SYDNEY METRO - WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

Aerotropolis
Detailed Site Investigation

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

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Executive Summary

Background

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 23km 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.

CPBG 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.

This report provides the findings of the Detailed Site Investigation (DSI) completed for the Aerotropolis site by TTMP.

Objectives of the DSI

The purpose of the DSI is to:

- Provide comment on the site's suitability for the proposed development
- Provide data to inform the management of spoil generated during construction for either on-site reuse and / or off-site disposal
- Inform the required controls which need to be implemented during construction regarding the management of contamination in soil and groundwater
- Inform the requirement for remediation and / or management measures which need to be implemented for the design of the Aerotropolis station box.

The completion of this DSI was a requirement of the Sydney Metro - Western Sydney Airport Station Boxes and Tunnelling Works Design and Construction Deed Contract No: WSA-200-SBT. Under Section 12.19 of this Deed, objectives of the DSI included:

- Investigate areas of proposed excavation or disturbance
- Investigate land within the construction site and / or surrounding the areas of proposed excavation or disturbance with respect to the potential migration of contamination via groundwater, ground gas and odour into the areas of excavation or disturbance
- Provide in-situ classification of solid waste (i.e., spoil).

Scope of Work

The following scope of work has been completed:

- Review of existing information including the previous investigation reports.

- A site walkover to observe conditions within the site and surrounding land.
- Prepare a Sampling Analysis and Quality Plan (SAQP) for investigations at the site to address data gaps / uncertainties.
- Intrusive investigation which included drilling 77 boreholes or test pits to depths between 1 m and 37 m below ground surface (mbgs), and 8 grab samples to 0.1 m bgs.
- Conversion of four boreholes into groundwater monitoring wells, and groundwater sampling from 13 monitoring wells
- Analysis of soil and groundwater samples for contaminants of potential concern (COPC).
- Preparation of this report discussing the findings of the assessment.

Key Findings

Based on the review of investigations completed prior to the DSI and TTMP data available the Aerotropolis Site was conceptualised 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 Areas (North, South and West) and a Medium Impact Area.

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 criteria within the Airport Regulations.

Materials in the low risk areas are not considered to pose an unacceptable risk 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

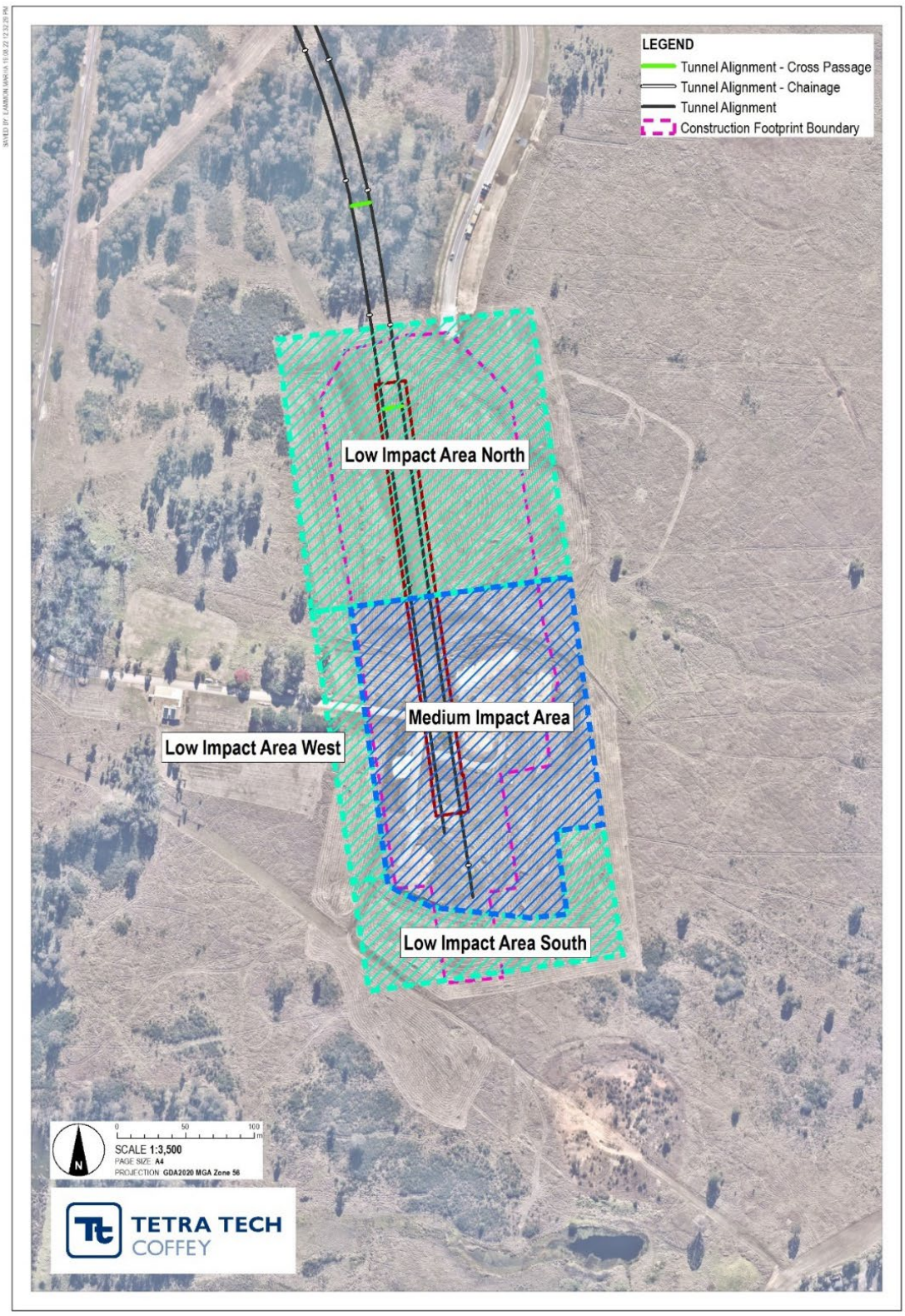
Fill material within the Medium Impact Area should be considered as potentially containing asbestos and is considered to pose an unacceptable health risk for a commercial/industrial land use. TTMP notes that there is randomness to the presence/distribution of asbestos in fill. Based on the findings to date, it would be reasonable and practical to assume that fill materials in this area would potentially contain asbestos based on historical data.

In the Medium Impact Area, PFAS impact in soil has been reported in multiple locations associated with the historical use of the site including a former septic system, contaminated stockpile, and fire system used at the site. PFAS impact in soil extends beyond the eastern boundary of the Aerotropolis site.

Samples reporting elevated concentrations of PFAS are predominately located within the top 1 m of soil material in these areas. PFAS in soil within the footprint of the Aerotropolis site is potentially 'low risk' if it is sealed beneath a hardstand. However, if improperly managed PFAS in soil at the 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-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.

Consideration of PFAS in soil, groundwater, and surface water beyond the boundary of the Aerotropolis station box was outside the scope of this DSI.



Aerotropolis Low and Medium Impact Areas

Organics in the Bringelly Shale

Previous investigations and the investigation completed by TTMP reported the presence of organics in the Bringelly Shale (mainly investigated within the footprint of the station box) including:

- TRH hydrocarbons in the F1 C6-C10 fractions, F2 C10-C16 fractions and F3 C16-C34 fractions
- BTEX (benzene, toluene, ethyl xylene and xylene)
- PAHs (mainly naphthalene)

These were interpretated in previous investigations as false positives from drilling on the basis that no confirmed source of hydrocarbons had been identified on the site. Based on the findings of the DSI completed by TTMP the organics in the Bringelly Shale within the Station Box at Aerotropolis are now considered to be naturally occurring.

Conclusions and Recommendations

TTMP conclude that the 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 site is required to make the site suitable for commercial/industrial use on account of asbestos in fill materials. Remediation of PFAS impact in soil the Medium Risk Area is also considered to be required to make the site suitable for commercial/industrial use and to manage potential risk to off-site receptors.

TTMP has recommended the development of a Remedial Action Plan for the Medium Risk Area of the site.

TTMP considers that the concentrations of PFAS reported in groundwater could trigger duty to report contamination to the NSW EPA under Section 2.3.5 of the NSW EPA (2015) *Guidelines on the Duty to Report Contamination* under the *Contaminated Land Management Act 1997*. It is recommended that Sydney Metro discuss the findings of the DSI with Western Park City Authority (WPCA), and for Sydney Metro or WPCA to seek legal advice in whether the requirement for notification under Section 60 of the *Contaminated Land Management Act 1997* has been triggered.

