
	0.003	0.011	1

MW02	Copper (Filtered)	Zinc (Filtered)
	0.01	0.014

MW06	Copper (Filtered)
	0.003

MW01	Copper (Filtered)	Zinc (Filtered)
	0.01	0.014

- Legend**
- Site Boundary
  - Adjacent Residential Land
  - Investigation Area (First Building Extent) - Excluded from Investigation
  - Metro Access Road - Excluded from This Investigation
  - Metro Licensed Area - Excluded from This Investigation
  - Heritage Area to Avoid (50m Buffer)
  - Watercourses
  - Groundwater Monitoring Well

**Exceedances - Groundwater**

**F6**

Analytes	Heavy Metals		PAH
	Copper (Filtered)	Zinc (Filtered)	Phenanthrene
Units	µg/L	µg/L	µg/L
ANZG (2018) Freshwater - Slightly to moderately disturbed ecosystems	0.0014	0.008	0.6

Drawing No: 0571466s_BCCDSL_G006_R1.mxd Date: 30/09/2022 Drawn By: GC/FS Coordinate System: GDA 1994 MGA Zone 56	Drawing Size: A4 Reviewed By: IB Client: Western Parkland City Authority	Bradfield City Centre DSI
---	--	---------------------------

Scale: 0 50 100 150m

North Arrow

This figure may be based on this party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

Data Source: NEW DEL DCOB/DTP/192  
Mapmap Imager, June 2022

## Appendix 6.4 Fill/Topsoil Material Removal and Supplementary Asbestos Sampling

CPBG has advised that at the time of preparing this RAP fill materials in the Medium Impact Area has been excavated in two main stages including:

- Stage 1: fill materials within CPBG construction disturbance footprint
- Stage 2: fill materials within the Medium Impact Area and outside the CPBG construction disturbance footprint.

These stages are described as follows.

### Stage 1: fill materials within CPBG construction disturbance footprint

Stage 1 involved the excavation of fill materials within CPBG construction disturbance footprint. These areas are shown in the polygons in yellow in Figure 6.7.1.

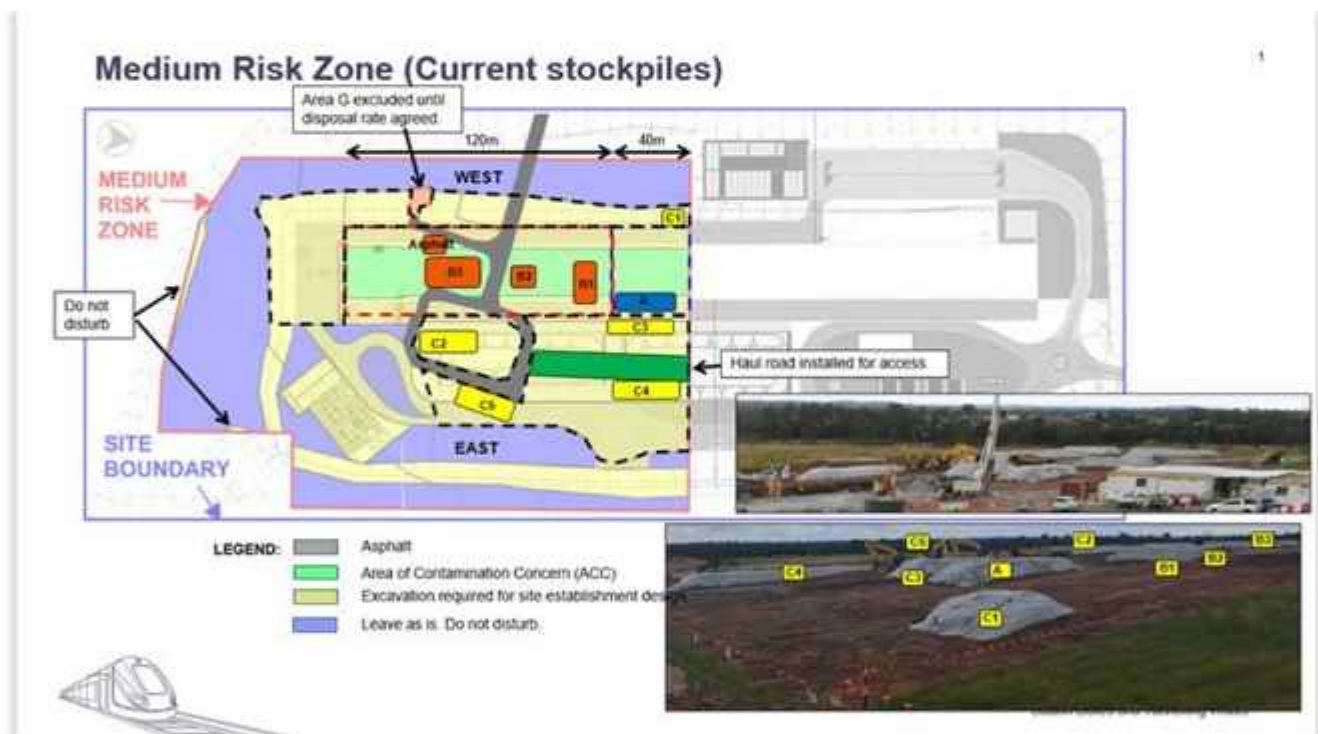


Figure 6.7.1 Stage 1 Excavation of Fill Materials (areas shown with yellow polygons)

TTMP understand that fill materials from the Stage 1 excavation area were placed into approximately 11 sub-stockpiles, and based on an instruction from Sydney Metro sampled to confirm the presence of ACM. This sampling was undertaken by AIRSAFE between 1 December 2022 and 14 December 2023. The results of sampling are summarised in Table 17. In summary ACM was detected in all 11 sub-stockpiles.

TTMP understand that the results of this sampling were considered by Sydney Metro as line of evidence to support recommendation made by TTMP that all fill and disturbed natural materials in the Medium Impact Area should be considered as potentially containing asbestos. Based on this finding Sydney Metro instructed CPBG to excavate all remaining fill materials in the Medium Impact Area. Excavation of these materials were undertaken as part of Stage 2.



Material excavated in Stage 1 were disposed by CPBG at an appropriately licenced waste management facility.

**Stage 2: fill materials within the Medium Impact Area and outside the CPBG construction disturbance footprint.**

Sydney Metro instructed CPBG to excavate and stockpile all fill material from the Medium Impact Area and outside of the CPBG construction disturbance footprint (i.e. the balance of fill and disturbed natural materials in the Medium Impact Area following the removal of materials in Stage 1). Materials which have been excavated in Stage 2 are shown as the labelled polygons 1 to 7 in Figure 6.7.2.

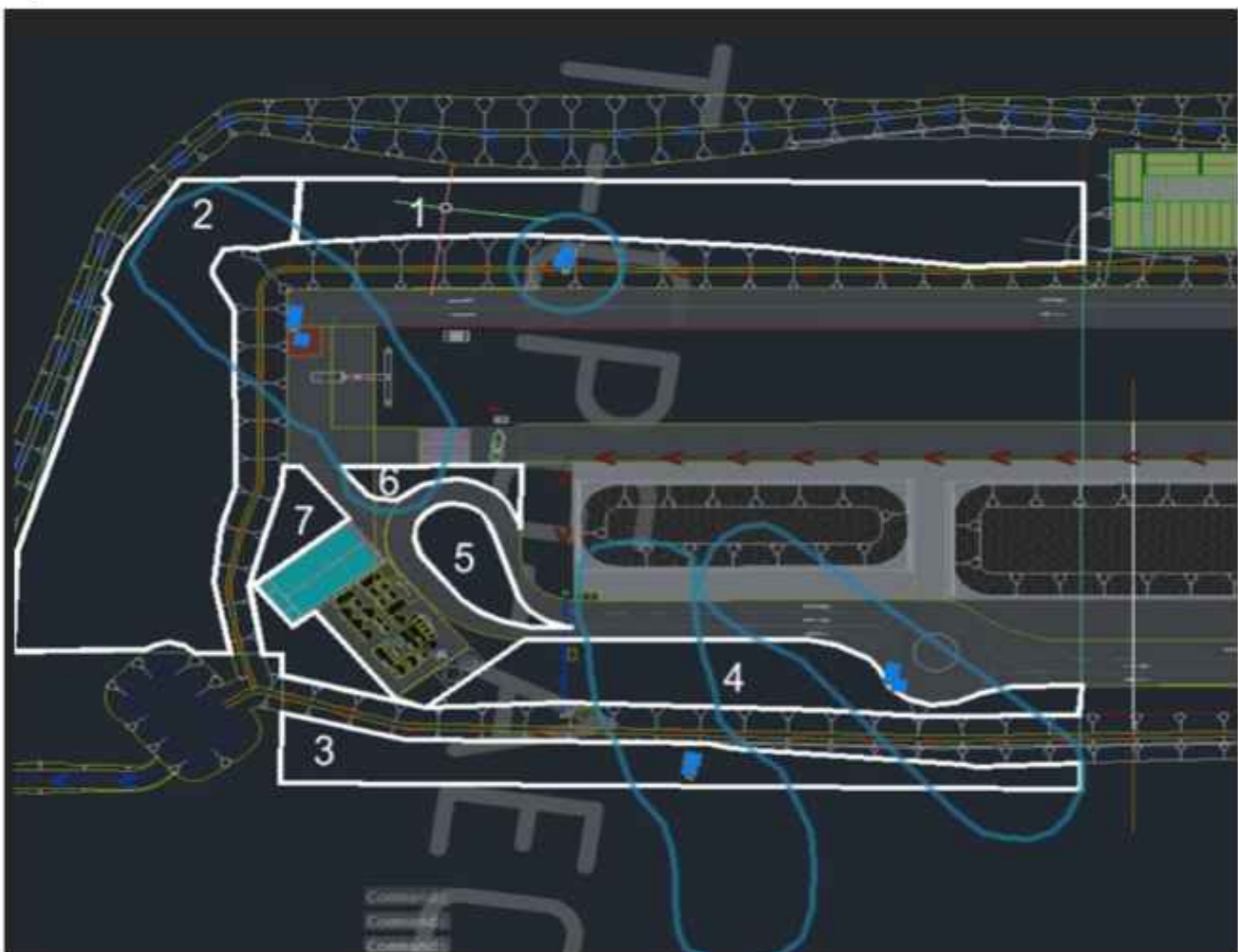


Figure 6.7.2 Stage 2 Excavation of Fill Materials (areas within the numbered polygons 1 to 7)

The materials stockpiled are to be disposed at a contaminated land containment facility being developed for the Sydney Metro Western Sydney Airport Surface and Civil Alignment Works (SCAW) or an appropriately licenced waste management facility if disposal at the SCAW facility is not practicable or not available within the SBT construction program. Sydney Metro has advised CPBG that the containment facility at SCAW is expected to be completed in 2023.

At the time of preparing this RAP it is understood that materials excavated in Stage 2 have been placed in the stockpiles shown in Figure H. CPBG has advised that the approximate volume of material in the stockpiles is 750 m<sup>3</sup>, and the material in the stockpiles has been placed directly on



the ground surface and the stockpiles have been covered in a geofabric. The location of these stockpiles is shown in Figure E (refer to Section 8.1).

Table 15: Conceptualisation of Aerotropolis Site

AIRSAFE Test Report Reference and Date	Stockpile No.	No. Samples	Asbestos Result
65989 1/12/22	A, B, C	3	Chrysotile and Amosite asbestos found loose and bound to fibrous cement sheet in two samples.  No respirable fibres detected.
66107 6/12/22	A	5	Chrysotile and Amosite asbestos found loose and bound to fibrous cement sheet within the soil and debris samples in three samples  No respirable fibres detected.
66058 7/12/22	C3	5	Chrysotile asbestos found loose in soil and in fibrous cement sheet debris in one sample  No respirable fibres detected.
66064 8/12/22	B1	4	Chrysotile asbestos found loose and bound to fibrous cement sheet in soil in one sample  No respirable fibres detected.
66063 8/12/22	B2	5	Chrysotile and Amosite asbestos found loose and bound to fibrous cement sheet fragments in one sample.  No respirable fibres detected.
66062 6/12/22	B3	5	Chrysotile and Amosite asbestos found loose and bound to fibrous cement sheet fragments in four samples  No respirable fibres detected.



AIRSAFE Test Report Reference and Date	Stockpile No.	No. Samples	Asbestos Result
66056 6/12/22	C1	5	Chrysotile asbestos found loose and bound to fibrous cement sheet fragments in two samples.  No respirable fibres detected.
66060 7/12/22	C2	5	Amosite, Chrysotile and Crocidolite asbestos found in fibrous cement sheet debris found in one sample. Chrysotile asbestos found loose in soil and in fibrous cement sheet found in one sample.  No respirable fibres detected.
66059 7/12/22	C4	4	Chrysotile asbestos found loose in soil and in fibrous cement sheet debris in one sample.  No respirable fibres detected.
66061 7/12/22	C5	5	Chrysotile asbestos found loose in soil and in fibrous cement sheet debris in one sample.  No respirable fibres detected.
66213 14/12/22	C6	5	Chrysotile asbestos found loose in soil and in fibrous cement sheet fragments in five samples.  No respirable fibres detected.



## Appendix 6.5 Supplementary PFAS Test Pits

Supplementary test pits were completed in May 2023 to further define the extent of PFAS requiring remediation at DSI sampling locations with concentrations which exceeded the remediation criteria.

The location of the supplementary test pits completed are shown in Figure 4B, 4C and 4D in Appendix 1.

## Methodology

Test pits were excavated to the depths and methodologies summarised in the following tables:

Table 16: Supplementary Test Pit Depths

Test Pit	Excavation Depth (m bgs)
A1_1A, A1_1B	0.4
A1_1C, A1_1D, A1_1E	0.1
A2_54 to A2_66	3
A4_42 to A4_53	2
A5_50 to A5_51	1

Table 17: Sampling Methods

Activity	Sampling Methods
Sample Depths and Sample ID	<p>Soil samples were collected at 0.1 m and then 1m intervals to the target depth of the test pit.</p> <p>Test pits A1_1A to A1_1E were surveyed prior to excavation to determine the equivalent depth of the sample based on pre-construction ground levels. The sample depth recorded in the sample ID from these test pits is based on pre-construction ground levels.</p> <p>For all other test pits, the sample depth recorded with the Sample ID is based on existing ground surface levels. These test pits are located in areas which CPBG has advised approximately 0.3 to 0.4 m of topsoil/fill materials have been removed. This topsoil fill stripping depth has been considered in the data presented in Appendix 5 and the characterisation of the site and areas requiring remediation in Section 8.</p>
Soil Sampling Containers	Soil samples for PFAS analysis were placed in PFAS specific sample containers provided by the laboratory. Soil samples were also be collected in clean acid washed glass jars supplied by the laboratory and sealed with a Teflon-lined lid for subsequent analysis for waste classification purposes if required.
Sample collection	Each soil sample were collected with new nitrile gloves to reduce the potential for cross contamination.
Soil Logging	Soil samples were be logged by a suitably qualified and experienced TTMP scientist in accordance with TTMP's relevant Standard Operating Practice (SOP), Field Description of Soils, in Schedule B2 of the ASC NEPM 2013. Presence or absence of anthropogenic material and contamination (i.e. odours or staining) will recorded on the soil logs.
Sample Handling and Transportation	The samples were be placed into ice chilled coolers and dispatched to NATA accredited laboratories for analysis under chain of custody (COC) control.
Laboratory Analysis	Soil samples were analysed for the PFAS Extended Suite at the Standard LOR.





Activity	Sampling Methods
QA/QC Samples	To measure the accuracy and precision of the data generated by the field and laboratory procedures for this assessment, quality assurance / quality control (QA/QC) samples were collected in accordance with Table 18 and the DQI's set forth in Appendix 10.