Table of contents

Table of tables

Table of figures

Annexures

Abbreviations

Abbreviation	Definition
AHD	Australian height datum (0 AHD corresponds roughly to mean sea level)
AIP	NSW Aquifer Interference Policy
ARI	Average recurrence interval
AS	Australian Standard
BoM	Australian Bureau of Meteorology
Bgs	Below ground surface
Bgl	Below ground level
BTEXN	Benzene, toluene, ethyl-xylene, xylene, and naphthalene
BSF	Bringelly Service Facility
CMF	Claremont Meadows Service Facility
COPC	Chemicals of potential concern
CPBG	CPB Contractors Ghella
CSM	Conceptual Site Model
DCE	Dichloroethene
DDD	Dichlorodiphenyldichloroethane (organochlorine insecticide)
DPI	NSW Department of Primary Industries
DSI	Detailed site investigation
EC	Electroconductivity
EIS	Environmental Impact Statement
ENM	Excavated natural material
EPA	NSW Environment Protection Authority
EY	Exceedances per year
GDE	Groundwater dependent ecosystem
GDR	Geotechnical Data Report
GWMR	Groundwater Monitoring Report
GSW	General solid waste
m	Metre
mg/L	Milligram per litre
NSW	New South Wales

Abbreviation	Definition
PAH	Polycyclic aromatic hydrocarbon
PCE	Perchloroethylene also called tetrachloroethylene
PCSM	Preliminary Conceptual Site Model
PDS	Portal Dive Structure
PFAS	Per and polyfluoroalkyl substances
PMF	Probable maximal flood
SBT	Station Boxes and Tunnelling Works
SBT North	Area including STM, CMF and OHE
SBT South	Area including PDS, ATM, BSF and AEC
SWA	Sydney Western Airport
TAN	Technical Advice Note
TBC	To be completed
TBM	Tunnel boring machine
TCE	Trichloroethylene
TDS	Total dissolved solids
TfNSW	Transport for New South Wales
TRH	Total Recoverable Hydrocarbons
TTC	Tetra Tech Major Projects Pty Ltd (Coffey)
µg/L	Micro gram per litre
UST	Underground storage tank
VENM	Virgin excavated natural material
VC	Vinyl chloride
VWP	Vibrating wire piezometer
WAL	Water Access License
WSA	Western Sydney Airport
WSI	Western Sydney International (Airport)

1. Introduction

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 23km 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 1-1 shows the proposed alignment and key features of the Project.

The SBT Works are divided into two parts:

- SBT North: SBT North: St Marys Station to Orchard Hills Station. St Marys Station is an existing heritage-listed suburban rail station. The Orchard Hills Station (OHS) is a new station for the Sydney Metro line and will include the portal dive structure.
- 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 stations at St Marys, Orchard Hills, Airport Terminal and Aerotropolis
- Excavations for two intermediate services facilities, one in each of the tunnel sections at Claremont and Bringelly.

CPBG 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.

Previous investigations have been conducted at the Aerotropolis Site (refer to Section 5). This includes a detailed investigation of the Aerotropolis Site which was 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).

Based on the potential for contamination at the Aerotropolis Site from historical land use and the findings from previous investigations, further investigation was required to investigate the potential for contamination and to inform the design and construction of the Aerotropolis station box ("the Aerotropolis Site"). The station box is located on Lot 101 DP1282949 ("the Property").

This document describes the Detailed Site Investigation (DSI) completed within the proposed construction footprint of the SBT Works at Aerotropolis ("the site"). The site boundary is shown in Figure 1, Appendix 1.

Separate DSIs are being prepared for the tunnel, other station sites, and CMF. This DSI is specific to the construction phase on the site. Consideration to the use of the site post construction (other than the use of the shaft for commercial / industrial purposes) is outside the scope of the SBT Works.

Figure 1-A Overview of SBT Works

The purpose of this DSI is to:

- Provide comment on the site's suitability for the proposed development;
- Provide data to inform the management of spoil generated during construction for either on-site reuse and / or off-site disposal;
- Inform the required controls which need to be implemented during construction regarding the management of contamination in soil and groundwater; and
- Inform the requirement for remediation and / or management measures which need to be implemented for the design of the Aerotropolis station box.

This DSI was carried out in conjunction with geotechnical and hydrogeological investigations and relevant information from these investigations was included in this report.

The completion of this DSI was a requirement of the Sydney Metro - Western Sydney Airport Station Boxes and Tunnelling Works Design and Construction Deed Contract No: WSA-200-SBT. Under Section 12.19 of this Deed, objectives of the DSI included:

- Investigate areas of proposed excavation or disturbance;
- Investigate land within the construction site and / or surrounding the areas of proposed excavation or disturbance with respect to the potential migration of contamination via groundwater, ground gas and odour into the areas of excavation or disturbance; and
- Provide in-situ classification of solid waste (i.e., spoil).

1.1. Boundary of DSI

The boundary of the DSI is the construction footprint at Aerotropolis and is shown in Figure 1, Appendix 1.

1.2. Regulatory Framework

This DSI was prepared in general accordance with the following legislation, industry standards, codes of practice, and guidance documents, where relevant:

- ANZG 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia.
- Australian Standard (AS) 4482.1, *Guide to Investigation and Sampling of Sites with Potentially Contaminated Soil, Part 1: Non-volatile and Semi-volatile Compounds, 2005* (AS4482.1 – 2005)
- AS 4482.2, *Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 2: Volatile Substances*, 1999 (AS4482.2-1999)
- *Contaminated Land Management (CLM) Act, 1997* (CLM Act 1997)
- CRC Care Technical Report No. 10, *Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, 2011* (CRCCARE 2011)

- Heads of EPAs Australia and New Zealand (HEPA). *PFAS National Environmental Management Plan. Version 2.0 – January 2020* (HEPA NEMP 2020)
- *Protection of the Environment Operations (POEO) Act 1997* (POEO Act 1997)
- *POEO (Underground Petroleum Storage Systems) Regulation 2019* (POEO UPSS Regulation 2019)
- *National Environment Protection Council (NEPC) Act 1994* (NEPC Act 1994)
- *National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999* (April 2013) (ASC NEPM 2013)
- NSW Department of Environment and Conservation (DEC), *Contaminated Sites Guidelines for the Assessment and Management of Groundwater Contamination, 2007* (DEC 2007)
- NSW EPA (1995) *Contaminated Sites Sampling Design Guidelines*
- NSW EPA (2014) *Waste Classification Guidelines Part 1: Classifying waste*
- NSW EPA (2014) *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 - The excavated natural material order 2014*
- NSW EPA (2016) *Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste*
- NSW EPA *Contaminated Land Guidelines: Assessment and management of hazardous ground gases, 2020* (NSW EPA 2020)
- NSW EPA (2020), *Contaminated Land Guidelines: Consultants Reporting on Contaminated Land, 2020*.

2. Scope of Work

The following scope of work has been completed:

- Review of existing information including the previous investigation reports.
- A site walkover to observe conditions within the site and surrounding land.
- Prepare a Sampling Analysis and Quality Plan (SAQP) for investigations at the site to address data gaps / uncertainties. The SAQP was presented in the following report:
  - TTMP (May 2022); *Aerotropolis Sampling Analysis and Quality Plan; Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works* (Ref: SMWSASBT-CPBG-SWD-SW000-GE-RPT-040506; Rev. A.01 dated 30 May 2022).
- Intrusive investigation which included drilling 77 boreholes or test pits to depths between 1 m and 37 m below ground surface (m bgs), and 8 grab samples to 0.1 m bgs.
- Conversion of four boreholes into groundwater monitoring wells, and groundwater sampling from 13 monitoring wells (i.e. the four monitoring wells installed by TTMP, and nine monitoring wells installed during previous investigations that were considered relevant to the Project).
- Analysis of soil and groundwater samples for contaminants of potential concern (COPC).

- Preparation of this report discussing the findings of the assessment.

3. Site Description

3.1. Site Setting and Features

The site is located on Badgerys Creek Road at Bringelly. The boundary of the site is shown in Figure 1, Appendix 1 and is based on the construction footprint of the SBT Works. Key attributes of the site are summarised in Table 1.

Table 1: Site Information

Attribute	Description
Address	215 Badgerys Creek Road, Bringelly NSW 2556
Site Area	Construction footprint is approximately 5.27 ha
Title Identification Details	Part Lot 101 DP1282949. The whole of Lot 101 DP1282949 is referred to as "the Property".
Current Land Use	Cleared vacant land
Current Land Zoning	RU4 – Primary production small lots
Adjoining Land Uses	The Property is located within the suburb 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.

3.2. Environmental Site Setting

Table 2 presents a summary of the environmental setting of the site.

Table 2: Environmental Site 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 southeast direction towards Moore Gully and Thompsons Creek.
Geology	A review of the Penrith 1:100 000 scale geology map[1] indicates that the site is underlain by Bringelly Shale of the Wianamatta Group which was deposited in a deep marine environment of the Middle Triassic. The Bringelly shale is described as shale, carbonaceous claystone, laminite, lithic sandstone, with rare coal.

[1] 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
	Based on previous investigations (refer to Section 6) the geology of the site is expected to comprise of fill material (~ 0.2 to ~ 0.5 m thick) and underlain by residual soils comprised of Silty Clay (~ 2 m thick) derived from the weathering of the Shale. The thickness of soils varies along the alignment and is approximately ~ 3 m below ground surface (bgs) in the northern end, ~ 2 to ~ 4 m bgs in the central portion of the station box, and ~ 2 m bgs at the southern end of the station box. Soils are underlain by the Bringelly Shale.
Hydrogeology	Groundwater at the Aerotropolis Site has been measured at approximately 66 to 72 m AHD within the Interbedded Siltstone and Sandstone Unit (the Bringelly Shale). A groundwater elevation of 67 m AHD is considered typical in the vicinity of the Aerotropolis Core Station (refer to Section 5). Groundwater is expected to flow in a south-east to easterly direction towards Thompsons Creek (TTC, 2021)[2]. Table 9 provides further detail on groundwater levels.
Registered Groundwater Bores	The nearest registered groundwater bores (GW113438, GW113439, GW113440) are located between 30 and 130 m south west of the Aerotropolis Site.
Salinity	A review of the map indicates that the Aerotropolis Site is mapped as having moderate salinity.
Acid Sulfate Soils	The Atlas of Australian Acid Sulfate Soil (ASS) compiled by CSIRO[3] was reviewed to assess the probability of occurrence of ASS within the site. The ASS risk plan indicates that the Aerotropolis Site is located in an area with Extremely Low Probability of Occurrence of ASS.
List of Contaminated Sites Notified to the EPA	A search of the List of NSW Contaminated Sites Notified to NSW EPA[4] (as of 8 March 2022) was carried out on 17 May 2022. The Aerotropolis Site is not recorded on the register.
NSW EPA Contaminated Land Public Record	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 Aerotropolis Site, or properties within 250 m of the site, were not present on the contaminated land public record.

3.3. Site Walkover

3.3.1. 22 March 2022

The site was part of and accessed from a larger construction site off Badgerys Creek Road. The site was surrounded by 2 m high temporary fencing. A large, brick building that has since been demolished was present in the central portion of the site, with two smaller storage sheds of brick construction, that have since been demolished were present in the north-east corner. The internal driveway appeared to be bitumen sealed and in poor condition. A small concrete structure, of unknown purpose, approximately 1 m in height was present on the northern site of the main building.

A large stockpile of soil, observable in Figure 3, was present south of main building, although it was not clear where this material had been derived from. The remainder of the site appeared to be

[2] TTC (2022) *Western Sydney Airport Station Boxes and Tunnels Tender, Hydrogeological Interpretative Report.*
[3] http/www.asris.csiro.au/
[4] https://www.epa.nsw.gov.au/your-environment/contaminated-land/notification-policy/contaminated-sites-list

characterised by tall grass, with no evidence of die-back observed. Several monument groundwater monitoring wells were observed on the perimeter of the site, to the north-east, east and south-east of the buildings.

At the time of the site walkover, it is understood that lead and asbestos removal works were in progress, limiting the walkover to the perimeter of the fenced area, and as a result the buildings were not inspected, and observations of the central area were made from a distance greater than 10 m. This limited observations which could be made at the time of this inspection.

The areas surrounding the site were characterised by tall grass and were undeveloped. The site was noted to be relatively flat although appeared to drop gradually in elevation east and south of the site. To the north, the surrounding land dropped off slightly and then increased again in elevation. To the west it was relatively flat.

3.3.2. 18 May 2022

A follow up visit was undertaken following the demolition of the buildings and associated works (refer to Section 3.4). The central portion comprising the majority of the site was characterised by bare earth that appeared to be recently disturbed; this was especially apparent in the north-western portion of the site, with minor soil mounding created an undulating appearance. The soils in large part appeared to comprise topsoil and the underlying clay, with demolition materials, including brick, pipework, metal, and tile fragments noted across the portion of the site where bare soil was present and demolition activities were taking place.

The building footprints appeared to have been recently covered with imported crushed sandstone, with the crushed sandstone exhibiting a relatively uniform appearance in colour and size. Suspected asbestos-containing materials (ACM) in the form a degraded fibre cement fragment (considered likely to be pulverisable to hand pressure) was identified adjacent to the south-east corner of the footprint of the former shed and a second ACM in the form of a bituminous paper product was identified within the footprint of the main building.

The large stockpile of soil that was present during the March inspection (refer to Section 3.3.1) had been removed by another party prior to CPBG having control of the site.

The footprint of another building not observed during March inspection (refer to Section 3.3.1) was noted south of the stockpile location. A retaining wall was present at the southern extent of the footprint (refer to Figure 3, Appendix A).

Prior to commencing the site walkover, information was provided indicating that odours consistent with hydrocarbons had been noted recently in the soil (refer to Section 3.3.1), however these were not noted during the site walkover. The perimeter of the disturbed area had grass cover although it appeared to have been cut back.

3.4. Demolition Activities

Based on the GHD (2022) *Sydney Metro Western Sydney Airport - Aerotropolis Station Box Compound –Entry Contamination Report, 215 Badgerys Creek Road, Bringelly, 9 June 2022* (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[5] at the former Defence Overseas Telecommunications Radio Station Complex (OTC) site
- Removal of a 1,600 m^3 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 included asbestos Clearance Certificates for the demolition areas. From the Clearance Certificate dated 14 May 2022 the following is understood:
  - demolition areas where soil was visible at surface were inspected. An inspection and issuing 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 1 shows the location of the areas identified above.

3.5. Site History

The history of the Aerotropolis Site is described in *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). The EIS Technical Paper provides a Preliminary Site Investigation (PSI) of the Project footprint. Information in the EIS Technical Paper has been supplemented with historical information included in GHD (2022) *Sydney Metro Western Sydney Airport - Aerotropolis Station Box Compound Assessment - Sampling, Analysis and Quality Plan, 15 March 2022* (GHD SAQP) which was provided to TTMP on the 7 April 2022.

In summary, the site was historically used for agricultural purposes. The site was acquired by the Department of Defence (Defence) and used a Defence (RAAF[6]) radar receiving station from the 1950s to approximately 2005 when the station was demolished. Potential sources of contamination associated with the use of this facility included but not limited to: underground storage tanks (USTs), workshops, fire fighting systems which included the use of firefighting foams, and workshops.

[5] The GHD Investigation describes the removal of building footings in Table 16
[6] Royal Australian Air Force

Historical aerial imagery shows Defence housing was present north of the main 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.

The photograph from 2013 shows that a bushfire occurred on the southern portion of the site, surrounding some of the buildings.

The site was vacant and not used from the mid-2000s to the 2022. Buildings and the remaining infrastructure on the site were demolished and removed in April-May 2022 (refer to Section 3.4).

The EIS Technical Paper has identified the Aerotropolis Site as containing areas with moderate to high risk of contamination (refer to Section 4).

4. Potential Areas of Environmental Concern

Historical activities with the potential for contamination (referred to as Areas of Environmental Concern (AEC)) were identified in the EIS Technical Paper (M2A, 2020). The locations of the AEC are shown in the following Figure 2-A and are summarised in Table 3.