Table 18: Field and Laboratory QA/QC

Item	Acceptable Limit
Analysis of blind (intra-laboratory) duplicates and split (inter-laboratory) duplicates.	<p>Rate of 1:10 primary soil samples for the same analysis of primary samples;</p> <p>Calculation of relative percentage differences between primary and duplicate samples.</p> <p>RPD results for soil samples:</p> <ul style="list-style-type: none"> <li>• No Limit (where the average concentration is 0-10 x laboratory limit of reporting (LOR);</li> <li>• 50% (where the average concentration is 10-20 x laboratory LOR); and</li> <li>• 30% (where the average concentration is &gt; 20 x laboratory LOR).</li> </ul> <p>RPDs will be considered where a concentration is greater than 10 times the LOR.</p>
Analysis of rinsate blanks	<p>Where non-disposable equipment were used, at least one (1) sample per batch of soil sampling or material type where the source and sampling methods are consistent; and</p> <p>Results less than the laboratory LOR.</p>
Analysis of laboratory prepared trip blanks	<p>At least one (1) sample per batch for soil samples submitted.</p> <p>Results less than the laboratory LOR.</p>
Analysis of laboratory blanks, surrogates, reference and control samples	<p>The laboratories conducted their own internal quality program for assessment of the repeatability of the analytical procedures and instrument accuracy under their NATA accreditation. This included analysis of laboratory blank samples, duplicate samples, spike samples, control samples and surrogate spikes. The laboratory QA/QC procedures and results are described within the laboratory reports.</p> <p>The laboratory internal QA/QC sample results were reviewed for comparison with the laboratory's NATA guidelines and Schedule B3 of the ASC NEPM 2013.</p>
Laboratories and methods used	NATA accredited for the method. Methods should be in accordance with amended ASC NEPM 2013.
Holding times	Samples were analysed within recommended holding times.
Sample LORs	Results less than the adopted assessment criteria; justify/quantify if different.

The field investigation was undertaken by an experienced environmental scientist in accordance with TTMP standard operating procedures and the RAP. Samples were collected in laboratory provided containers, stored in chilled insulated containers, and submitted to a NATA accredited laboratory (ALS) under chain of custody documentation. Each sample was collected with a new set of nitrile gloves. Samples were received by the laboratory in good condition and analysis was completed within the required holding times for the contaminants of concern. No laboratory control outliers were noted which would affect the interpretation of the results. In summary the laboratory data is considered to be directly useable.

## Ground Conditions



The lithology was relatively consistent in the stripped area predominantly comprising loose soft silty clays to around 0.2m then low to medium dense, firm plastic clays to around 1m overlying stiff low plastic mottled clays combined with highly weathered shales to around 2.0 to 2.5m transitioning to moderately weathered shale at around 2.5 to 3 m.

PVC and clay drainage pipes and other service trenches (comms/electrical) were found at several locations, generally in the top 1.0m. Where this was the case samples were typically collected from the vicinity of the pipe/trench to target preferential pathways.

### Analytical Data

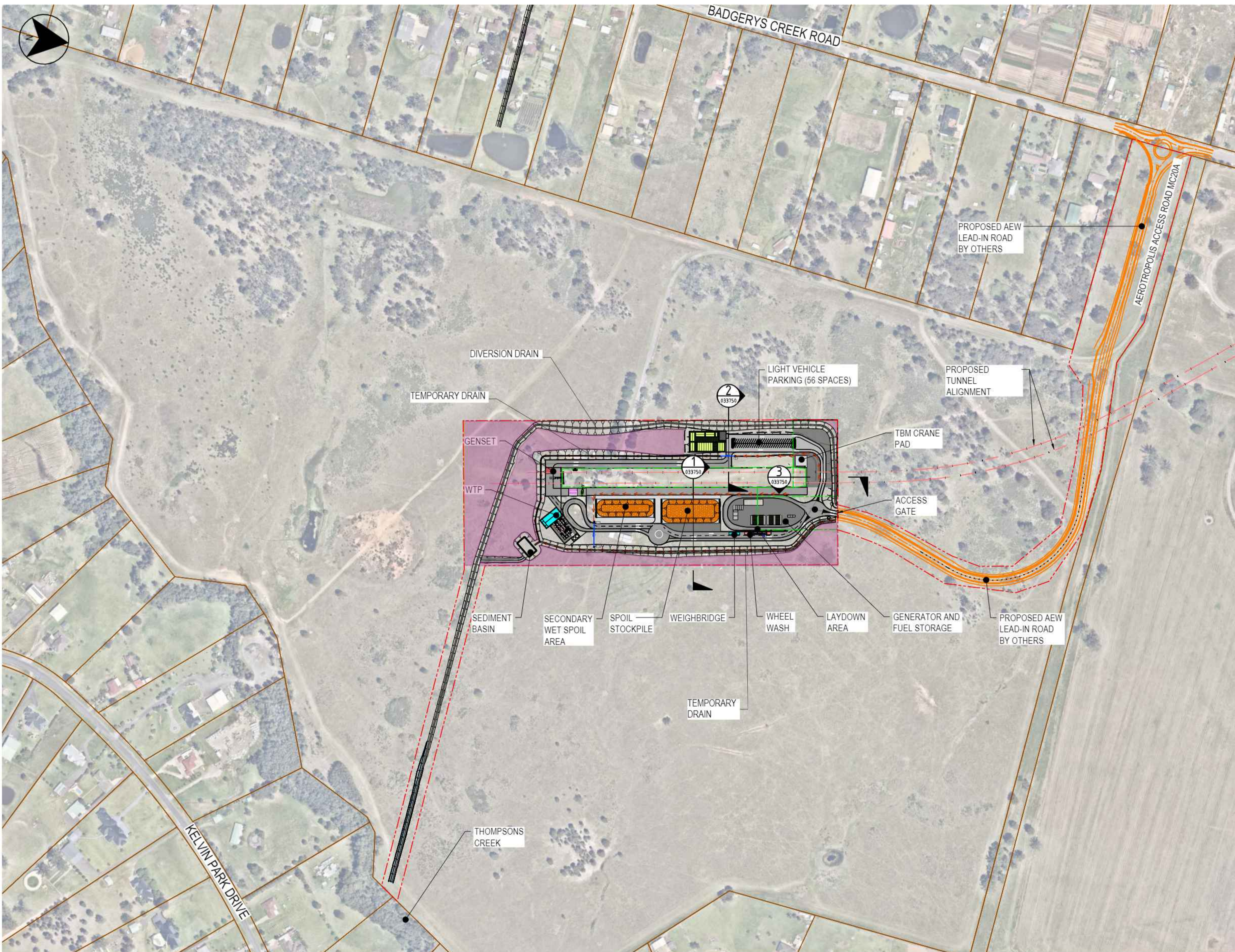
The analytical data from these locations is presented in the tables included in Appendix 5 and discussed in the Section 8.

Laboratory reports and duplicate/triplicate data is included in this appendix (Appendix 6.5).



## APPENDIX 9 Temporary Drains and Sediment Pond





- LEGEND**
- CONSTRUCTION SITE BOUNDARY
  - CADASTRAL BOUNDARY
  - TBM TUNNEL ALIGNMENT (BY OTHERS)
  - SECURITY FENCE
  - AEW DESIGN PACKAGE 4 A-4 6B (BY OTHERS)
  - INTERNAL SITE ROAD
  - INDICATIVE UNDISTURBED PROJECT AREA (NOT SUBJECT TO TOPSOIL STRIPPING)

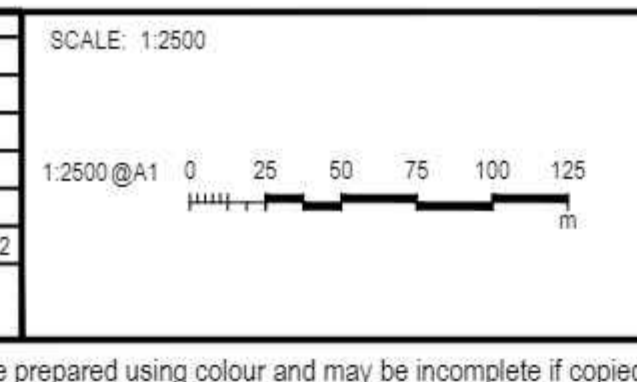
Proj Date: 27/07/22 - 18:03 Cad File: C:\W\SASBT-EXPORT\PLOTTING\SMW\SASBT-CPG-AEC-SN450-MB-DRG-033710.dwg

100mm AT FULL SIZE

File Path: C:\W\SASBT-EXPORT\PLOTTING\SMW\SASBT-CPG-AEC-SN450-MB-DRG-033710.dwg

FOR CONSTRUCTION

00	APPROVED FOR CONSTRUCTION	HY	MS	CL	27.07.22
REV	AMENDMENT DESCRIPTION	Design by	Verified by	Approved by	Date
A1	Original	Co-ordinate System: GDA2020/MGAZone56	Height Datum: AHD	This sheet may be prepared using colour and may be incomplete if copied	



NOTE: Do not scale from this drawing.

CLIENT:

Engineering Design Solutions  
A member of the BGC Group

The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Sydney Metro Project.

DRAWN	GARY VALLANCE	27.07.2022
DESIGNED	HEEAE YANG	27.07.2022
DRG CHECK	COLIN BIBLE	27.07.2022
DESIGN CHECK	TREVOR WOODWARD	27.07.2022
APPROVED	CHRIS LAWTON	27.07.2022

BG&E - bgeeng.com  
CIVIL

SYDNEY METRO - WESTERN SYDNEY AIRPORT - STATION BOXES AND TUNNELLING WORKS  
AEROTROPOLIS  
MOBILISATION AND SITE ESTABLISHMENT  
OVERALL GENERAL ARRANGEMENT PLAN

FILE No: SMWSASBT-CPG-AEC-SN450-MB-DRG-033710	SHEET: 1 OF 1	©
STATUS: APPROVED FOR CONSTRUCTION	EDMS No:	
DRG No: SMWSASBT-CPG-AEC-SN450-MB-DRG-033710	REV 00	VER

## APPENDIX 10 Data Quality Objective and Data Quality Indicators



## Data Quality Objectives

As stated in Section 18 Appendix B of Schedule B2 of the ASC NEPM, the DQO process is a seven-step iterative planning approach used to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site.

The seven-step DQO process adopted for the validation of remediation is summarised in the following table.

Table A: Data Quality Objectives

<p><b>1. State the problem</b></p>	<p>The primary objective for the remediation of the SBT Site is to make it suitable for commercial and open space land use based on the configuration of the SBT Site shown in Figure 3, Appendix 1.</p> <p>Based on the findings of the DSI and subsequent investigations undertaken during construction remediation of the SBT Site, remediation is required to make the SBT Site suitable for commercial and open space land use. Remediation of the SBT Site includes:</p> <ul style="list-style-type: none"> <li>the removal of fill materials and disturbed natural ground from the Medium Impact Area which potentially contain asbestos (note at the time of preparing this RA{ these materials have been excavated and disposed off-site or stockpiled on-site), and land between the eastern boundary of the Medium Impact Area and the SBT Site boundary</li> <li>the removal of PFAS impacted soil which exceeds the adopted remediation criteria.</li> </ul> <p>Validation of the SBT Site is required to confirm that the remediation objectives have been achieved. The main problems are:</p> <ul style="list-style-type: none"> <li>What areas require remediation?</li> <li>How should site soils be validated?</li> <li>What validation sampling density should be used?</li> <li>What contaminants should be analysed for?</li> </ul>
<p><b>2. Identify the decision</b></p>	<p>Is the data suitable for assessing whether the areas requiring remediation have been remediated?</p> <p>Is the Remediation Area suitable for the proposed land uses?</p>
<p><b>3. Identify inputs to the decision</b></p>	<p>The primary inputs to assessing the above include:</p> <ul style="list-style-type: none"> <li>Previous investigations (where applicable)</li> <li>Field observations including the presence of fill materials including anthropogenic materials</li> <li>Analytical data of validation sample media, and quality assurance / quality control (QA/QC) samples</li> <li>Data quality protocols</li> <li>Remediation criteria (refer to Section 11.2).</li> </ul>



<p><b>4. Define the boundaries of the study</b></p>	<p>The boundaries for the validation sampling program are identified as follows:</p> <ul style="list-style-type: none"> <li>• Spatial Boundaries: Medium Impact Area, ACM Remediation Area 1, ACM Remediation Area 2, and the PFAS Remediation Areas. These areas are shown in Figure 7A and Figure 7B, Appendix 1.</li> <li>• Temporal boundaries: The status of the sampling points at the time of the investigation.</li> <li>• The vertical study boundary will be the depth of the validation samples described in Section 12.</li> </ul>
<p><b>5. Develop a decision rule</b></p>	<p>The decision rules to be applied to the DSI include:</p> <p>For PFAS in soil, the following approach is to be adopted:</p> <ul style="list-style-type: none"> <li>• Where PFAS concentrations for each sample are below the adopted remediation criteria, no further remediation is required.</li> <li>• Where soil contaminant concentrations are reported to exceed the adopted remediation criteria, then the following additional steps will be undertaken: <ul style="list-style-type: none"> <li>– Where sufficient data is available, calculate the 95% Upper Confidence Level of the mean (95%UCL), data range and standard deviation.</li> <li>– Where the 95% UCLs are less than the assessment criteria and no individual results in the data set are to be greater than 250% of the assessment criteria; and the standard deviation of the data set is to be within 50% of the assessment criteria, no further remediation is required.</li> <li>– Where the 95% UCL is more than the assessment criteria, consider these results in the context of the current CSM to evaluate whether there are plausible pollutant linkages remaining.</li> <li>– If plausible pollutant linkages are identified, then further remediation should be undertaken to remove impacted soil.</li> </ul> </li> </ul> <p>For asbestos in soil, the following approach is to be adopted:</p> <ul style="list-style-type: none"> <li>• An environmental consultant who is competent in the identification of materials suspected to contain asbestos shall undertake a systematic walkover survey to record the soil type (fill or natural soil) to confirm that materials have been stripped to undisturbed natural ground, fill materials have been removed, and to check for visible forms of asbestos.</li> <li>• Where ACM is encountered, the type and characteristics (i.e. number, size and condition) of ACM would be recorded. Samples of the suspected ACM would be sent for confirmatory laboratory analysis. Where the ACM is assessed to comprise a friable form of asbestos, samples will be collected to estimate the mass of asbestos (ACM and fines) as outlined within the ASC NEPM and WA DEH (2009) methodology.</li> </ul>



<p><b>6. Acceptable limits on decision error</b></p>	<p>Decision errors are incorrect decisions caused by using data that is not representative of site conditions due to sampling or analytical error. As a result, a decision may be made that remediation/management is not needed when it is, or vice versa. There are two types of decision error:</p> <ul style="list-style-type: none"> <li>• Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area; and</li> <li>• Measurement errors, which occur during sample collection, handling, preparation, analysis and data reduction.</li> </ul> <p>To consider whether decision errors have been made, an assessment of data quality indicators will be undertaken as described in Section 13.3 (including a QA/QC assessment of the data collected). The closeness of the data to the assessment criteria will also be considered.</p>
<p><b>7. Optimise the design for obtaining data</b></p>	<p>The methodology and rationale for obtaining relevant data for the detailed site investigation is described Section 13.3.</p>





## Data Quality Indicators

Data Quality Indicators (DQIs) are used to show that the DQOs have been met. DQIs for the project are based on the field and laboratory considerations in Section 19.6 of ASC NEPM 2013 Schedule B2 Appendix B, which include:

- Completeness – a measure of the amount of useable data (expressed as %) from a data collection activity.
- Comparability – the confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event.
- Representativeness – the confidence (expressed qualitatively) that data are representative of each media present on the Site.
- Precision – A quantitative measure of the variability (or reproducibility) of data.
- Accuracy – a quantitative measure of the closeness of reported data to the true value; and
- The QA review will include a check of performance against the DQIs.

The DQIs adopted for soil sampling is discussed in the following tables.

Table A: DQI Completeness

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Completeness	Critical locations sampled	Samples will be collected from nominated locations with no deviation from the sampling plan, without reasonable justification.	Critical samples analysed according to sampling plan.	Samples will be analysed for PFAS.
	Samples collected	Samples will be collected in accordance with TTC's SOPs during the assessment.	Identified COPCs included.	As above.
	Standard Operating Procedures (SOPs) appropriate and complied with	No departure from TTC SOPs without reasonable justification.	Appropriate methods and LORs	Samples will be analysed by NATA accredited laboratories, for the analyses to be performed and appropriate methods were used. LORs were less than assessment criteria.
	Experienced sampler	Experienced TTC Environmental Scientists conducted will be the sampling.	Sample documentation complete	Chain of custody's (COCs) will be returned, signed and dated by laboratory. NATA endorsed laboratory certificates will be completed in accordance with Schedule B3 of the ASC NEPM. Field logs will be completed in accordance with Coffey SOPs.
	Documentation correct	Samples will be handled and transported under appropriate chain of custody (COC) documentation. Coffey	Sample holding times will be complied with	Samples will be analysed within holding times specified in Schedule B3 of the ASC NEPM.



DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
		will keep original COC documentation.  Sample Receipt Notifications (SRN) from the laboratory will be reviewed to assess that samples were received cool and in good condition.		

Table B: DQI Comparability

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Comparability	Same SOPs used on each occasion	TTMP SOPs will be implemented.	Same sample analytical methods will be used.	The same NATA accredited laboratories will be used to undertake analyses of primary, duplicate and triplicate samples collected for this study. The laboratory will use the same analytical methods for each sample for each analytical parameter.
	Experienced sampler	Experienced TTMP Environmental Scientist will conducted sampling.	Same sample LORs	As above
	Climatic conditions (temperature, rainfall, wind etc.)	Environmental scientist will attempt to sample in similar climatic conditions if practicable.	Same laboratories	As above
	Same types of samples collected	Samples will be collected in the appropriate laboratory supplied container specific to the analyses performed.	Same units	As above

Table C: DQI Representativeness

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Representativeness	Appropriate media sampled according to sample plan	Soil samples and groundwater will be collected and analysed in accordance with TTMPs SOPs.	Appropriate media sampled according to this plan	Collected samples will be analysed by NATA accredited laboratories.



DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
	All media identified in sample plan	Soil collected and analysed in accordance with TTMPs SOPs.	-	-
	SOPs appropriate and complied	TTMPs SOPs will be implemented.	Analysis of field duplicates	Laboratory duplicates will be analysed in general accordance with ASC NEPM. Duplicate and triplicate samples collected for soil.

Table D: DQI Precision

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Precision	SOPs appropriate will be complied with	TTC's SOPs will be implemented.	Analysis of laboratory duplicates	Relative Percent Differential (RPD) values for laboratory duplicates and recovery of matrix spikes should be within acceptable ranges.
	Analysis of field duplicates	As for laboratory considerations	Analysis of field duplicates	Duplicates were analysed at a frequency set out in Section 13.3. RPDs will be calculated and compared to relevant acceptance criteria. TTC will adopt 30% for concentrations more than 10 times the LOR and 50% for concentrations less than 10 times the LOR (Standards Australia 1997).

Table E: DQI Accuracy

DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
Accuracy	SOP appropriate and complied with	TTC SOPs will be implemented	Same sample analytical methods will be used.	The same NATA accredited laboratories will be used to undertake analyses of primary, duplicate and triplicate samples collected for this study. The laboratory will use the same analytical methods for each sample for each analytical parameter.
	Trip blanks	Trip blank sample will be collected using	Field blanks	A laboratory prepared trip blank will be included for each sample set.



DQI	Field Considerations	DQI Criteria	Laboratory Considerations	DQI Criteria
		laboratory supplied distilled water.		
	Rinsate sample	Where reusable sampling equipment is utilised (if any) a rinsate sample will be collected using laboratory supplied distilled water.  If rinsate sampling is not completed as part of the assessment, justification will be required.	Rinsate sample	Non-detection of COPCs in rinsate sample.
	-	-	Laboratory duplicate and Matrix spike	RPD values for laboratory control duplicates and recovery of matrix spikes should be within acceptance limits.





**SYDNEY METRO - WESTERN SYDNEY AIRPORT  
STATION BOXES AND TUNNELLING WORKS**



## APPENDIX 11 Technical Memorandum



4 August 2022

Client ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040551

CPB Ghella Joint Venture  
Level 8, Tower 1, 495 Victoria Avenue  
Chatswood  
Australia, NSW 2067

Attention: Stuart Anstee

Dear Stuart,

## Technical Memorandum: Soil Results for Aerotropolis

### 1. INTRODUCTION

---

Sydney Metro has engaged the CPB Ghella Joint Venture (CPBG) for the design and construction of the Station Boxes and Tunnelling Works (SBT Works) of the Sydney Metro Western Sydney Airport project (the Project). CPG has engaged Tetra Tech Major Projects Pty Ltd (TTMP) to provide geotechnical, hydrogeological and contaminated land consultancy services associated with the design and construction of the SBT Works.

A detailed site investigation (DSI) is currently being undertaken at the Aerotropolis Station site (Aerotropolis Site) in accordance with the Tetra Tech Coffey (2022) *Aerotropolis Sampling Analysis Quality Plan, Rev A01* (the SAQP).

The *Sydney Metro - Western Sydney Airport Technical Paper 8 Contamination* (M2A, 2020) ("the EIS Technical Paper") which is a supporting document to the *Sydney Metro - Western Sydney Airport Environmental Impact Statement* (Sydney Metro, 2020), identified Medium and High risk Areas of Environmental Concern (AEC) which were summarised in Section 2.3 of the SAQP.

Condition E92 of *Sydney Metro Western Sydney Airport - Conditions of Approval (SSI 10051)* requires the undertaking of a DSI prior to construction which would result in disturbance to moderate (Medium) and high risk contaminated sites identified in the EIS Technical Paper.

Proposed mitigation measure SC2 in the EIS Technical Paper includes the following: "if a medium or high risk area of environmental concern is reassessed as low, the site would be managed in accordance with the Soil and Water Management Plan. This would typically occur where there is minor, isolated contamination that can be readily remediated through standard construction practices such as excavation and off-site disposal."

This mitigation measure was identified in a meeting with Sydney Metro on the 31 May 2022 as a mechanism for re-assessing sites identified as Medium or High risk in the EIS Technical Paper as Low risk. Where sites are considered to be Low risk it was discussed in the meeting on the 31 May 2022 that the Preliminary Works clause in the WSA SBT Deed would be used.

## Purpose of this Technical Memorandum

This technical memorandum provides a summary of the site investigation data for Aerotropolis (at the time of writing), and consideration as to whether the AECs should continue to be considered Medium and/or High risk with regards to contamination and the Project.

This technical memorandum also provides:

- a summary of the demolition activities which have recently been completed at the Aerotropolis Site by Sydney Metro
- a review of the available data for the excavation of a proposed diversion drain. The purpose of the diversion drain is to divert stormwater around the construction site. CPBG requires the excavation of the diversion drain to be complete as part of early works to facilitate the construction of the Aerotropolis Site. The location of the diversion drain is shown in **Appendix B**.

## Background

Fieldwork for the investigation described in the SAQP is currently being undertaken at Aerotropolis and is expected to be completed in August 2022.

An investigation of the Aerotropolis Site was also recently completed between February and May 2022 and is reported in GHD (2022) *Sydney Metro Western Sydney Airport – Aerotropolis Station Box Compound – Entry Contamination Report, 215 Badgerys Creek Road, Bringelly, 9 June 2022* (GHD Investigation).

This technical memorandum is being provided in advance of the preparation of the report on the DSI to outline findings to date with regards to the contamination risk rating of the Aerotropolis Site and recommendations for Low Impact Work.

The Aerotropolis Site includes two AECs which are summarised in Table 1, and these are shown in **Appendix A**. AEC46 and AEC47 were identified in the EIS Technical Paper as Medium and High risk sites respectively.

**Table 1: SAQP IDs Eastern Portion of Aerotropolis Site Boundary**

EIS Reference	Activity Description
<b>AEC46</b>	Site Summary <ul style="list-style-type: none"> <li>• AEC46 includes project land at Aerotropolis which is part of or in the vicinity of AEC47.</li> <li>• Potential sources of contamination were considered to include hazardous building materials and unidentified items (activities) in this area.</li> </ul>
<b>AEC47</b>	Site Summary <ul style="list-style-type: none"> <li>• Former Defence Overseas Telecommunications Radio Station Complex (OTC) site.</li> <li>• Potential sources of contamination include former fuel / oil and chemical storage, hazardous building materials, and an on and/or off site source of per and polyfluoroalkyl substances (PFAS)</li> </ul>

This technical memorandum draws information from previous investigations completed for the Sydney Metro WSA Project which include:

- Investigations completed by Cardno, and Golder & Douglas Partners:
  - Cardno (Nov, 2021); *Contamination Assessment Report – Phase D/E, Sydney Metro Western Sydney Airport* (Ref: 80021888; RevB, dated 22<sup>nd</sup> November 2021)
  - Cardno (May, 2021); *Contamination Assessment Report, Sydney Metro Western Sydney Airport* (Ref: 80021888; dated 5<sup>th</sup> May 2021)



- Golder & Douglas Partners (Feb 2021); *Factual Contamination Report – Preliminary Site Investigation* (Ref: 19122621-003-R-Rev3; Rev3; dated 19<sup>th</sup> February 2021).
- GHD Investigation including investigation data completed pre demolition activities in February 2022, and post-demolition in May 2022.
- Preliminary data from the investigation currently being undertaken by TTC as per the SAQP.

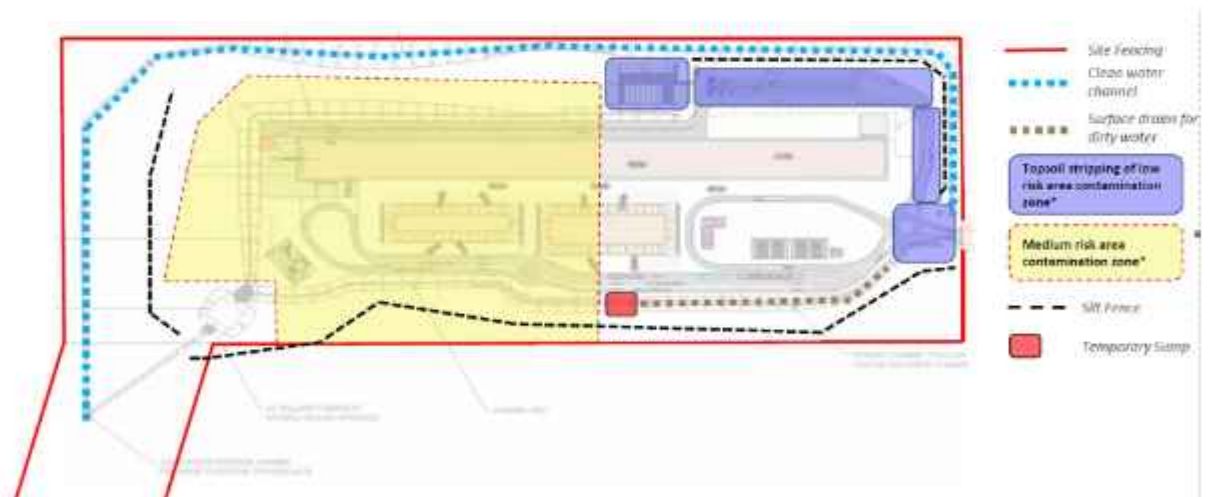
Investigation locations from these investigations are shown in **Figure 8**, and **Figure 8A** to **Figure 8D** in **Appendix A**.

### Preliminary Works

Preliminary Works to be undertaken at Aerotropolis are shown in **Figure 9**, **Appendix A** and include:

- Perimeter Fencing
- Topsoil Stripping
- Site Levelling
- Erosion and Sediment Control Development
  - Swale drains
  - Sediment Basin
  - Drain Diversion
- Pavements
- Establishment Site Facilities
- Installation of concrete slab and site amenities.

The following figure provides a conceptual plan of the proposed works.



**Figure 1 Conceptual Plan of Preliminary Works**

Note the extent of the medium risk area shown on the conceptual plan is indicative, and this area is discussed further in **Section 4** and shown in **Figure 9**, **Appendix A**.

## 2. DEMOLITION ACTIVITIES

---

Based on the report on the GHD Investigation and a meeting with Sydney Metro on the 21 June 2022 it is understood that demolition activities were undertaken by EnviroPacific for Sydney Metro.

- Demolition of buildings and removal of building footings<sup>1</sup> at the OTC
- Removal of a 1,600 m<sup>3</sup> stockpile of contaminated soil located south of the buildings at the OTC
- Removal of three underground petroleum storage system (UPSS) tanks or underground storage tanks (USTs) and the completion of a surface scrape of soil from the base and side walls of the tank pits. It is understood that no visual or olfactory signs of contamination were present in the tank pits (refer to Section 8.2.3 of the GHD Investigation).
- Removal of a septic tank and the completion of a surface scrape of soil from the base and side walls of the tank pit. It is understood that no visual or olfactory signs of contamination were present in the tank pits (refer to Section 8.2.4 of the GHD Investigation).
- Completion of an emu pick following the completion of demolition activities by EnviroPacific. Appendix K of the GHD Investigation includes asbestos Clearance Certificates for the demolition areas. From the Clearance Certificate dated 14 May 2022 (**Appendix C**) the following is understood:
  - only areas where visible soil were inspected (i.e. demolition areas) were inspected. An inspection and issuing of a Clearance Certificate was recommend following removal of vegetation outside the demolition area.
  - an area with ACM present in soils had been identified and was not included in the Clearance Certificate
  - there is potential for sub-surface pieces of asbestos to be encountered during earthworks including areas which had been assessed in the clearance certificate.

Figure 3, Appendix A shows the location of the areas identified above.

The following sections summarise the data from previous investigations.

## 3. PREVIOUS INVESTIGATIONS

---

### 3.1 CARDNO, AND GOLDR & DOUGLAS PARTNERS

Section 4.2 of the SAQP provided a summary of previous investigations completed by Cardno, and Golder & Douglas Partners for the Project. These investigations primarily focused on the footprint of the proposed station box which goes through AEC46 and AEC47. Tabulated data from these investigations is included in **Appendix D1**, and the investigation locations shown in **Figure 8A to 8D** in **Appendix A**. The following provides a high level summary of this data from the SAQP.

#### **Fill Material**

In summary, the fill material reported analytes (potential contaminants) with low concentrations which were below the NEPM (Health) HIL-D commercial industrial guidelines. Trace concentrations of PFAS were

---

<sup>1</sup> The GHD Investigation describes the removal of building footings in Table 16

reported in fill materials over the Aerotropolis Site. Asbestos containing materials (ACM) were observed in previous investigations. Three samples of fill material with positive detection of asbestos were reported.

### Natural Material

In summary, the natural material reported analytes (potential contaminants) with low concentrations which were below the NEPM (Health) HIL-D commercial industrial guidelines.

Cardno (2021) Contamination Assessment Report – Phase D/E has noted that PFAS results in natural materials may be attributed to false positives. TTC considers that whilst it is possible that the reported PFAS concentrations may be false positives, it is important to recognise that PFAS compounds may also be attributed to PFAS sources which have been identified at the Aerotropolis site, and potential off-site sources which have been identified in previous investigations. In addition PFAS compounds particularly at trace levels, are ubiquitous contaminant in urban environments (i.e. a common ambient contaminant). Notwithstanding further investigation is being undertaken under the SAQP to investigate the potential for false positives from PFAS and hydrocarbons.

## 3.2 GHD INVESTIGATION

Sydney Metro engaged GHD to undertake a contamination investigation over the Aerotropolis Station construction area. The investigation was undertaken over two main time periods included an investigation in February 2022 and an investigation post demolition in May 2022.

Tabulated data from the GHD Investigation is provided in **Appendix D2**, and investigation locations shown in **Appendix A**.

The investigation in February 2022 comprised approximately:

- 84 test pits
- 30 boreholes
- 6 monitoring wells
- 3 surface water / sediment sampling points.

At the completion of demolition activities (refer to **Section 2**) GHD completed a post demolition investigation and sampling. The location of post-demolition sample locations with the exception of those from the USTs and septic tank excavations are shown in **Appendix A**. Annotated photographs of USTs and septic tank excavations showing the location of post demolition samples are provided in Appendix F of the GHD Investigation and have been reproduced in **Appendix A** in this document.

Post demolition investigation locations completed by GHD are summarised in **Table 2** on the following page.