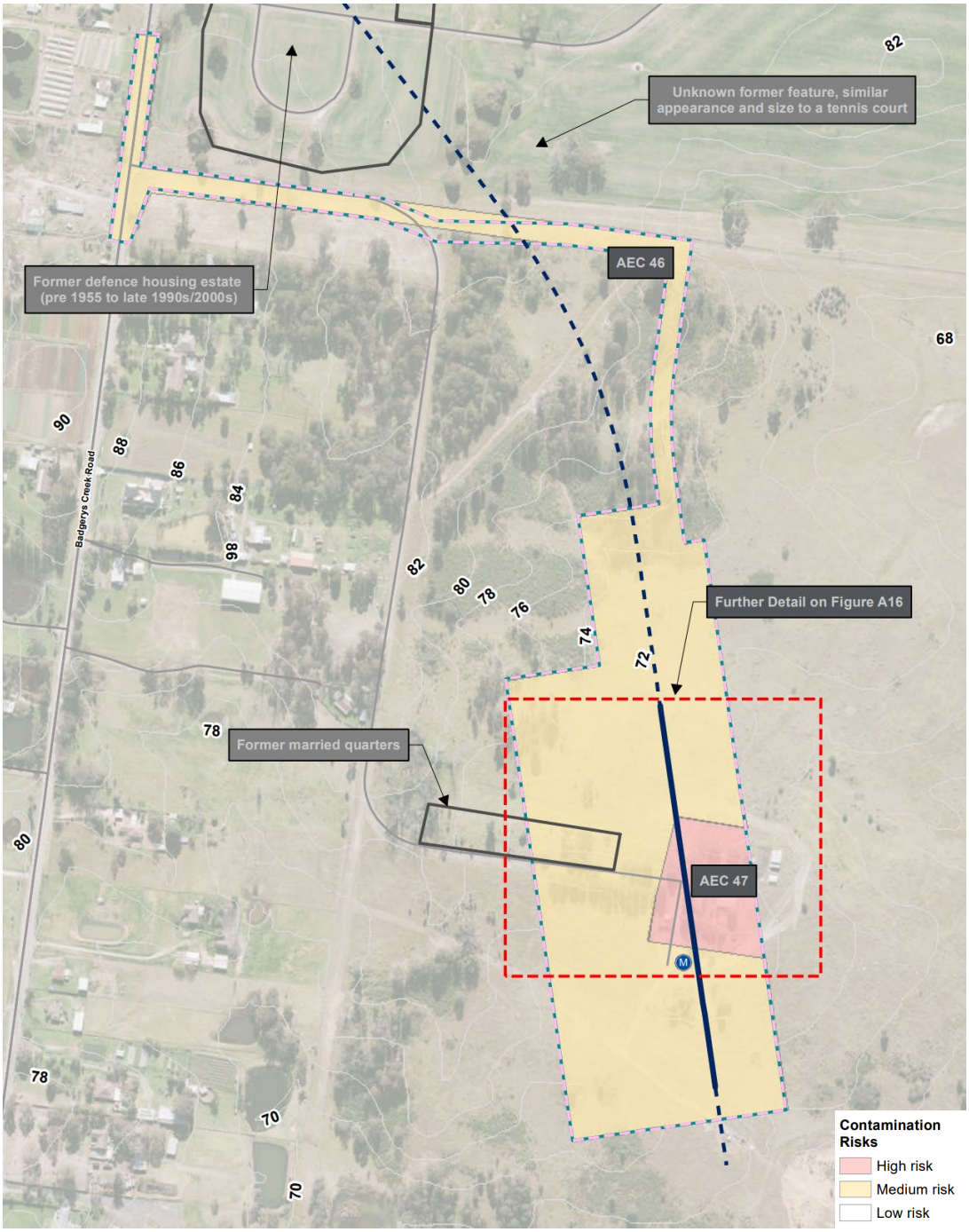


Figure 2-A AEC Sites (source Figure A15 EIS Technical Paper)

AEC46 and AEC47 were identified in the EIS Technical Paper (M2A, 2020) as medium and high risk sites, respectively.

Table 3: AEC Sites

EIS Reference	Activity Description	EIS Assigned Risk Level
AEC46	Site Summary • AEC46 includes project land at Aerotropolis which is part of or in the vicinity of AEC47. • Potential sources of contamination were considered to include hazardous building materials and unidentified items (activities) in this area.	Medium
AEC47	Site Summary • Former Defence Overseas Telecommunications Radio Station Complex (OTC) site. • 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)	High

Based on the GHD investigation 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-CPBG-SWD-SW000-GE-MEM-040551, 4 August 2022* (TTMP Technical Memorandum). A copy of the TTMP Technical Memorandum has been included in Appendix 11.

This technical memorandum provided 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. The following summarise key findings of the TTMP Technical Memorandum.

AEC47

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 were removed and a source of contamination associated with these was not identified in the GHD Investigation it was recommended that AEC47 could be removed.

AEC46

Based on the available data and site observations, the boundary of AEC46 was modified which resulted in the change of medium risk areas in the north, south and west of the AEC being changed to low risk. The eastern boundary of the remaining medium risk area was further extended east to the eastern boundary of the Aerotropolis site.

The revised boundary of the AEC46 site is shown in Figure 3-A.

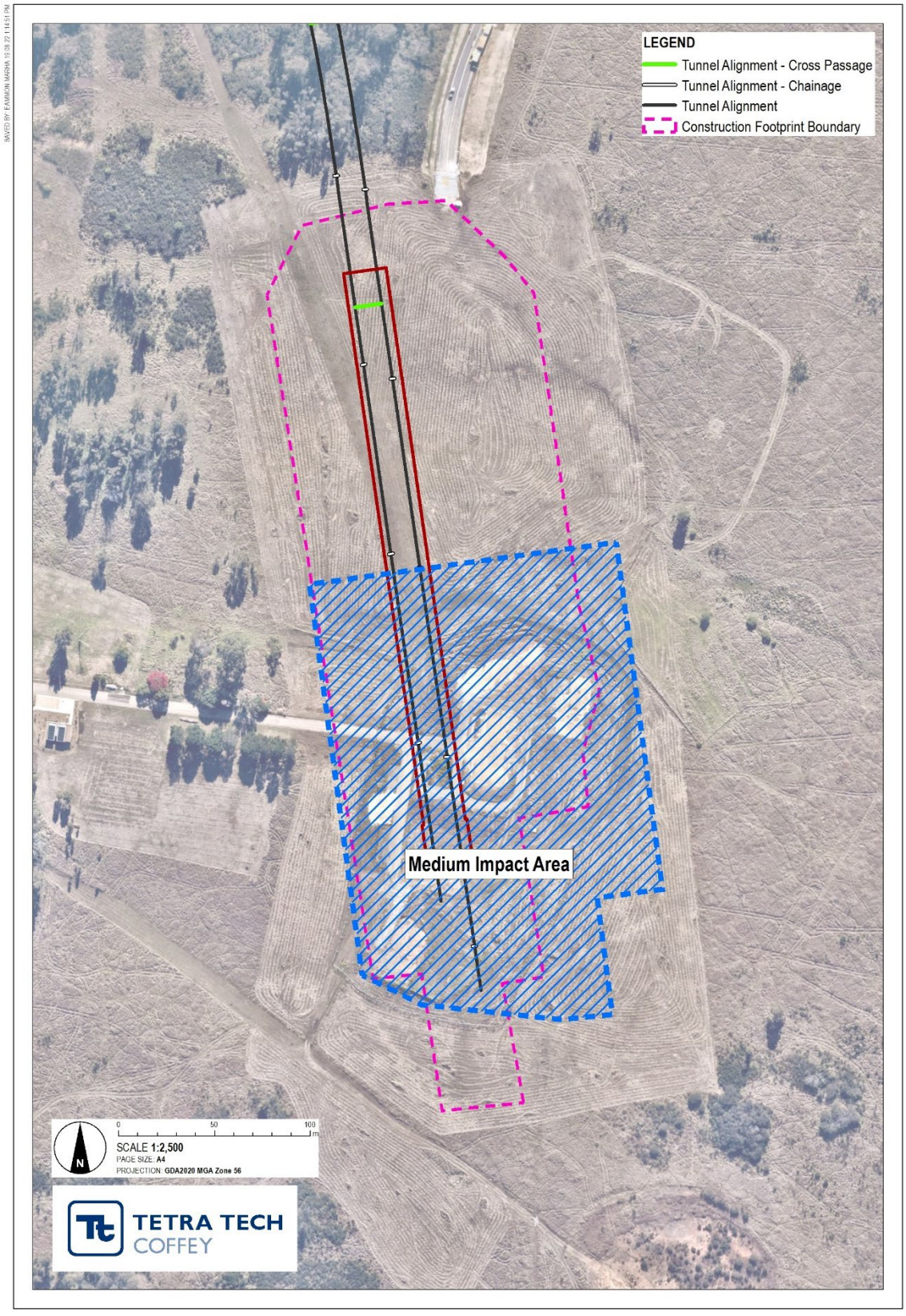


Figure 3-A Amended AEC Boundary based on TTC Memorandum

5. Project Description

5.1. Construction

The proposed layout of the Aerotropolis Site during construction is provided in Figure 1, Appendix 1.

In summary, the construction activities to be undertaken at the site include:

- Preliminary works[7] including:
  - Establishment of temporary offices, amenities, car parking and access roads for construction purposes.
  - Topsoil stripping
  - Erosion and Sediment Control Development including: swale drains, sediment basins, and the diversion drain
- Site levelling (refer to Figure 8, Figure 8A, Figure 8B, Figure 8C, Figure 8D).
- Piling and bulk excavation for the station box using rippers and rock hammers. The station box will be excavated to approximately 20 m bgs or 53 m AHD. Excavation of the station box is expected to generate approximately 132,000 m^3 (as a bank volume) of spoil which requires disposal off-site.
- Stub tunnel excavation using road headers.
- Retrieval of the Tunnel boring machine (TBM) within the station box.

For the SBT Works the station box will be a drained structure. A decision on whether the station box is to be undrained (tanked) is to be made by another contractor in-conjunction with Sydney Metro.

The tunnels and associated cross passages and stub tunnels are to be undrained (tanked). The tunnels and associated cross passages and stub tunnels are to be undrained (tanked).

Post completion of the SBT Works it has been assumed that the Aerotropolis Station site will be used for community and transportation purposes (train station) and will be predominately covered in hard landscaping (station site, buildings and carparking) with minimal soft landscaping (e.g. small garden bed in carpark with trees or shrubs)[8]. The specific layout of the proposed development post construction of the SBT Works was not available for consideration during this DSI.

5.2. Dewatering

An assessment of potential groundwater inflow during construction is reported in TTC (2022) ("the HIR") and summarised in the Groundwater Monitoring Plan (TTC, 2022a) ("the GMP"). The following is a summary from the GMP.

The Aerotropolis station box is approximately 200 m to the northwest of Thompsons Creek. Groundwater levels recorded at location SMGW-BH-D326 showed a 1.1 m rise in response to a heavy rainfall event in March 2021 with subsequent recovery to a level of 66.8 m AHD. Based on

[7] Preliminary works are to be undertaken in areas considered Low Risk (refer to Section 4) in advance of completion of the DSI.