Table 2 GHD Post Demolition Sampling Locations

Historical Site Feature	GHD Building No.	Post Demolition Sample Locations
Receiving Station	Building A	A_V016, A_V019, A_V023
Engineering Workshop / Garage	Building B/C	B_V001A, B_V002 to B_V011 C_V001, C_V002
Flammable Store	Building D	D_V001, D_V002, D_V003
Fire Hose Shed	Building E	E_V001, E_V002, E_V003
Fire Pump House / Water Tank	Building F/G	F_V001, F_V002 G_V001 to G_V005
Septic Tank	N/A	ST_V001 to ST_V023
USTs (UPSS)	N/A	UPSS-BASE1/2.4m UPSS-BASE2/2.4m UPSS-BASE3/2.4m UPSS-BASE4/2.4m UPSS-BASE5/2.4m UPSS-BASE6/2.4m UPSS-EW1/1.7-2m UPSS-EW2/0.8-1.2m UPSS-EW3/0.2-0.6m UPSS-LINE/0.4m UPSS-NW1/1.0-1.5m UPSS-NW1/1.7-2m UPSS-SW1/0.1-0.4m UPSS-SW1/1.8-2m UPSS-SW1A/1.0-1.5m UPSS-WW1/1.0-1.5m UPSS-WW2/1.0-1.3m UPSS-WW3/0.1-0.5m

Key findings of the GHD investigations including the post demolition investigations included the following:

- Visual and olfactory signs of contamination were not observed in the USTs pit and septic tank pit excavations. Laboratory analytical data for investigation locations in the pits reported the majority of results with non-detectable concentrations for: total recoverable hydrocarbons (TRH); benzene, toluene, xylenes, and ethyl-benzenes (BTEX); and polyaromatic hydrocarbons (PAH). A low concentration of TRH was reported in one sample (SMWSA-UPSS-NW1/1.0-1.5m), and low concentrations of the PAH analyte acenaphthene in two samples (SMWSA-UPSS-BASE1/2.4m and SMWSA-UPSS-EW1/1.7-2m).
- With the exception of asbestos, the concentration of metals, TRH/BTEX, PAH, PCBs, OCPs/OPP, PFAS and VOCs were within the adopted guidelines for future landuse scenarios being considered including HIL-B (high density residential), HIL-C (open space) and HIL-D (commercial industrial).
- Asbestos was detected in surficial soils in close proximity to former OTC buildings, the footprint of the former barracks, and within the footprint of the former stockpile. Asbestos was also detected in deeper fill materials (0.4 – 1.1 m bgs) at the location of the former stockpile. Locations where GHD found asbestos are shown in **Appendix A**, and the asbestos data in **Appendix D2**. Forms of asbestos reported included:
  - Asbestos cement sheeting
  - Asbestos fibre boards
  - Loose asbestos fibre bundles.

Concentrations of asbestos reported exceeded NEPM guidelines for commercial/industrial landuse in the following locations:

- SMWSA-GHD-BH16 0-0.2 m bgs (FA & AF – 0.012%) (note not from a 10 L sample)
- SMWSA-GHD-TP61 0-0.1 m bgs (FA & AF – 0.007%) (note not from a 10 L sample)
- SMWSA-SP01-TP93 0.4-0.6 m bgs (FA & AF – 0.13%) from a 10 L sample
- SMWSA-SP01-TP93 0.9-1.1 m bgs (FA & AF – 0.23%) from a 10 L sample

These locations are located within or in close proximity to the following Potential Areas of Concern (PAC) identified in the SAQP:

- SMWSA-SP01-TP9 - PaC 6 (refer to Figure 8D)
- SMWSA-GHD-TP61 - PaC 4 (refer to Figure 8D)
- SMWSA-GHD-BH16 - PaC 2 (refer to Figure 8C)

From Section 8.4.2 in the GHD report it is noted the visual observation of ACM may or may not be an indicator of the presence of fibrous asbestos and asbestos fines.

Bulk 10 L samples were collected in a number of locations (SMWSA-GHD-SP01-TP85, SMWSA-GHD-SP01-TP88, SMWSA-GHD-SP01-TP92) where visual ACM was reported and returned concentrations of asbestos below the laboratory limit of reporting (LOR). The result of the bulk sample however does not negate the original finding of the positive detection of asbestos.

Visual signs of ACM have also been reported in the investigation undertaken by TTC and this is discussed further in Section 4. ACM has also been previously reported in the location of the former houses (married quarters) refer to **Figure 3, Appendix A** in an investigation undertaken by Golder (refer to Section 4.1 in the SAQP).

### 3.3 TTC INVESTIGATION

TTC reviewed the draft GHD data (data tables) to inform the development of the SAQP which identified twelve Potential Areas of Concern (PAC). These mainly related to areas where high concentrations of PFAS were reported in soils, areas of the site which had not been previously investigated, and the demolition area (in the absence of information provided on demolition activities undertaken at the site).

At the time of writing laboratory results for primary samples has been received from the following intrusive locations:

- |               |               |               |
|---------------|---------------|---------------|
| • SBT-BH-4235 | • SBT-BH-4253 | • SBT-BH-4280 |
| • SBT-BH-4237 | • SBT-BH-4254 | • SBT-BH-4281 |
| • SBT-BH-4238 | • SBT-BH-4255 | • SBT-BH-4282 |
| • SBT-BH-4241 | • SBT-BH-4256 | • SBT-BH-4283 |
| • SBT-BH-4242 | • SBT-BH-4257 | • SBT-BH-4287 |
| • SBT-BH-4247 | • SBT-BH-4258 | • SBT-BH-4289 |
| • SBT-BH-4248 | • SBT-BH-4260 | • SBT-BH-4292 |
| • SBT-BH-4249 | • SBT-BH-4263 | • SBT-BH-4296 |
| • SBT-BH-4251 | • SBT-BH-4264 | • SBT-BH-4304 |
| • SBT-BH-4252 | • SBT-BH-4277 | • SBT TP 4276 |

- SBT-TP-4277
- SBT-TP-4278
- SBT-TP-4286

Draft field logs from these investigation locations<sup>2</sup> are provided in **Appendix E** and the analytical data in **Appendix D3**. Laboratory reports for this data are provided in **Appendix F**.

Preliminary review of the soil results shows low detectable concentrations of contaminants of potential concern (COPC) with concentrations below ASC NEPM<sup>3</sup> and PFAS NEMP<sup>4</sup> human health (HIL-D) guidelines for commercial/industrial land use. Further screening of the results against other guidelines referred to in the SAQP will be included in the DSI report including but not limited to:

- ASC NEPM and CRC CARE 20115 health screening levels (HSLs)
- ASC NEPM Petroleum Hydrocarbon Management Limits
- ASC NEPM ecological investigation levels (EILs) and ecological screening levels (ESLs)
- PFAS NEMP ecological guideline values for soil
- Threshold values for waste classification<sup>5</sup> and/or material re-use requirements including resource recovery, virgin excavated natural material (VENM) and excavated natural materials (ENM).

Detectable concentrations of the following contaminants of potential concern (COPCs) were reported in fill materials and soil materials:

- metals: arsenic, chromium, copper, lead, nickel, zinc
- perfluoroalkyl and polyfluoroalkyl substances (PFAS): Perfluorohexane sulfonic acid (PFHxS), Perfluorooctanesulfonic acid (PFOS), Perfluoropentanoic acid (PFPeA), Perfluorohexanoic acid (PFHxA), Perfluoroheptanoic acid (PFHpA), Perfluorooctanoic acid (PFOA), Perfluorodecanoic acid (PFDA)
- TRH C16-C34 in sample SBT-BH-4260\_0.0-0.1.

Detectable concentrations of BTEXN, PAH, and OCPs/OPPs were not reported. Other than sample SBT-BH-4260\_0.0-0.1, detectable concentrations of TRH were not reported.

Positive detection of ACM was reported in BH-4264 at 0.9 m where a fragment of potential ACM was observed and subsequently reported as containing asbestos. A fragment of ACM was also observed on the ground surface within the former demolition area.

Asbestos (Fines and Fibrous FA+AF) with a concentration of 0.05% were reported in a sample from SBT-TP 4277-0.0-0.1 which is located in the former stockpile area where GHD reported Asbestos (Fines and Fibrous FA+AF) (refer to **Figure 8D, Appendix A**). An excavator was used to complete this location and visual signs of ACM were not observed.

The location of BH-4264 and the location where potential ACM was observed on the ground surface is shown in **Figure 8C, Appendix A**.

Leachability tests are currently being undertaken on selected soil samples and will be reported in the DSI Report. The DSI Report will also include but not limited to:

---

<sup>2</sup> Note all boreholes planned for completion in this area have been completed.

<sup>3</sup> National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (April 2013)

<sup>4</sup> Heads of EPAs Australia and New Zealand (HEPA). PFAS National Environmental Management Plan. Version 2.0 – January 2020 (HEPA NEMP 2020)

<sup>5</sup> CRC Care Technical Report No. 10, Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, 2011 (CRCCARE 2011)

<sup>6</sup> NSW EPA Waste Classification Guidelines

- Groundwater data
- Quality control / quality assurance data.
- Waste classification and/or material reuse
- Recommendations for further investigations, risk assessment, and/or remediation (if required).

## 4. EIS RISK RATINGS

---

As summarised in Section 1 the EIS identified two AECs including AEC46 and AEC47. The risk ratings for these areas are discussed further in this section.

### 4.1 AEC47

AEC47 is located within AEC46 and includes the Former Defence OTC site and was assessed in the EIS in the High Risk site. While the EIS does provide a clear basis how sites were determined to be Medium or High Risk, based on the risk matrix in Table 3-1 of the EIS Technical Paper it is inferred that AEC was assessed as being High Risk based on the presence of underground tanks (and potentially Defence activities) at the OTC site and the potential for soil vapour risks. On the basis that the underground tanks have been removed and a source of contamination associated with these was not identified in the GHD Investigation and demolition activities, TTC consider that AEC47 can be removed.

### 4.2 AEC46

AEC46 includes project land at Aerotropolis which is part of or in the vicinity of AEC47 was identified as a Medium Risk Site. Potential sources of contamination were considered to include hazardous building materials and unidentified items (activities) in this area. Based on the site investigation TTC consider that portions of AEC46 can be changed to Low Risk including:

- northern portion of AEC46 (refer to Section 4.2.1)
- western portion of AEC46 (refer to Section 4.2.2)
- southern portion of AEC46 (refer to Section 4.2.3)

TTC consider that the central portion of AEC46 remain as a medium risk site and should be expanded further to the east; this is discussed further in Section 4.2.4.

#### 4.2.1 Northern Portion of AEC46 (Low Risk)

Based on the data available data at the time of writing TTC considers that the northern portion of AEC46 (refer to **Figure 9, Appendix A**) can be considered Low Risk of contamination to the project based on the following:

- laboratory results were within commercial/industrial human health guidelines
- no gross contamination was identified within this area of the site.
- historical infrastructure associated with the former OTC facility were not located in this area and therefore risk from demolition materials including ACM is considered to be low and consistent with the findings of the GHD investigation which did not report the positive detection of asbestos in this area.
- No significant contamination data gaps remain.

The northern boundary of AEC46 has been based on site investigation data including and north of the following locations: SMWSA\_GHD\_TP34, SMWSA\_GHD\_TP35, SMWSA\_GHD\_BH07, SMWSA\_GHD\_TP36, SBT-BH-4279, SMWSA\_GHD\_TP37 and SMWSA\_GHD\_BH08. Land north of these locations is north of the former OTC facility, and also to the north of areas where PFAS and asbestos has been reported in previous investigations, and north of areas where known activities by Defence (e.g. stockpiling) took place.

GHD laboratory data for this area is included in **Appendix H**.

Ground disturbance in this area is proposed to be managed by CPG through implementation of standard construction practices including soil and water management techniques as outlined in the Project Preliminary Construction Environmental Management Plan (CEMP) including the Soil and Water Preliminary CEMP Sub-Plan (SWMP).

Unexpected contamination, if identified during Preliminary Work, can be managed through implementation of the Unexpected Contaminated Finds Protocol included in the Preliminary CEMP.

Furthermore, TTC recommends that:

- a competent person is present during disturbance of soil materials to visually monitor for signs of potential contamination and potential asbestos containing materials (ACM). If evidence of potential ACM or other potential contamination are observed (e.g. stained or odourous soils, buried wastes, etc) work should cease pending further investigation of this material by TTC. The competent person must be experienced in the undertaking excavation/remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.
- fill materials are stockpiled separately to natural soils, and stockpiles are managed in accordance with the requirements of the Preliminary CEMP.
- no soil materials shall be removed from the Aerotropolis site without a Waste Classification Report and/or a Material Classification Report.

#### 4.2.2 Western Portion of AEC46 (Low Risk)

Based on the data available data at the time of writing TTC considers that the western portion of AEC46 (refer to **Figure 9, Appendix A**) can be considered Low Risk of contamination related impacts to the project. The basis for based on the following:

- laboratory results were within commercial/industrial human health guidelines
- no gross contamination was identified within this area of the site
- no ACM observed in intrusive locations and/or positive detection of asbestos in soil.
- No significant contamination data gaps remain.

GHD laboratory data for this area is included in **Appendix H**.

The western boundary of AEC46 has been based on site investigation data for the following locations: SMWSA\_GHD\_TP38, SMWSA\_GHD\_BH09, SMWSA\_GHD\_BH10, SMWSA\_GHD\_TP48, SMWSA\_GHD\_TP59, SMWSA\_GHD\_TP64, and SBT-TP-4302. The western boundary also appears to be outside the operational area of the former OTC facility.

Ground disturbance in this area is proposed to be managed by CPG through implementation of standard construction practices including soil and water management techniques as outlined in the Preliminary CEMP including the SWMP.

Unexpected contamination, if identified during Preliminary Work, can be managed through implementation of the Unexpected Contaminated Finds Protocol included in the Preliminary CEMP.



Furthermore, TTC recommends that:

- a competent person is present during disturbance of soil materials to visually monitor for signs of potential contamination and potential asbestos containing materials (ACM). If evidence of potential ACM or other potential contamination are observed (e.g. stained or odourous soils, buried wastes, etc) work should cease pending further investigation of this material by TTC. The competent person must be experienced in the undertaking excavation/remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.
- fill materials are stockpiled separately to natural soils, and stockpiles are managed in accordance with the requirements of the Preliminary CEMP.
- no soil materials shall be removed from the Aerotropolis site without a Waste Classification Report and/or a Material Classification Report.

Additional controls for the construction of the diversion drain and sediment basin are described in Section 5.

### 4.2.3 Southern Portion of AEC46 (Low Risk)

Based on the data available data at the time of writing TTC considers that the western portion of AEC46 (refer to **Figure 9, Appendix A**) can be considered Low Risk of contamination to the project. The basis for based on the following:

- laboratory results were within commercial/industrial human health guidelines
- no gross contamination was identified within this area of the site
- no ACM observed in intrusive locations and/or positive detection of asbestos in soil.

The southern boundary of AEC46 has been based on site investigation data including and south of the following locations: SBT-TP-4302, SMWSA-GHD-TP71, SBT-BH-4280, SMWSA\_GHD\_TP78, SMWSA\_GHD\_TP79, SMWSA\_GHD\_TP75, SMWSA\_GHD\_TP68, and SMWSA\_GHD\_TP69.

GHD laboratory data for this area is included in **Appendix H**.

Ground disturbance in this area is proposed to be managed by CPG through implementation of standard construction practices including soil and water management techniques as outlined in the Preliminary CEMP including the SWMP.

Unexpected contamination, if identified during Preliminary Work, can be managed through implementation of the Unexpected Contaminated Finds Protocol included in the Preliminary CEMP.

Furthermore, TTC recommends that:

- a competent person is present during disturbance of soil materials to visually monitor for signs of potential contamination and potential asbestos containing materials (ACM). If evidence of potential ACM or other potential contamination are observed (e.g. stained or odourous soils, buried wastes, etc) work should cease pending further investigation of this material by TTC. The competent person must be experienced in the undertaking excavation/remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.
- fill materials are stockpiled separately to natural soils, and stockpiles are managed in accordance with the requirements of the Preliminary CEMP.
- no soil materials shall be removed from the Aerotropolis site without a Waste Classification Report and/or a Material Classification Report.

Additional controls for the construction of the diversion drain and sediment basin are described in Section 5.

The southern portion of AEC46 is located in close proximity to two Potential Areas of Concern (PAC) located within the Central Portion of AEC 46 including PAC 06 and PAC 05. These areas are discussed further as follows.

### **PAC 06**

PAC 06 includes the former stockpile area. The southern extent of this area appears to be defined by a brick retaining wall / berm (refer to **Figure 8D, Appendix A**). Fill material on the northern side is approximately 1.1 m thick in SP01-TP92 and SP01-TP93. Previous investigations (GHD and TTC) have reported ACM and fibrous asbestos & asbestos fines in the fill material. Ground levels on the northern side of the wall are notably higher than the southern side as shown in the following photograph.



Plate 1: Photograph looking west with retaining wall present within grassed strip. Land on the northern side of the wall (right of grass strip in the photograph) is visibly higher than the southern side.

Fill materials south of the retaining wall are approximately 0.2 m thick (SMWSA-GHD-TP70 and SMWSA-GHD-TP71) and are comprised of clay. No ACM was observed in the test pits on the southern side of the retaining wall or detected in soil samples.

### **PAC 05**

PAC 05 is an area where an elevated concentration of PFAS was reported in surface soil samples. Trace concentrations were reported in SMWSA-GHD-TP75 which is down-slope of this location.

## **4.2.4 Central Portion of AEC46 (Medium Risk)**

Based on the data available data at the time of writing TTC considers that the central portion of the AEC46 (refer to **Figure 9, Appendix A**) is considered as Medium Risk with the potential contamination impacts to the project pending completion of the DSI for the following reasons:

- The TTC investigation which is further assessing Potential Areas of Concern (PAC) identified in the SAQP is currently on-going and needs to be completed to inform management measures for materials being investigated in this area including soils contaminated with PFAS from previous use of the OTC site. The

investigation needs to be completed in order to develop appropriate soil handling procedures can be developed for areas with sources of PFAS contaminated have been identified.

- Asbestos including ACM, and asbestos fines / fibrous asbestos has been identified in fill materials within this area associated with the former use / demolition of the OTC site (including areas recently demolished) and the historical housing (married quarter) area. TTC recommends that all fill material within this area be considered to contain asbestos.

The eastern boundary of AEC46 is defined by the SBT Works project boundary and PACs currently being investigated.

Further investigation including test pitting and the collection of bulk 10L samples may be required if fill materials in AEC46 are to be retained on-site post completion of the SBT Works. To further consider materials to be retained on-site, further information on the final landuse proposed for this area beyond the completion of the SBT works will be required including information on planned excavations post completion of the SBT Works, and the final configuration of the Aerotropolis site including areas with hard landscaping (hardstand), and areas with soft landscaping (e.g. gardens, landscaped areas, etc.). Sydney Metro may also have a preference not to retain fill materials on the basis that these contain asbestos and pose a potential risk to future users of the site, if not appropriately managed, and/or the fill materials may not be suitable for other reasons (e.g. geotechnical). TTC also notes that there is randomness to the presence/distribution of asbestos in soils and this has been demonstrated by the existing site investigation data for this site. While further investigations may provide information on the potential distribution of asbestos in fill materials, fill materials in this area would be assumed to potentially contain asbestos based on historical data. Fill materials retained on-site within the Aerotropolis Station site will need to be encapsulated beneath hard-standing.

If fill materials are not retained on-site and are planned to be excavated for the SBT Works or post SBT Works, waste classification guidelines within NSW requires soil waste containing 'any asbestos' to be classified as Special Waste (Asbestos Waste). Under this scenario a decision could be made to not complete further in-situ investigations to quantify (estimate) asbestos concentrations in fill prior to excavation.

Controls for work completed within with central portion of AEC 46 will be outlined in the DSI and described in the Remediation Action Plan (RAP) prepared for the SBT Works.

### 4.3 ASBESTOS MANAGEMENT PLAN

Excavation of fill materials from the Aerotropolis site (for both the northern and southern portion) will need to be managed under an Asbestos Management Plan (AMP), which will outline controls to mitigate health risks to workers and occupants of neighbouring land. TTC does not believe further investigation is needed to develop the AMP.

## 5. DIVERSION DRAIN AND SEDIMENT BASIN

Investigation locations within and/or in close proximity to the Diversion Drain and Sediment Basin include the following locations summarised in the following table. The GHD analytical data specific to these locations is included in **Appendix I**.

**Table 3 Diversion Drain and Sediment Basin Locations**

Location ID	Project Location
SMWSA_GHD_BH01	Diversion Drain
SMWSA_GHD_BH09	Diversion Drain
SMWSA_GHD_BH10	Diversion Drain
SMWSA_GHD_BH24	Sediment Basin

SMWSA_GHD_BH26	Diversion Drain
SMWSA_GHD_BH28	Diversion Drain
SMWSA_GHD_TP07	Diversion Drain
SMWSA_GHD_TP13	Diversion Drain
SMWSA_GHD_TP18	Diversion Drain
SMWSA_GHD_TP24	Diversion Drain
SMWSA_GHD_TP29	Diversion Drain
SMWSA_GHD_TP34	Diversion Drain
SMWSA_GHD_TP38	Diversion Drain
SMWSA_GHD_TP48	Diversion Drain
SMWSA_GHD_TP54	Diversion Drain
SMWSA_GHD_TP59	Diversion Drain
SMWSA_GHD_TP64	Diversion Drain
SMWSA_GHD_TP68	Sediment Basin / Cut Area
SMWSA_GHD_TP69	Sediment Basin
SMWSA_GHD_TP70	Diversion Drain
SMWSA_GHD_TP71	Diversion Drain
SMWSA_GHD_TP75	Sediment Basin
SMWSA_GHD_TP78	Diversion Drain
SMWSA_GHD_TP79	Diversion Drain
SMWSA_GHD_TP80	Diversion Drain
SMWSA_GHD_TP84	Diversion Drain
SBT-BH-4274*	Diversion Drain
SBT-BH-4275*	Diversion Drain
SBT-TP-4302*	Diversion Drain
SMGW-BH-D328	Diversion Drain

\* TTC location to be completed

Investigation locations from the diversion drain have reported low concentrations of potential contaminants including trace concentrations of PFAS in surficial soils. Non-detectable concentrations of PFAS were reported in soil materials at or deeper than 2 m bgs from the sample locations listed in Table 3.

Investigation locations along the diversion drain were generally limited to the collection of samples to 1 m bgs. The vertical extent of the excavation of the diversion drain will extend to up to 7 m bgs in a southern section of the drain. While previous investigations have generally not investigated natural soil materials to be excavated deeper than 1 m bgs, TTC considers that these soil materials to be low risk to human health and risk to the environment based on the existing data from natural materials along the diversion drain, and the diversion drain being located up-gradient of the Potential Areas of Concern (PAC). PFAS contamination from PAC is expected to migrate in an easterly direction towards Thompsons Creek.

Natural materials excavated from deeper than 1 m bgs can be segregated and investigated ex-situ in stockpiles to determine management requirements including on-site reuse as part of project fill requirements.

The diversion drain passes through areas where asbestos is potentially present in fill material, and in particular the southern portion of the Aerotropolis site described in **Section 4.2.2**.

TTC recommends that fill materials excavated from the diversion drain be segregated into five main stockpiles based on the sections shown in **Figure 9, Appendix A**. These sections include:

- Section A: Fill materials from Low Risk Area
- Section B: Fill materials from Former Houses (Married Quarter)
- Section C: Fill materials west of the southern portion of the site.

- Section D: Fill materials in the southern portion of the site where asbestos has been reported in previous investigations.
- Section E/Sediment Basin: Fill materials east of the southern portion of the site.

Fill materials which are excavated which contain visual signs of asbestos (e.g. ACM) should also be segregated into a separate stockpile.

Excavated fill materials from all sections will require management under an AMP. Positive detection of asbestos has previously been reported in fill materials in Section 2 and Section 4.

Natural materials excavated from these sections should also be segregated into separate stockpiles.

Depending on the nature of the fill material, the excavated surface of the diversion drain will need to be managed to stabilise materials which have been cut into and exposed fill materials and natural soils. Stabilisation is required to minimise the erosion of these materials from wind and surface water runoff.

## 6. CONCLUSION AND RECOMMENDATIONS

---

Based on the findings of this Technical Memorandum the following conclusions and recommendations have been made:

- AEC47 can be removed on the basis that Sydney Metro has removed the USTs and impact from hydrocarbons was not reported by GHD.
- portions AEC46 in the north, west and south be considered Low Risk with respect to contamination impacts. TTC considers that soil within this area poses a low contamination risk to the project given that no gross contamination was identified within this area of the site. Ground disturbance during Preliminary Work within this area is proposed to be managed by CPG through implementation of standard construction practices including soil and water management techniques as outlined in the Preliminary CEMP including the SWMP.
- the central portion of the AEC46 poses a Medium Risk with respect to contamination impacts based on the presence of asbestos in fill materials and the Potential Areas of Concern (PAC) which are currently being investigated by TTC.
- the excavation of the proposed diversion drain can proceed subject to the controls described in this Technical Memorandum and under an AMP. The controls to be implemented for the construction of the diversion drain should be compiled into a sub-plan for this task which is appended to the Preliminary CEMP. Materials excavated during the construction of the diversion drain should be segregated as outlined Section 5 in this document.
- excavation of fill material will need to be undertaken under an Asbestos Management Plan (AMP). A competent person will need to be present during disturbance of soil materials to visually monitor for signs of potential contamination and potential asbestos containing materials (ACM). If evidence of potential ACM or other potential contamination are observed (e.g. stained or odourous soils, buried wastes, etc) work should cease pending further investigation of this material by TTC. The competent person must be experienced in the undertaking excavation/remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.
- a competent person is present during disturbance of soil materials to visually monitored for signs of potential contamination and potential asbestos containing materials (ACM). If evidence of potential ACM or other potential contamination are observed (e.g. stained or odourous soils, buried wastes, etc) work should cease pending further investigation of this material by TTC. The competent person must be

experienced in the undertaking excavation/remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.

- a meeting with Sydney Metro is recommended for the purpose discussing whether fill materials which are not required to be removed for the SBT Works are to be retained within AEC46. Further investigation and consideration to the final configuration of the Aerotropolis site including areas with hard landscaping (hardstand), and areas with soft landscaping (e.g. gardens, landscaped areas, etc.) will be required if fill materials are to be retained. Fill materials retained within the Aerotropolis Station site will need to be encapsulated beneath hard-stand such as concrete or asphalt pavement. Sydney Metro may have a preference not to retain fill materials on the basis that these contain asbestos and pose a potential risk to future users of the site if not appropriately managed, and/or the fill materials may not be suitable for other reasons (e.g. geotechnical).
- no soil materials to be removed from the Aerotropolis site without a Waste Classification Report and/or a Material Classification Report.

For and on behalf of Tetra Tech Coffey,



## Appendices

Appendix A: Figures

Appendix B: Diversion Drain

Appendix C: Clearance Certificate

Appendix D: Data Tables

Appendix E: Field Logs

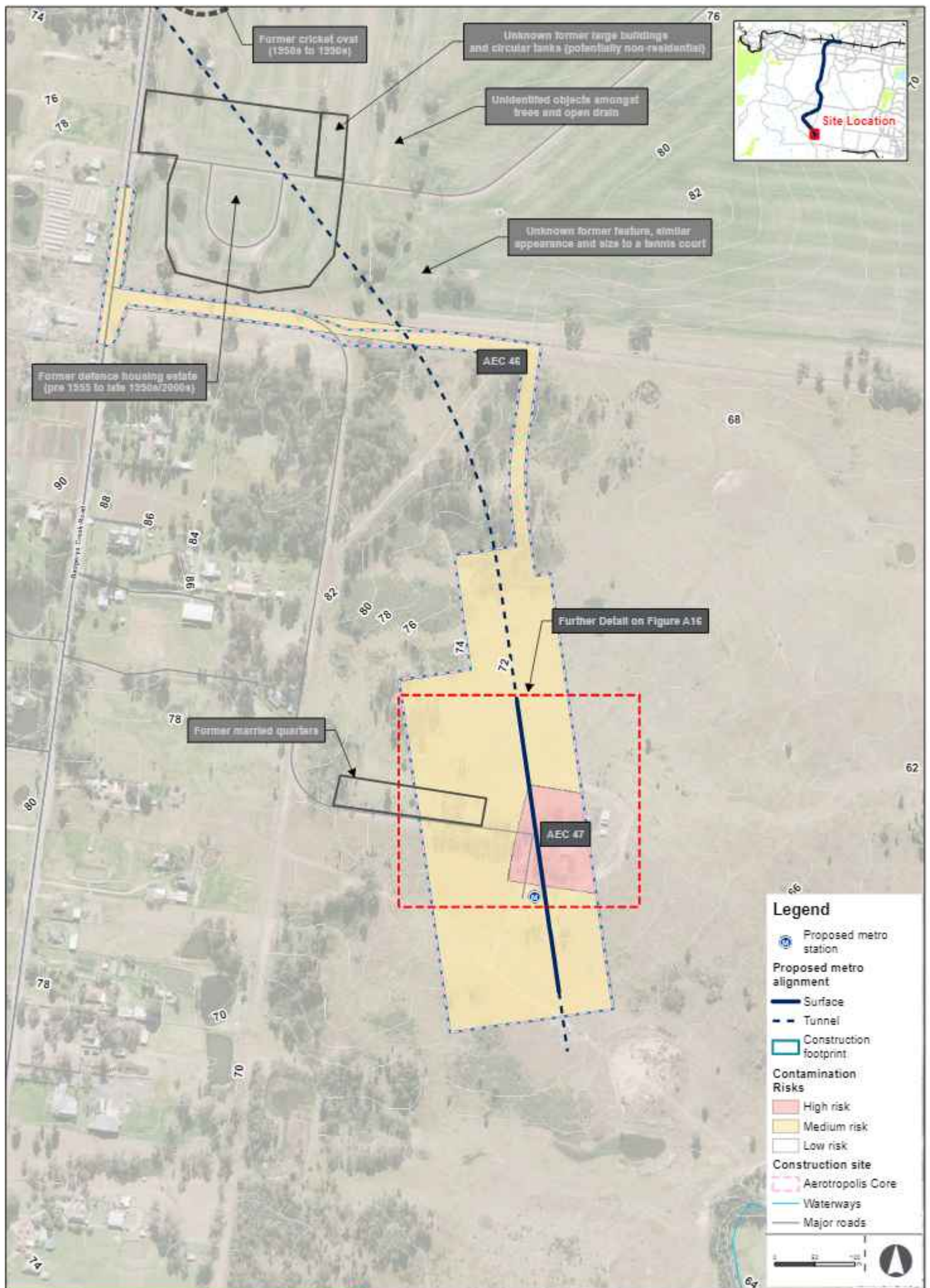
Appendix F: Laboratory Reports

Appendix G: GHD Data for Low Risk Areas

Appendix H: GHD Data for Diversion Drain

## APPENDIX A: FIGURES

---

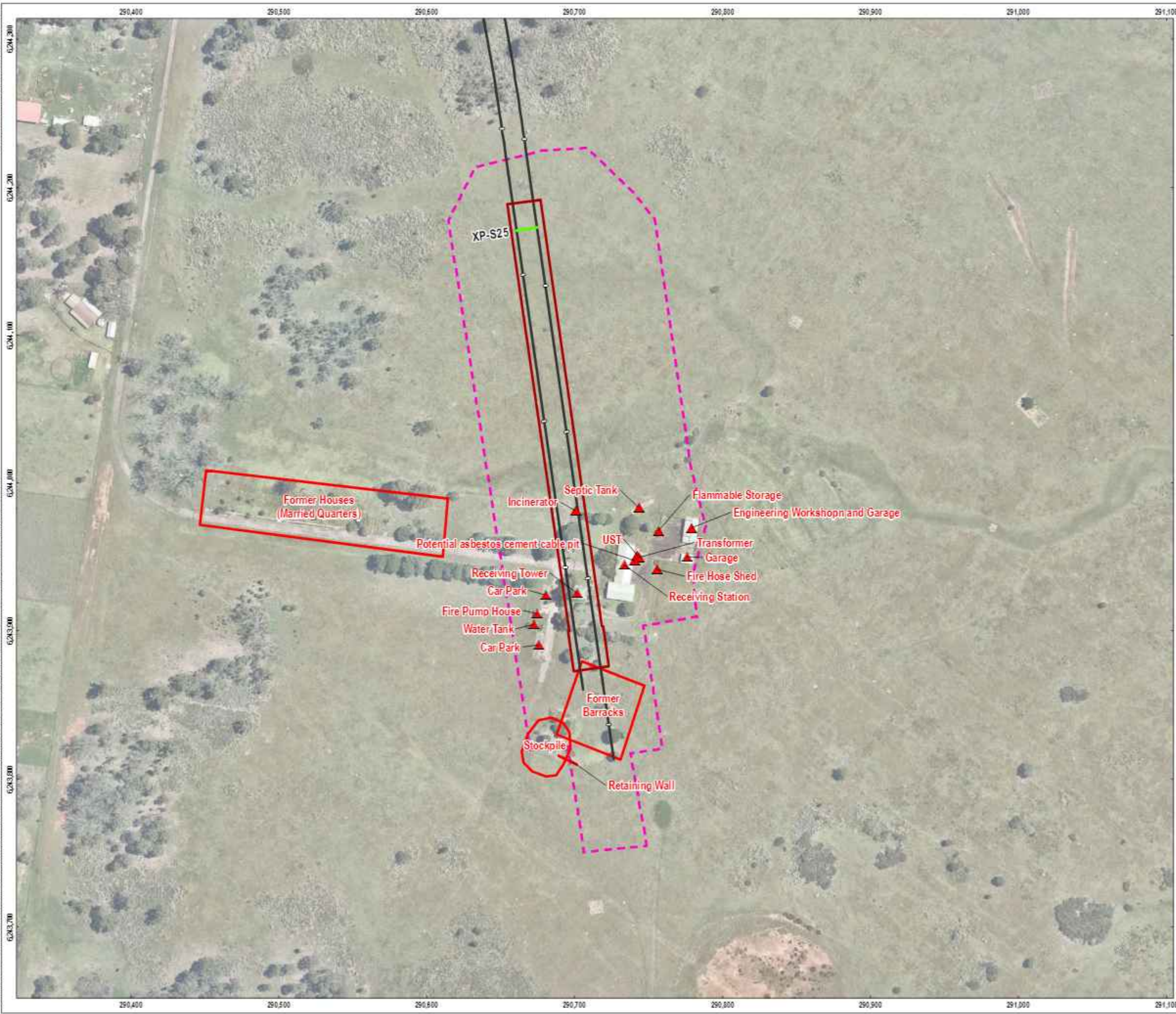


Aerotropolis Core construction site and driven tunnel alignment contamination sources and risk ranking

\*HBM - Potential hazardous building materials  
Indicative only; subject to design development

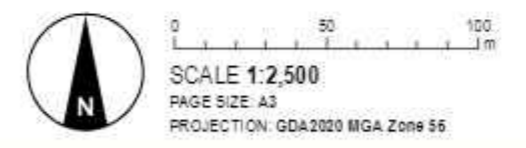
Figure A15





- LEGEND**
- ▲ Historic Site Location
  - Tunnel Alignment
  - Tunnel Alignment - Chainage
  - Tunnel Alignment - Cross Passage
  - Construction Footprint Boundary
  - Station Box / Shaft
  - Historic Site

**SOURCE**  
 Site boundaries and historic sites from Tetra Tech Coffey.  
 Station box, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 19-01-2019).