[8] Note type of land use is analogous with a commercial/industrial landuse as defined in Schedule B7, Section 3.2.4 of the ASC NEPM.

these measurements a pre-development groundwater level of 67 m AHD was adopted for assessment of construction groundwater inflow and drawdown response.

Borehole logs for the area show thin residual soil cover over Bringelly Shale.

A sustained construction groundwater seepage inflow of 0.2 L/s is assessed, with a drawdown response limited to 450 m laterally from the station box. Drawdown greater than 1 m is assessed to occur within 300 m of the excavation.

5.3. Re-use of Excavated Material within the larger Airport Site

Suitable material that is excavated from the site will be used to fill parts of the site. Surplus excavated material will be transported for reuse as fill within the larger Western Sydney Airport (designated the 'FS01 site'), where such materials meet the requirements set out under the *Airport Environment Protection Regulations 1997* (AEPR) (refer Table 7.3; Appendix 3).

Material which cannot be re-used will be disposed off-site as waste.

6. Summary of Previous Investigations

Numerous previous investigations of the site have been undertaken between 2011 and 2022. A detailed summary was provided in the SAQP (TTMP, 2022b)

The scope of the previous investigations is summarised in Table 4 and the results are summarised in the following sections.

Table 4: Scope of Previous Investigations

Investigation	Former RAAF Receiving Station	Whole of Property	Aerotropolis Station Box	Aerotropolis Construction Footprint	New Access Road Aerotropolis to Badgerys Creek Road
Golder (2011a) Former RAAF Bringelly Receiving Station – Detailed Site Investigation	✓				
Golder (2011b) Hazardous Building Materials Assessment	✓				
Golder (2014) Bringelly Receiving Station – Remedial Action Plan	✓				
Thuroona Services and Western Environmental (2019) 215 Badgerys Creek Road, Bringelly, NSW, Detailed	✓	Note 1			
ERM (2021a) Aerotropolis Core Precinct – Review of contamination issues (preliminary final)		Note 1	✓		
ERM (2021b) Aerotropolis Core Precinct – Targeted site investigation		✓	✓		
AECOM (2021) Contamination Investigation Report - 215 Badgerys Creek Road, Bringelly, NSW					✓
Cardno (Nov, 2021); Contamination Assessment Report – Phase D/E, Sydney Metro Western Sydney Airport (Ref: 80021888; RevB, dated 22nd November 2021)			✓		
Cardno (May 2021); Contamination Assessment Report, Sydney Metro Western Sydney Airport (Ref: 80021888; dated 5th May 2021)			✓		
Golder & Douglas Partners (Feb 2021); Factual Contamination Report – Preliminary Site Investigation (Ref: 19122621-003-R-Rev3; Rev3; dated 19th February 2021).			✓		
GHD (2022) Sydney Metro Western Sydney Airport - Aerotropolis Station Box Compound Assessment			Note 2	✓	

Notes:

1. limited consideration to the whole of property (Lot 10 DP 1235662 and Lot 2714 DP 1128906)

2. The investigation undertaken by GHD was generally limited to soil materials less than 2 m bgs. Sampling from soil/rock materials which make up the bulk of the excavation for the station box was not undertaken.

6.1. Summary of Previous Investigations

Table 5 provides the maximum concentrations of COPOC identified in the previous investigations completed between 2019 and 2022.

Table 5: Maximum Concentration Report in Previous Investigations by Thuroona, AECOM, ERM and GHD

Analyte (mg/kg unless shown)	Thuroona 2019	AECOM 2021	ERM 2021	GHD 2022
Arsenic	NA	19	14	37
Cadmium	NA	ND	ND	ND
Chromium (III+VI)	NA	27	42	66
Copper	NA	39	42	60
Lead	NA	35	52	73
Mercury	NA	ND	ND	ND
Nickel	NA	13	17	65
Zinc	NA	79	101	202
TRH C6 - C10 Fraction F1	NA	ND	ND	ND
TRH C6 - C10 Fraction Less BTEX F1	NA	ND	ND	ND
TRH >C10 - C16 Fraction F2	NA	ND	ND	ND
TRH >C10 - C16 Fraction Less Naphthalene (F2)	NA	ND	ND	ND
TRH >C16 - C34 Fraction F3	NA	ND	ND	ND
TRH >C34 - C40 Fraction F4	NA	ND	ND	190
TRH C10 - C40 Fraction	NA	ND	ND	190
Benzene	NA	ND	ND	ND
Toluene	NA	ND	ND	0.7
Ethylbenzene	NA	ND	ND	ND
Xylenes (m & p)	NA	ND	ND	0.3
Xylene (o)	NA	ND	ND	ND
Xylenes (Total)	NA	ND	ND	0.3
Naphthalene	NA	ND	ND	ND
PAHs (Sum of total)	NA	ND	ND	ND
PFOS + PFHxS	0.035	0.0003	0.0191	0.84
PFOA	0.0023	ND	0.0009	0.005
Sum of PFAS Analytes	0.035	0.0003	0.0201	0.852

Notes: NA – not assessed; ND – non-detect. All values expressed in mg/kg.

Previous investigations of the Aerotropolis station box have been undertaken by Cardno and Golder Associates / Douglas Partners.

These investigations included soil/rock sampling from deep boreholes within the station box and are therefore more representative of materials to be excavated from the station box. Figure 5, Figure 5a and Figure 5b Appendix 1 shows the location of boreholes and test pits completed for these investigations.

Analytical data from the investigations completed by Cardno and Golder Associates / Douglas Partners is provided in Appendix 5.

Table 6: Summary of previous soil assessments – boreholes and monitoring wells

Report	Key Findings
Factual Contamination Report (Golder & Douglas Partners, Feb 2021)	• Ten boreholes (SMGW-BH-D107, SMGW-BH-D109, SMGW-BH-D109S, SMGW-BH-D206, SMGW-BH-D206S, SMGW-BH-D207, SMGW-BH-D207S, SMGW-BH-D208, SMGW-BH-D208S, SMGW-BH-D209 and SMGW-BH-D211) was drilled and sampled. The boreholes are located throughout the site
Contamination Assessment Report (Cardno, May 2021)	• Eleven boreholes (SMGW-BH-D308, SMGW-BH-D310, SMGW-BH-D321 to SMGW-BH-D329) were drilled and sampled. BH-D303 and located throughout the site • Two test pits (SMGW-TP-D301 and SMGW-TP-D303) were excavated and sampled. The test pits are located to the north side of the buildings on site
Contamination Assessment Report – Phase D/E (Cardno, Nov 2021)	• Two boreholes (SMGW-BH-D321S and SMGW-BH-D323S) were drilled and sampled. The boreholes are located to the north west of the buildings on site

6.1.1. Fill Materials

Fill material was observed in all previous investigation intrusive locations over the station box.

Review of soil descriptions provided in the logs from previous investigations indicates that the depth of fill between 0.1m to 1.0 m bgs across the Aerotropolis station box.

Fill was largely described as a brown, low plasticity clayey silt with roots. Visual / olfactory signs of contamination such as soil staining and hydrocarbon odours were not reported in the logs from previous investigations.

Table 7 summarises the laboratory analysis of fill samples collected during previous investigations.

Table 7: Fill Analytical Results

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	NEPM HIL-D	No. of Samples Exceeding NEPM HIL-D
Arsenic	35 / 33	<2	43	3000	Nil
Cadmium	35 / 0	<0.4	<1	900	Nil
Chromium (III+VI)	35 / 34	<5	160	3600	Nil
Copper	35 / 34	<5	140	240000	Nil
Lead	35 / 33	<5	140	1500	Nil
Mercury	25 / 1	<0.1	0.1	730	Nil
Nickel	35 / 33	<5	130	6000	Nil
Zinc	35 / 35	11	1300	400000	Nil
pH (aqueous extract)	17 / 17	5.9	8.3		-
TRH C6 - C10 Fraction F1	35 / 0	<10	<25	260	Nil
TRH C6 - C10 Fraction Less BTEX F1	35 / 0	<10	<25	260	Nil
TRH >C10 - C16 Fraction F2	35 / 0	<25	<50	20000	Nil
TRH >C10 - C16 Fraction Less Naphthalene (F2)	31 / 0	<50	<100	20000	Nil
TRH >C16 - C34 Fraction F3	35 / 3	<100	170	27000	Nil
TRH >C34 - C40 Fraction F4	35 / 0	<100	<100	38000	Nil
TRH C10 - C40 Fraction	35 / 3	<25	170		-
Benzene	35 / 0	<0.1	<0.2	3	Nil
Toluene	35 / 0	<0.1	<0.5	99000	Nil
Ethylbenzene	35 / 0	<0.1	<1	27000	Nil