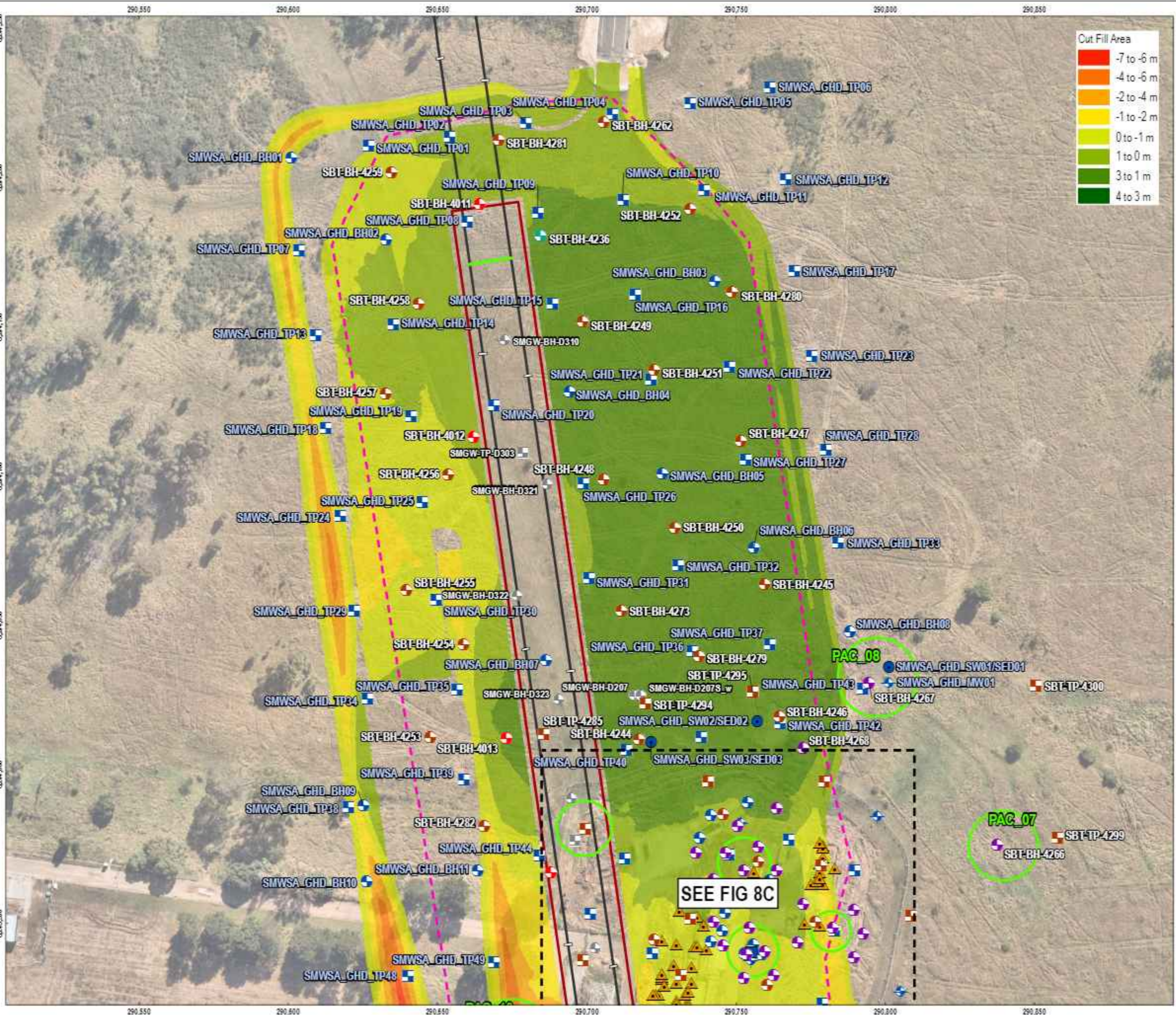
CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 3**  
**Historical Site Features**  
**Aerotropolis Core Station**



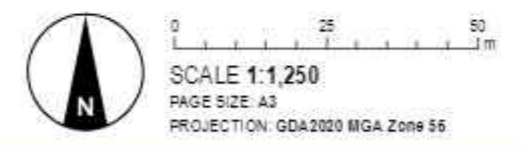


DOC REFERENCE: \\TETRA\CONSTRUCTION\2024\03\2024\_03\_22\_10\_29\_48\_24 PM\_SAVED BY: EMMANUELA\K21\01\_22\_4\_48\_24 PM  
 DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INTERNAL REVIEW ONLY AND MAY CONTAIN INCONSISTENCIES OR OMISSIONS. IT IS NOT INTENDED FOR PUBLICATION.



- LEGEND**
- Additional Contaminated Land Location
    - Borehole (1 m)
    - Borehole (2 m)
  - Proposed Investigation Location
    - Borehole (6 m)
    - Test Pit (1 m)
  - Additional Geotechnical/Hydrogeological Location
    - Borehole
  - GHD Investigations (2022)
    - Borehole
    - Test Pit
    - Monitoring Well
    - Surface Water Sample
    - Other
    - Post-demolition Sample
  - Existing Investigation Location
    - Borehole
    - Test Pit
  - Tunnel Alignment
  - Tunnel Alignment - Chainage
  - Tunnel Alignment - Cross Passage
  - Construction Footprint Boundary
  - Station Box / Shaft
  - Potential Area Of Concern

**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD.  
 Existing site investigations from Cardno and Golder.  
 Station box, cut fill, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 22-03-2022).

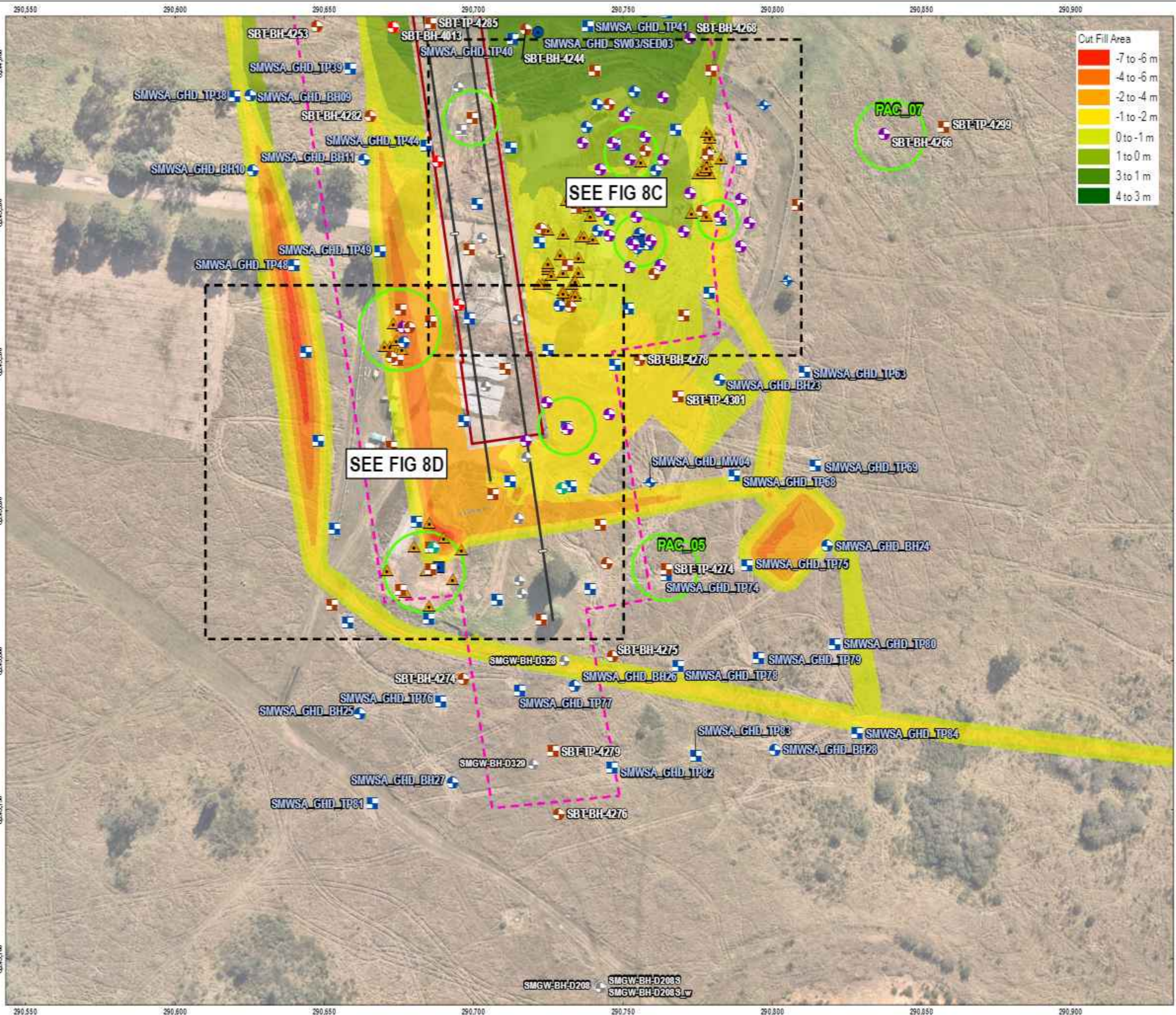


CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 8A**  
 Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

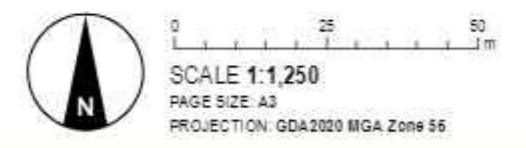


DOC REFERENCE: LOCALISATION OF SYDNEY AIRPORT STATION BOXES AND TUNNELLING WORKS - AEROTROPOLIS CORE STATION  
 FILE: 292575\_SAQP\_AE\_F0108B\_GIG  
 DATE: 23.06.22  
 PROJECT: 754-SYDGE292575  
 DRAWING: 292575\_SAQP\_AE\_F0108B\_GIG



- LEGEND**
- Additional Contaminated Land Location
    - Borehole (1 m)
    - Borehole (2 m)
  - Proposed Investigation Location
    - Borehole (6 m)
    - Test Pit (1 m)
  - Additional Geotechnical/Hydrogeological Location
    - Borehole
  - GHD Investigations (2022)
    - Borehole
    - Test Pit
    - Monitoring Well
    - Surface Water Sample
    - Other
    - Post-demolition Sample
  - Existing Investigation Location
    - Borehole
    - Test Pit
  - Tunnel Alignment
  - Tunnel Alignment - Chainage
  - Construction Footprint Boundary
  - Station Box / Shaft
  - Potential Area Of Concern

**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD.  
 Existing site investigations from Cardno and Golder.  
 Station box, cut fill, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 22-03-2022).

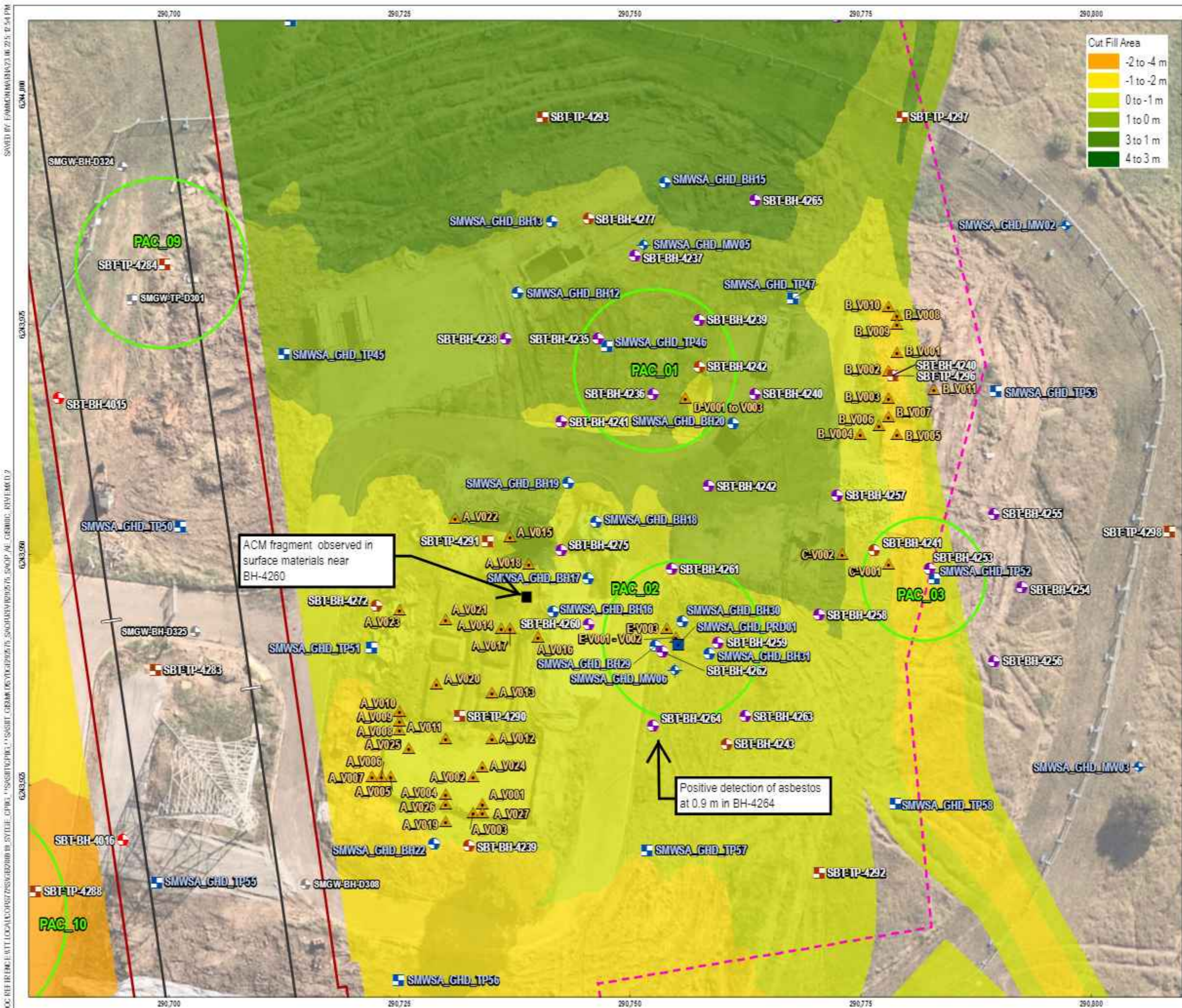


CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS

**FIGURE 8B**  
 Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station



DISCLAIMER: THIS FIGURE HAS BEEN PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND DOES NOT CONSTITUTE AN OFFICIAL ENDORSEMENT OR WARRANTY. IT IS NOT INTENDED FOR PUBLICATION.