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	NEPM HIL-D	No. of Samples Exceeding NEPM HIL-D
Xylenes (m & p)	35 / 0	<0.2	<2		-
Xylene (o)	35 / 0	<0.1	<1		-
Xylenes (Total)	35 / 0	<0.3	<3	81000	Nil
Naphthalene	35 / 0	<0.1	<0.5	11000	Nil
PAHs (Sum of total)	30 / 0	<0.05	<0.5	4000	Nil
Benzo(a)pyrene TEQ (upper bound)*	30 / 28	1.2	1.2	40	Nil
Total Halogenated Phenol*	9 / 0	<1	<1		-
Total Non-Halogenated Phenol*	9 / 0	<20	<20		-
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	33 / 0	<0.0001	<0.005		-
Perfluoropentanoic acid (PFPeA)	33 / 0	<0.0001	<0.005		-
Perfluorobutane sulfonic acid (PFBS)	33 / 0	<0.0001	<0.005		-
Perfluorooctanesulfonic acid (PFOS)	37 / 20	<0.0001	0.01		-
Perfluorooctanoate (PFOA)	37 / 3	<0.0001	0.0033		-
Perfluorohexanesulfonic acid (PFHxS)	37 / 1	<0.0001	0.0005		-
Perfluorohexanoic acid (PFHxA)	33 / 1	<0.0001	0.0002		-
Perfluorooctanesulfonamide (PFOSA)	33 / 1	<0.0002	0.0008		-
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	33 / 1	<0.0002	0.0014		-
Perfluoropropanesulfonic acid (PFPrS)	23 / 0	<0.0001	<0.005		-
Sum of PFHxS and PFOS (lab reported)	37 / 20	<0.0001	0.0101		-
Sum of PFASs (n=28)	33 / 12	<0.0001	0.0129		-
PCB (Sum of Total-Lab Reported)	23 / 0	<0.5	<0.5	7	Nil
1,2,4-trimethylbenzene	8 / 0	<0.5	<0.5		-

Note: Commercial/industrial guidelines include the NEPM HIL-D and HSL, and the CRC Care (2011) petroleum hydrocarbon HSLs for direct contact for commercial industrial workers. Minimum and maximum concentration values and NEPM HIL-D assessment thresholds expressed in mg/kg.

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 reported in fill materials over the Aerotropolis Site. ACM were observed in previous investigations. Three samples of fill material with positive detection of asbestos were reported in the Medium Risk Area and included:

- SMGW-BH-D211 (fragment)
- SMGW-BH-D327 (in two samples from 0.1 m).

Based on the available data fill material would potentially be classified General Solid Waste (GSW) or GSW-A (asbestos). No sample results returned Restricted Solid Waste (RSW) or Hazardous waste classes. No fill materials should be considered ENM based on the site investigation data and the detection of asbestos[9].

[9] The NSW EPA considers soil material with PFAS concentration <5 µg/kg as being within the ENM criteria with respect to PFAS analytes.

6.1.2. Natural Materials

Table 8 summarises the laboratory analysis of natural soil samples collected during previous investigations.

Table 8: Natural Materials Analytical Results

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	NEPM HIL-D	No. of Samples Exceeding NEPM HIL-D
Arsenic	179 / 157	<2	100	3000	Nil
Cadmium	179 / 2	<0.4	10	900	Nil
Chromium (III+VI)	179 / 167	<2	60	3600	Nil
Copper	179 / 177	<5	86	240000	Nil
Lead	179 / 175	<5	72	1500	Nil
Mercury	149 / 7	<0.1	0.3	730	Nil
Nickel	179 / 170	<4	68	6000	Nil
Zinc	179 / 179	13	180	400000	Nil
pH (aqueous extract)	143 / 143	5	10		-
TRH C6 - C10 Fraction F1	191 / 12	<10	31	260	Nil
TRH C6 - C10 Fraction Less BTEX F1	191 / 5	<10	25	260	Nil
TRH >C10 - C16 Fraction F2	191 / 3	<50	75	20000	Nil
TRH >C10 - C16 Fraction Less Naphthalene (F2)	184 / 3	<50	73.8	20000	Nil
TRH >C16 - C34 Fraction F3	191 / 5	<100	220	27000	Nil
TRH >C34 - C40 Fraction F4	191 / 1	<100	250	38000	Nil
TRH C10 - C40 Fraction	190 / 5	<50	470		-
Benzene	191 / 5	<0.1	0.2	3	Nil
Toluene	191 / 37	<0.1	3.4	99000	Nil
Ethylbenzene	191 / 33	<0.1	0.6	27000	Nil
Xylenes (m & p)	191 / 48	<0.2	5.5		-
Xylene (o)	191 / 38	<0.1	1.5		-
Xylenes (Total)	191 / 47	<0.3	7	81000	Nil
Naphthalene	206 / 42	<0.1	2.3	11000	Nil
PAHs (Sum of total)	160 / 20	<0.5	3.3	4000	Nil
Benzo(a)pyrene TEQ (upper bound)*	165 / 160	1.2	1.2	40	Nil
Total Halogenated Phenol*	10 / 0	<1	<1		-
Total Non-Halogenated Phenol*	10 / 0	<20	<20		-
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	303 / 1	<0.0001	0.0002		-
Perfluoropentanoic acid (PFPeA)	303 / 2	<0.0001	0.0004		-
Perfluorobutane sulfonic acid (PFBS)	303 / 24	<0.0001	0.0009		-
Perfluorooctanesulfonic acid (PFOS)	308 / 17	<0.0001	0.0017		-
Perfluorooctanoate (PFOA)	309 / 2	<0.0001	0.0002		-
Perfluorohexanesulfonic acid (PFHxS)	308 / 8	<0.0001	0.0011		-
Perfluorohexanoic acid (PFHxA)	303 / 2	<0.0001	0.0002		-
Perfluoropropanesulfonic acid (PFPrS)	271 / 2	<0.0001	0.0003		-
Sum of PFHxS and PFOS (lab reported)	308 / 18	<0.0001	0.0028		-
Sum of PFASs (n=28)	302 / 11	<0.0001	0.0032		-
PCB (Sum of Total-Lab Reported)	17 / 0	<0.1	<0.5	7	Nil
1,2,4-trimethylbenzene	28 / 2	<0.5	1.5		-

Note: Commercial/industrial guidelines include the NEPM HIL-D and HSL, and the CRC Care (2011) petroleum hydrocarbon HSLs for direct contact for commercial industrial workers. Minimum and maximum concentration values and NEPM HIL-D assessment thresholds expressed in mg/kg.

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

Based on the available data fill material would potentially be classified GSW and no sample results returned RSW or Hazardous waste classes. No natural materials would be considered VENM or ENM based on the site investigation data and the positive detection of PFAS.

Cardno (2021) Contamination Assessment Report – Phase D/E has noted that PFAS results in natural materials may be attributed to false positives. TTMP considers that whilst false positive PFAS detections are possible in natural materials, the presence of trace level PFAS in these materials cannot be precluded. As such, the detection of trace PFAS in natural materials may not solely be attributed to false positives.

Visual and/or olfactory signs of hydrocarbon contamination were not reported in the bore logs from previous investigations.

6.1.3. Groundwater

6.1.3.1. Groundwater Levels

Figure 4-A shows the locations where groundwater level measurements have been collected near the Aerotropolis Core Station.

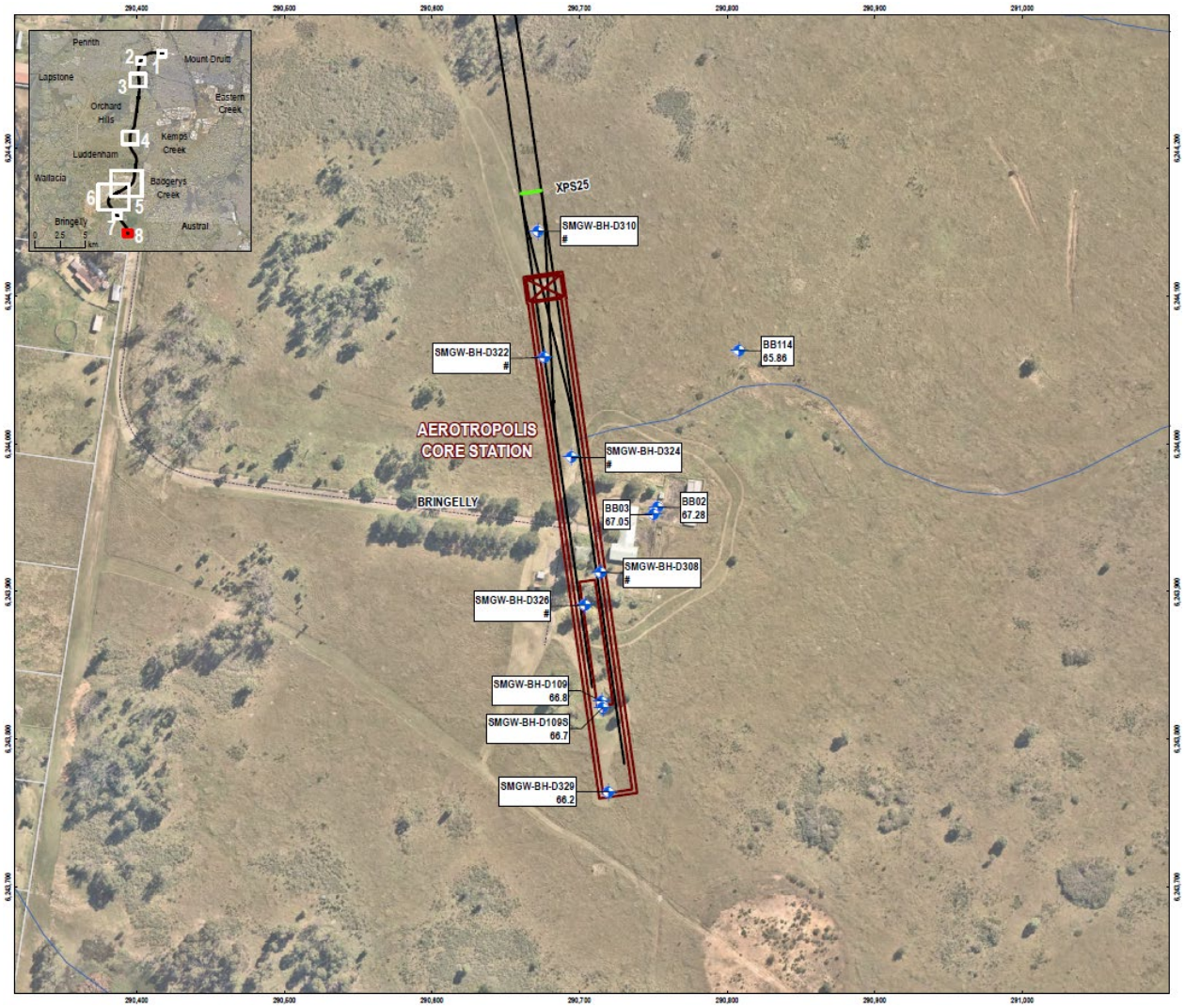


Figure 4-A Groundwater Monitoring Locations

Construction details and typical groundwater water levels recorded in the vicinity of the Aerotropolis Core Station are summarised Table 9.

Table 9: Groundwater monitoring construction details – Aerotropolis Core Station

BH ID	Surface Level (m AHD)	Screen Level (m AHD)	Unit	Typical Water Level (m AHD)	Water level Range (m AHD)
SMGW-BH-D109S	72.4	63.45 to 66.45	Interbedded Siltstone and Sandstone	66.6	66.5 to 66.7
SMGW-BH-D109	72.6	52.6 to 61.6	Siltstone	66.7	66.6 to 66.8
SMGW-BH-D308	73.35	61.85 to 67.85 (64.35 to 70.35)*	Siltstone / Sandstone	66.17	66.17
SMGW-BH-D310	71.55	59.85 to 65.85 (62.55 to 68.55)*	Siltstone	67.5	67.5

BH ID	Surface Level (m AHD)	Screen Level (m AHD)	Unit	Typical Water Level (m AHD)	Water level Range (m AHD)
SMGW-BH-D322	72.12	60.62 to 66.62 (62.12 to 68.12)*	Siltstone	Information not available	
SMGW-BH-D324	71.23	61.23 to 67.23 (67.23 to 70.23)*	Shale / Interbedded Siltstone and Sandstone	66.91	66.91
SMGW-BH-D326	74.18	60.18 to 66.18 (70.18 to 73.18)*	Siltstone / Interbedded Siltstone and Sandstone	66.43	66.43
SMGW-BH-D329	69.19	59.69 to 64.69 (65.19 to 68.19)*	Interbedded Siltstone and Sandstone / Shale / Dolerite / Sandstone	66.19	66.19
BB02	71.7	59.7 to 65.7	Information not available	67.28	67.28
BB03	71.9	59.9 to 65.9	Information not available	67.05	67.05

Note: * Construction details shown in Table 3.1 (SWMGW Monitoring Well Summary) contained in the Groundwater Monitoring Report (Cardno 2021) where these differ from the construction logs

Groundwater monitoring wells were installed within the Property by GHD (2022), ERM (2021) and Thuroona (2019). Table 10 provides a summary of the wells installed. Groundwater elevation data has not been included on the basis that no survey data and / or groundwater elevation data has been provided for these wells.

Table 10: Groundwater monitoring construction details – GHD (2022), ERM (2021) and Thuroona (2019)

BH ID	Surface Level (m AHD)	Screen Level (m bgs)	Screen Level (m AHD)	Unit
SMWSA_GHD_MW01	67.731	4 to 7	63.73 to 60.73	SHALE, weathered
SMWSA_GHD_MW02	69.174	4 to 8	65.17 to 61.17	SHALE, weathered
SMWSA_GHD_MW03	70.259	8 to 11	62.26 to 59.26	SHALE, weathered
SMWSA_GHD_MW04	72.623	11 to 14	61.62 to 58.62	SHALE, weathered
SMWSA_GHD_MW05	71.11	8 to 11	63.11 to 60.11	SHALE, weathered
SMWSA_GHD_MW06	72.111	8 to 11	64.11 to 61.11	SHALE, weathered
MW1_Thuroona_2019	Not provided	3 to 6	Not surveyed	Silty CLAY to SHALE
MW2_Thuroona_2019	Not provided	3 to 6	Not surveyed	Silty CLAY to SHALE
MW201_ERM_2021	Not provided	9 to 12	Not surveyed	SHALE, weathered
MW202_ERM_2021	Not provided	17 to 20	Not surveyed	SHALE
MW203_ERM_2021	Not provided	7 to 10	Not surveyed	SHALE, weathered
MW204_ERM_2021	Not provided	16 to 19	Not surveyed	SHALE, weathered

BH ID	Surface Level (m AHD)	Screen Level (m bgs)	Screen Level (m AHD)	Unit
MW205_ERM_2021	Not provided	7 to 10	Not surveyed	SHALE, weathered
MW206_ERM_2021	Not provided	7 to 10	Not surveyed	SHALE, weathered

6.1.3.2. Groundwater Quality

The COPC concentrations recorded in the previous investigations completed between 2020 and 2021 at the site are summarised in Table 11.

Table 11: Groundwater contamination summary – Aerotropolis Site

Parameter	ANZG (2018) Freshwater 95%	Units	Bedrock Aquifer			Comment
			No. wells / samples	Minimum	Maximum	
Ammonia (as N)	900	µg/L	9/26	30	4,140	Average 2,100 µg/L. Concentrations exceeded in all wells except SMGW-BH-D329 & SMGW-BH-D208
Nitrate (as NO3)	500	µg/L	9/26	<10	2,070	Intermittently exceeded at SMGW-BH-D109S
Aluminium (filtered)	55	µg/L	5/19	<10	20	-
Arsenic (filtered)	50 [1]	µg/L	7/21	<10	15	-
Cadmium (filtered)	0.2	µg/L	7/21	<0.1	0.2	Detection in single round at SMGW-BH-D109S
Copper (filtered)	1.4	µg/L	7/21	<1	10	57% of wells reported at least one criteria exceeded
Nickel (filtered)	11	µg/L	7/21	<1	495	Average of 30 µg/L 57% of wells reported at least one criteria exceeded
Zinc (filtered)	8	µg/L	7/21	<5	59	Six of the seven wells monitored exceeded criteria in at least one round.
Iron (filtered)	1,000 [1]	µg/L	7/23	<50	4,580	Criteria exceeded at SMGW-BH-D109
Manganese (filtered)	1,900	µg/L	7/21	44	5,450	Average of 53 µg/L Criteria exceeded only at SMGW-BH-D208
TPH C6-C9	150 [1]	µg/L	5/8	<20	90	Detectable concentration reported in SMGW-BH-B322
Benzene	950	µg/L	8/9	<1	<1	-

Parameter	ANZG (2018) Freshwater 95%	Units	Bedrock Aquifer			Comment
			No. wells / samples	Minimum	Maximum	
Toluene	300 [1]	µg/L	8/9	<1	44	Detectable concentrations at SMGW-BH-D322, SMGW-BH-D324K SMGW-BH308 and SMGW-BH-D208
TPH C10-C16		µg/L	8/8	<50	<50	-
TPH C16-C34		µg/L	8/8	<100	<100	-
Acetone	-	µg/L	8/8	<1	2	Detectable concentrations reported at four of seven wells.
Chlorinated VOCs	(DCM 2,000 [2])	µg/L	5/6	<LOR	0.21	Dichloromethane detected at three locations.
Herbicides & pesticides		µg/L	11/8	<0.2	0.01	DDD detected at three locations. May be present at low concentrations in other wells with high LOR.
Sum of PFAS [3]	-	µg/L	10/9	<0.001	0.007	PFAS detected in SMGW-BH-D324 and SMGW-BH-D308. No concentrations exceed PFOS or PFNA criteria.
Herbicides and pesticides		µg/L	5/7	<LOR	0.01	Low concentrations of DDD detected in four wells

[1] Airports (Environmental Protection) Regulations 1997 – Freshwater

[2] ANZG (2018) Freshwater (unknown reliability) toxicant DGVs

[3] PFAS NEMP 2.0 (2018) (99% freshwater ecosystem protection)

Table 12 provides a summary of groundwater data for monitoring wells outside the station box from GHD (2022), ERM (2021) and Thuroona (2019). The location of these monitoring wells is shown in Figure 7, Appendix 1. Other organic potential contaminants of concern (PCOC) were not detected in groundwater samples from these monitoring wells.