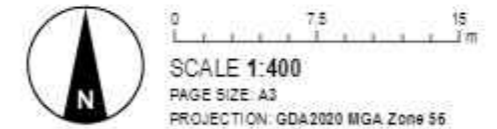


**LEGEND**

- Additional Contaminated Land Location
- Borehole (1 m)
- Borehole (6 m)
- Test Pit (1 m)
- Additional Geotechnical/Hydrogeological Location
- Borehole
- GHD Investigations (2022)
- Borehole
- Test Pit
- + Monitoring Well
- Surface Water Sample
- Other
- ▲ Post-demolition Sample
- Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Construction Footprint Boundary
- Station Box / Shaft
- Potential Area Of Concern
- Observed ACM fragment at surface

**SOURCE**

Site boundaries and investigations from Tetra Tech Coffey.  
Investigation locations from GHD.  
Existing site investigations from Cardno and Golder.  
Station box, cut fill, layouts and alignment supplied by CPBG.  
Aerial imagery from Nearmap (capture date 22-03-2022).



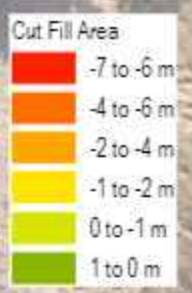
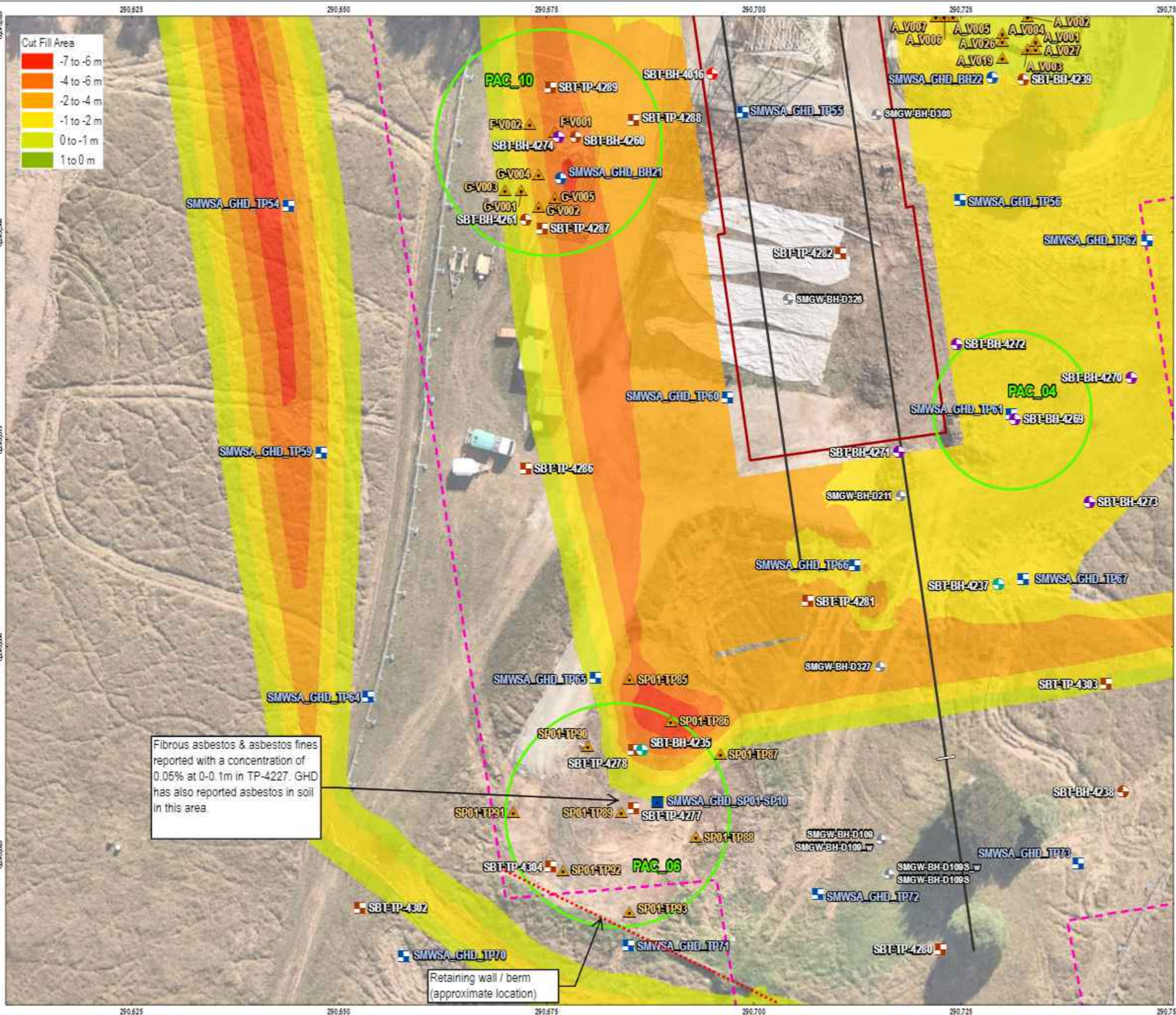
CPB - GHELLA

WESTERN SYDNEY AIRPORT  
STATION BOXES AND TUNNELLING WORKS

**FIGURE 8C**

Site Establishment Earthworks and Investigation  
Locations - Aerotropolis Core Station

DISCLAIMER: THIS FIGURE HAS BEEN PRODUCED FOR INFORMATIONAL PURPOSES ONLY AND DOES NOT CONSTITUTE AN OFFICIAL RECORD. IT IS NOT INTENDED FOR PUBLICATION.



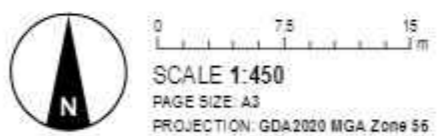
Fibrous asbestos & asbestos fines reported with a concentration of 0.05% at 0-0.1m in TP-4227. GHD has also reported asbestos in soil in this area.

Retaining wall / berm (approximate location)

**LEGEND**

- Additional Contaminated Land Location
  - Borehole (1 m)
  - Borehole (2 m)
- Proposed Investigation Location
  - Borehole (6 m)
  - Test Pit (1 m)
- Additional Geotechnical/Hydrogeological Location
  - Borehole
- GHD Investigations (2022)
  - Borehole
  - Test Pit
  - Other
  - Post-demolition Sample
- Existing Investigation Location
  - Borehole
  - Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Construction Footprint Boundary
- Station Box / Shaft
- Potential Area Of Concern

**SOURCE**  
 Site boundaries and investigations from Tetra Tech Coffey.  
 Investigation locations from GHD.  
 Existing site investigations from Cardno and Golder.  
 Station box, cut fill, layouts and alignment supplied by CPBG.  
 Aerial imagery from Nearmap (capture date 22-03-2022).



CPB - GHELLA  
 WESTERN SYDNEY AIRPORT  
 STATION BOXES AND TUNNELLING WORKS  
**FIGURE 8D**  
 Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

## Appendix F – Septic tank pit sample locations

Photograph 1 –  
North and east  
wall partial  
base (base  
samples 2.4 m)  
(n/a – not  
analysed)



Photograph 2 –  
East wall and  
base (base  
samples 2.4 m)

(n/a – not  
analysed)





Photograph 3 –  
South Wall

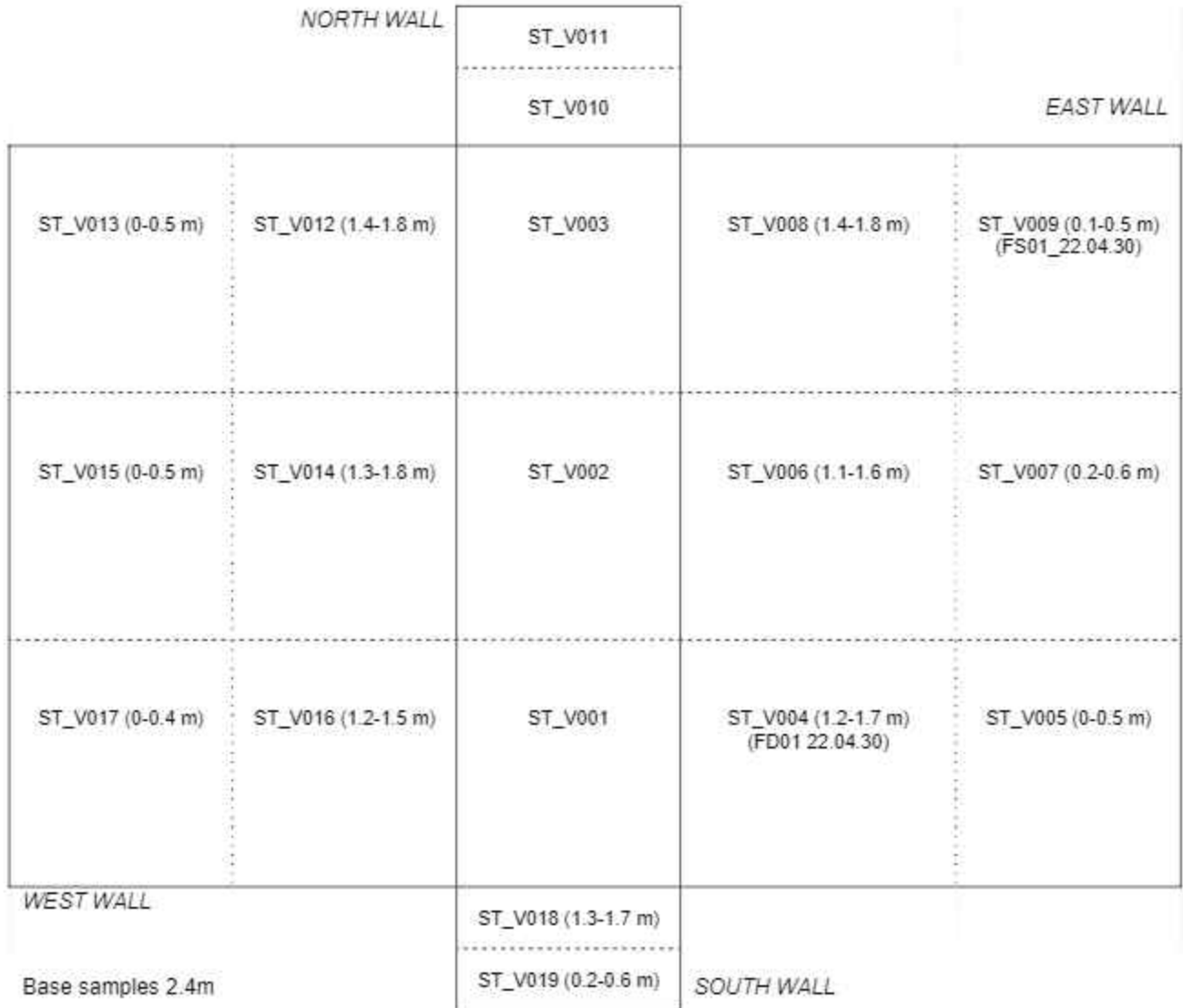
(n/a – not  
analysed)



Photograph 4 –  
Associated  
pipework trench



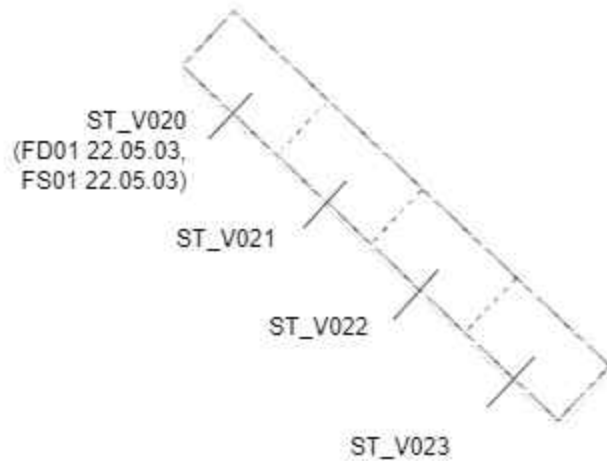
**SEPTIC TANK – excavation schematic with sample locations**



North

Sample scheduled for analysis

Not to scale



## Appendix F – UPSS tank pit sample locations

Photograph 1 –  
South Wall, east  
wall and partial  
base (base  
samples 2.4 m)



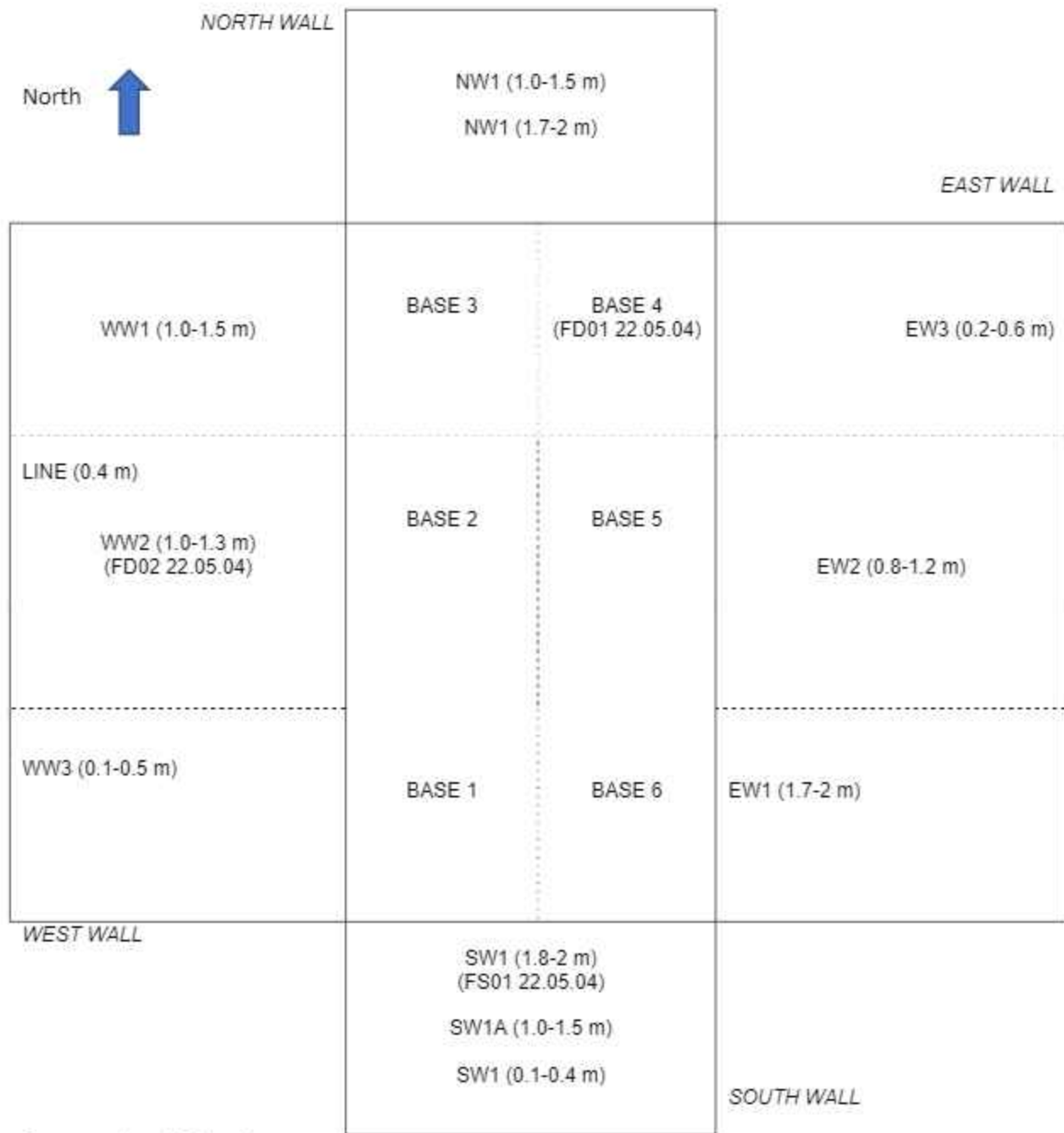
Photograph 2 –  
West wall and  
base (base  
samples 2.4 m)



Photograph 3 –  
North Wall,  
partial west wall  
and partial base  
(base samples  
2.4 m)



**UPSS – excavation schematic with sample locations**



Not to scale

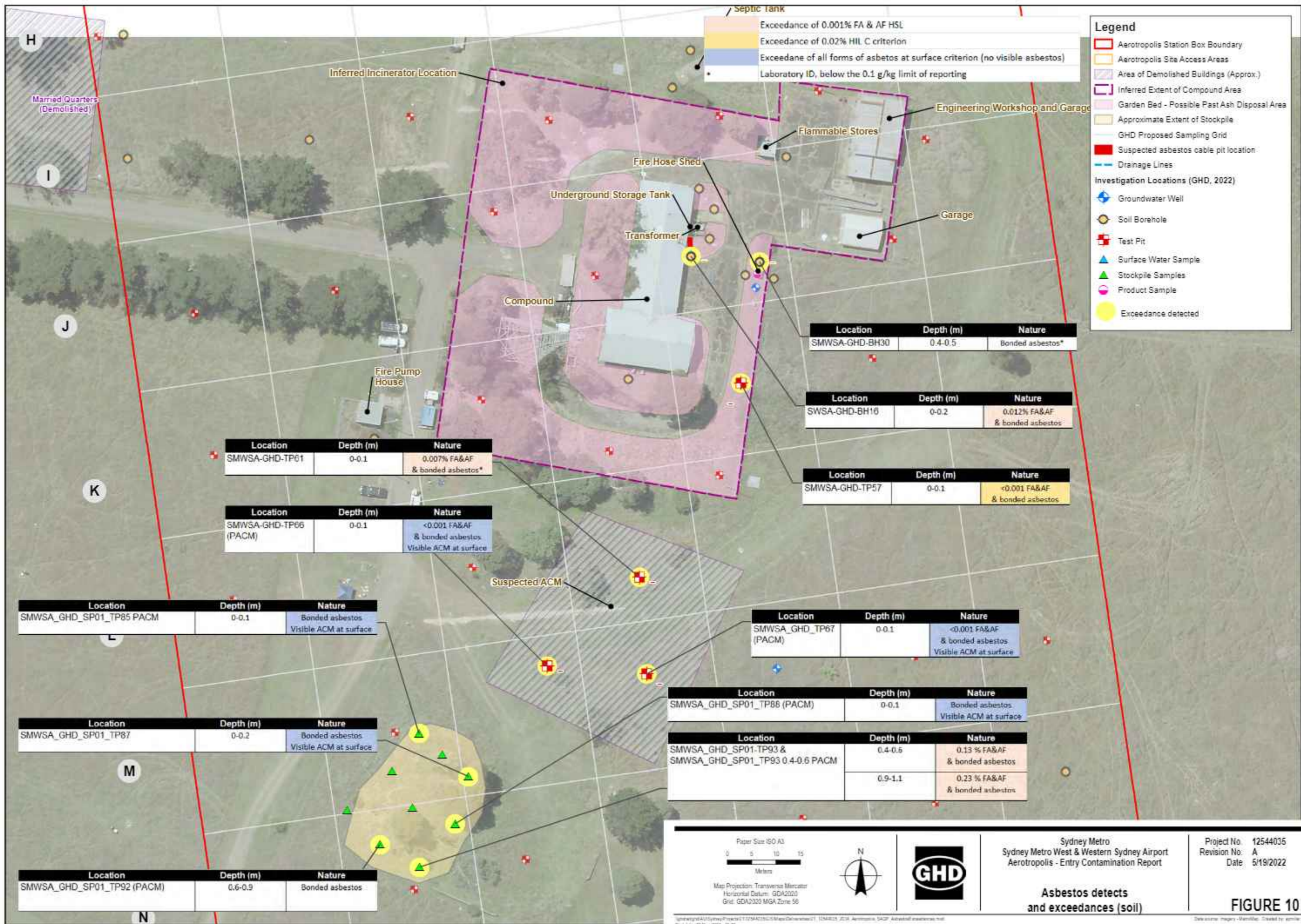


FIGURE 10

Source: Imagery - Modified. Created by: GHD





## APPENDIX B: DIVERSION DRAIN

---



## APPENDIX 12 DSI Summary



## Overview

The DSI included an assessment of soil and groundwater conditions at the SBT Site with a focus on the redevelopment of the SBT Site as a Station Box and Tunnel for the Project. Tabulated soil laboratory results presented in the DSI are included in Appendix 5.1 and Appendix 5.2, and investigation locations are shown in Figure 4A to 4C in Appendix 1.

Since the commencement of construction in Q4 2022 supplementary investigations have been undertaken for material classification purposes, additional information has been provided to CPBG by Sydney Metro for consideration, and instructions have been issued by Sydney Metro to CPBG which have implications for the remediation of the SBT Site. While this information has not required a change the Conceptual Site Model (CSM) developed for the SBT Site in the DSI (refer to Section 7.3), the information has been considered in the preparation of this RAP. This information is discussed in Section 8.

## DSI Objectives and Scope Summary

The objectives of the DSI which were to:

- Investigate areas of proposed excavation or disturbance.
- Investigate land within the construction site and / or surrounding the areas of proposed excavation or disturbance.
- Provide in-situ classification of solid waste (i.e., spoil).

The DSI included:

- A desktop study review of previous investigations and readily available online information pertaining to contamination, site history and the environmental setting of the SBT Site.
- An intrusive investigation including soil sampling from boreholes and installation and sampling of groundwater monitoring wells.
- Preparation of a refined conceptual site model (CSM) based on the results of the investigation in light of a commercial / industrial land use<sup>26</sup> and identified groundwater receptors.
- A preliminary waste classifications for anticipated spoil during bulk earthworks.

## Conceptualisation of Aerotropolis Site

Based on the review of available data from investigations completed, contamination impact was conceptualised into four main areas. A summary of these areas is provided in Table 5 and the areas shown in Figure B.

Table 19: Conceptualisation of Aerotropolis Site

Area	Description
Low Impact Area North (Northern portion of AEC 46)	The northern boundary of the Low Impact Area North was based on site investigation data including and north of the following locations: SMWSA_GHD_TP34, SMWSA_GHD_TP35, SMWSA_GHD_BH07,

<sup>26</sup> The refined CSM has been updated to include consideration to commercial and open space landuse and is included in Section 7.3.



Area	Description
	<p>SMWSA_GHD_TP36, SBT-BH-4279, SMWSA_GHD_TP37 and SMWSA_GHD_BH08. Land north of these locations is north of the former OTC facility, and also to the north of areas where PFAS and asbestos has been reported in previous investigations, and north of areas where known activities by Defence (e.g. stockpiling) took place.</p> <p>Historical infrastructure associated with the former OTC facility were not located in this area and therefore risk from demolition materials including ACM is considered to be low and consistent with the findings of the GHD investigation which did not report the positive detection of asbestos in this area. No gross contamination<sup>27</sup> was reported in this area in the GHD investigation.</p>
<p>Low Impact Area West (Western portion of AEC 46)</p>	<p>The western boundary of the Low Impact Area West was based on site investigation data for the following locations: SMWSA_GHD_TP38, SMWSA_GHD_BH09, SMWSA_GHD_BH10, SMWSA_GHD_TP48, SMWSA_GHD_TP59, SMWSA_GHD_TP64, and SBT-TP-4302.</p> <p>The western boundary also appears to be outside the operational area of the former OTC facility. Within this area no ACM was observed in intrusive locations and/or positive detection of asbestos in soil. No gross contamination was reported in this area in the GHD investigation.</p>
<p>Low Impact Area South (Southern portion of AEC 46)</p>	<p>The southern boundary of the Low Impact Area South was based on site investigation data including and south of the following locations: SBT-TP-4302, SMWSA-GHD-TP71, SBT-BH-4280, SMWSA_GHD_TP78, SMWSA_GHD_TP79, SMWSA_GHD_TP75, SMWSA_GHD_TP68, and SMWSA_GHD_TP69. The boundary of this area is also defined by a retaining wall present near PAC 06.</p> <p>This area appears to be outside the operational area of the former OTC facility. Within this area no ACM was observed in intrusive locations and/or positive detection of asbestos in soil. No gross contamination was reported in this area in the GHD investigation.</p>
<p>Medium Impact Area (Central portion of AEC 46)</p>	<p>The Medium Impact Area includes historical infrastructure associated with the former OTC facility, and which has been the subject of historical and recent demolition activities. The DSI has confirmed the presence of asbestos in fill in this area, and impact from PFAS in soil, groundwater and surface water on the SBT Site.</p>

<sup>27</sup> Gross contamination was considered to be wide-spread contamination which exceeds commercial/industrial guidelines.



## Ground Conditions (Pre-Construction)

### Low Impact Area North

Ground conditions within this area typically comprised between 0.2 m and 0.3 m thick layer of clay fill. The fill was underlain by natural residual clay soils. Highly to moderately weathered Bringelly Shale was encountered beneath the natural clay from a depth of 1.2 m bgs.

Soil materials with visual / olfactory signs of suspected contamination and potential asbestos containing materials (PACM) were not observed in the test pits or boreholes, or site observations made during the intrusive investigation works completed in this part of the SBT Site.

Soil headspace readings were typically below 10 ppm which was considered indicative that there is a low likelihood that significant concentrations of volatile organic compounds were present in the soil.

### Low Impact Area West

Ground conditions within this area typically comprised between 0.1 m and 0.4 m of clay fill, overlying natural residual clay soils to depths of between 1.2 m and 1.5 m bgs. Highly to moderately weathered Bringelly shale was encountered below the residual clay.

Soil materials with visual / olfactory signs of suspected contamination and PACM were generally not observed in test pits or boreholes, or site observations made during the intrusive investigation works completed in this part of the SBT Site.

Soil headspace readings were typically below 2 ppm which was considered indicative that there is a very low likelihood that significant concentrations of volatile organic compounds were present in the soil.

### Low Impact Area South

Ground conditions within this area typically comprised between 0.1 m and 0.4 m of clay fill, overlying natural residual clay soils to depths of between 2.0 m and 3.0 m bgs. The natural clay was underlain by highly to moderately weathered Bringelly shale.

Soil materials with visual / olfactory signs of suspected contamination and PACM were not observed in the test pits or boreholes, or site observations made during the intrusive investigation works completed in this part of the SBT Site.

Soil headspace readings were typically below 5 ppm which was considered indicative that there is a very low likelihood that significant concentrations of volatile organic compounds were present in the soil.

### Medium Impact Area

Ground conditions within this area typically comprised between 0.1 m and 1.1 m of fill, with deeper fill (between 0.7 m and 1.1 m) encountered along the eastern side and southern end of this area. The fill generally comprised clay fill with some gravelly clay, gravel, sandy gravel and gravelly sand fill also encountered.

Fill was underlain by natural soils comprising mostly clay with some sandy silty clay, silty clay and gravelly sandy clay.

Where bedrock was encountered beneath the natural soils, it comprised highly to moderately weathered Bringelly shale at depths of between 2.4 m bgs and 5.9 m bgs.



Asbestos including ACM, and asbestos fines / fibrous asbestos was identified in fill materials within this area associated with the former use / demolition of the OTC site (including areas recently demolished). In addition to ACM, test locations completed by GHD (GHD, 2022b) also recorded foreign materials in the fill comprising charcoal, coal refuse, glass, concrete, brick, mortar and asphalt.

Soil headspace readings were typically below 10 ppm when screened with a PID which is considered to indicate that there is a low likelihood that significant concentrations of volatile organic compounds were present in the soil, with the exception of borehole SBT-BH-4261 between 0.0 m bgl to 0.2 m bgl where a headspace reading on 46 ppm was recorded.

## Key DSI Findings

### Low Impact Areas

Soil materials in the Low Impact Area North, South and West reported contaminant concentrations which were below the adopted human health and ecological commercial/industrial guidelines published in the ASC NEPM (NEPC, 2013), and Airport Regulations.

Materials in Low Impact Areas are not considered to pose an unacceptable risk to human health or the environment for a commercial and open space land use. As such, remediation is not required for the low impact areas.

Controls to be implemented for the excavation of materials as part of the preparatory works were described in the Technical Memorandum<sup>28</sup>.

### Medium Impact Area

#### Asbestos

Fill materials within the Medium Impact Area should be considered as potentially containing asbestos and are considered to pose an unacceptable health risk for a commercial/industrial land use. TTMP notes that there is randomness to the presence/distribution of asbestos in soils and this has been demonstrated by the existing site investigation data for this site. Based on the findings to date, it is considered reasonable and practical to assume that fill materials in this area would potentially contain asbestos based on historical data. Remediation of the SBT Site is required to make the SBT Site suitable for commercial and open space land use on account of asbestos.

#### PFAS

In the Medium Impact Area, PFAS impact in soil has been reported in multiple locations associated with the historical use of the SBT Site including a former septic system, contaminated stockpile, and fire suppressant system used at the SBT Site. PFAS impact in soil extends beyond the eastern boundary of the SBT Site. Maximum concentration of PFAS reported at investigation locations undertaken within the SBT Site boundary are shown in Figure C.

Elevated concentrations of PFAS are predominately located within the top 1 m of soil material in these areas. PFAS in soil at the SBT Site poses a potentially unacceptable risk to future off-site

<sup>28</sup> TTMP (2022) Technical Memorandum: Soil Results for Aerotropolis, SMWSASBT-CPG-SWD-SW000-GE-MEM-040551, 4 August 2022





human receptors (residential receptors), groundwater and surface water receptors, and terrestrial and aquatic ecological receptors.

PFAS has been found in groundwater which exceeds the adopted human health guidelines (drinking water guidelines) and ecological guidelines (99% species protection). PFAS has also been found to be migrating off-site via surface water in previous investigations. PFAS has also been confirmed to be present in Thompsons Creek. Probable off-site sources of PFAS have also been identified in previous investigations.

Remediation of PFAS impact in soil in the Medium Impact Area is therefore considered to be required to make the SBT Site suitable for commercial and open space land use and to manage potential risk to off-site receptors.

### Other contaminants of concern

The other contaminants of potential concern identified in the DSI were below the adopted human health guidelines ) in soil materials in the Medium Impact Area and were not considered to pose an unacceptable risks to human health and ecological receptors for a commercial and open space land use.

Elevated concentrations of nutrients including ammonia have been reported in groundwater which exceed ANZG 2018 guidelines.

In high enough concentrations ammonia can be toxic to aquatic organisms and an irritant to humans; such concentrations are not present within the SBT Site. Based on the proximity of this site to Thompsons Creek (approximately 600 m away) it is considered unlikely that the ammonia present would pose an unacceptable risk to aquatic receptors.

During construction ammonia in groundwater has the potential to migrate to the station box and trigger the requirement for management during dewatering.

### Groundwater Levels and Flow Direction

A summary of key groundwater parameters recorded during recent monitoring events are summarised below:

- Groundwater levels and parameters were recorded from 13 locations (GHD MW01 to GHD MW06, ERM MW201 to ERM MW203, ERM MW205, ERM MW206, SBT-GW-4014, SBT-GW-4017, and SBT-GW-4019).
- Groundwater levels reported ranged between approximately 65 m AHD and 70 m AHD.
- Groundwater has been interpreted to flow east towards Thompsons Creek as shown in Figure 5, Appendix 1.
- Field parameters were recorded as follows:
  - Dissolved oxygen: 0.42 mg/L to 3.14 mg/L.
  - Electrical conductivity: 11,124  $\mu$ S/cm and 18,994  $\mu$ S/cm.
  - pH: 6.72 pH units and 7.68 pH units.
  - Redox potential: -6.8mV to 199.7mV (converted to standard hydrogen electrode).
  - Temperature: 16.1°C and 18.3°C.

Groundwater samples collected from GHD\_MW04, GHD\_MW06, ERM\_MW202, ERM\_MW203, and ERM\_MW206 had a mild sulfur odour.