An elevated concentration of TRH was detected in MW04 (GHD, 2022). Other potential organic contaminants of concern which are often associated with the detection of TRH were not detected including BTEX and PAHs.

Hydrocarbon odours and elevated PID readings were not reported in the bore log from MW04. It is considered that the result from MW04 is potentially a false positive from naturally occurring organic matter and requires further investigation.

Table 12: Maximum reported concentration in GHD (2022), ERM (2021) and Thuroona (2019) (µg/l)

BH ID	TRH C10-C40	BTEXN	PFOS+PFHxS	PFOA	Total PFAS
SMWSA_GHD_MW01	ND	ND	ND	ND	ND
SMWSA_GHD_MW02	ND	ND	ND	ND	ND
SMWSA_GHD_MW03	ND	ND	ND	ND	ND
SMWSA_GHD_MW04	1340	ND	ND	ND	0.17

BH ID	TRH C10-C40	BTEXN	PFOS+PFHxS	PFOA	Total PFAS
SMWSA_GHD_MW05	300	2	ND	ND	ND
SMWSA_GHD_MW06	ND	ND	ND	ND	ND
MW1_Thuroona_2019	NA	NA	ND	ND	ND
MW2_Thuroona_2019	NA	NA	ND	ND	ND
MW201_ERM_2021	NA	NA	ND	ND	ND
MW202_ERM_2021	NA	NA	ND	ND	0.02
MW203_ERM_2021	NA	NA	ND	ND	ND
MW204_ERM_2021	NA	NA	ND	ND	ND
MW205_ERM_2021	NA	NA	ND	ND	ND
MW206_ERM_2021	NA	NA	ND	ND	ND

Notes: NA – not assessed; ND – not detected.

6.2. Surface Water / Sediment

Surface water and/or sediment samples were collected from previous investigations undertaken by GHD (2022) and ERM (2011). Figure 5-A shows a selection of key sampling points from previous investigations which include:

- Moores Gully – samples from this area are topographically higher than the receiving station and are potentially representative of surface water discharged to the Property from properties located to the east.
- Thompsons Creek (Upstream) – samples from this area are potentially representative of surface water in Thompsons Creek upstream of the Property, and surface water / groundwater discharged to Thompsons Creek from the southern portion of the Property
- Drainage Line Downstream of Receiving Station – samples from this area are from a drainage line down slope of the receiving station and will receive contaminated runoff discharged from the receiving station area.
- Thompsons Creek (Downstream) – samples from this area are potentially representative of surface water in Thompsons Creek adjacent to, and downstream of the Property.

The maximum concentrations of PFAS reported in surface water and/or sediment samples from these investigations is provided in Tables 13 to 16.

In summary, the positive detection of PFAS at the samples locations from Moores Gully and Thompsons Creek (Upstream) indicate that there is potential for off-site sources of PFAS. This finding was also reported in ERM (2021a).

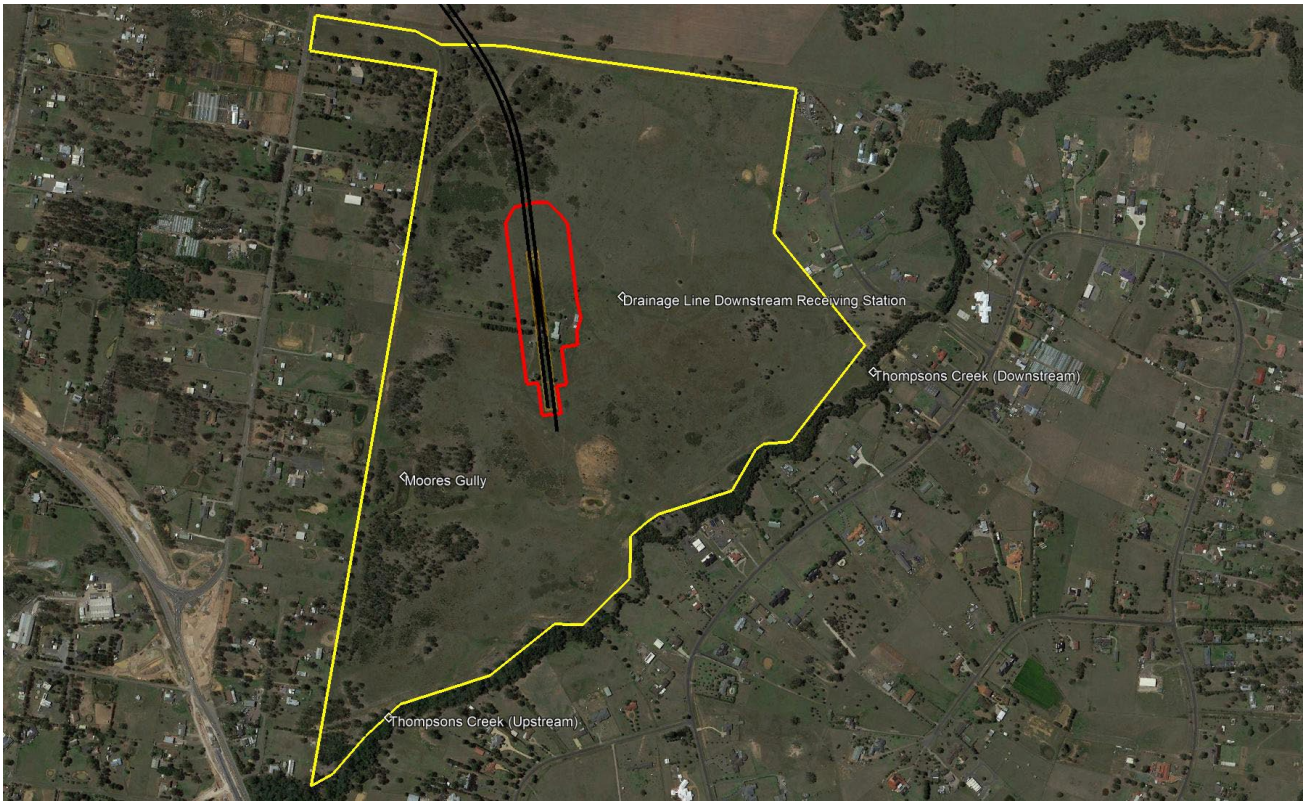


Figure 5-A Surface Water Sampling Locations

Table 13: Surface Water PFOS results (µg/l)

Analyte	ERM 2021	GHD 2021
Moore Gully (western upstream boundary of site)	Not detected	-
Thompsons Creek (western upstream boundary of site)	-	-
Drainage line downstream of receiving station	-	0.28
Thompsons Creek (eastern downstream boundary of site)	0.02	-

Table 14: Sediment PFOS results (mg/kg)

Analyte	ERM 2021	GHD 2021
Moore Gully (western upstream boundary of site)	0.0013	-
Thompsons Creek (western upstream boundary of site)	0.0006	-
Drainage line downstream of receiving station	-	0.0212
Thompsons Creek (eastern downstream boundary of site)	0.0018	-

Table 15: Total PFAS (µg/L)

Analyte	ERM 2021	GHD 2021
Moore Gully (western upstream boundary of site)	Not detected	-
Thompsons Creek (western upstream boundary of site)	-	-
Drainage line downstream of receiving station	-	0.53
Thompsons Creek (eastern downstream boundary of site)	0.11	-

Table 16: Total PFAS (mg/kg)

Analyte	ERM 2021	GHD 2021
Moore Gully (western upstream boundary of site)	0.0013	-
Thompsons Creek (western upstream boundary of site)	0.0006	-
Drainage line downstream of receiving station	-	0.0237
Thompsons Creek (eastern downstream boundary of site)	0.0018	-

6.3. 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, including an investigation in February 2022 and an investigation post demolition in May 2022.

Tabulated data from the GHD Investigation in 2022 is provided in **Appendix 10**, and investigation locations shown in Figure 8, Figure 8A, Figure 8B and Figure 8C in **Appendix 1**.

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, 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 1.** Annotated photographs of USTs and septic tank excavations showing the location of post demolition samples are included in the GHD (2022).

Post demolition investigation locations completed by GHD are summarised in Table 17.

Table 17: 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

Historical Site Feature	GHD Building No.	Post Demolition Sample Locations
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 investigation including the post demolition sampling 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/OPPs, PFAS and VOCs were within the adopted guidelines for future land use 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. 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 land use 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

  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 (ACM and fines) 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.

6.4. Overall Summary

In summary, previous investigations confirmed the presence of PFAS in fill and natural soil / rock materials and in groundwater, surface water and sediment. Based on GHD (2022) and ERM (2021) multiple areas have been identified with elevated concentrations of PFAS in soils. PFAS in this area is considered likely to be derived from firefighting foams historically used at the receiving station. Off-site sources of PFAS are also potentially present.

Previous investigations relating to the USTs did not detect hydrocarbon impact in boreholes and monitoring wells surrounding the USTs. Visual and olfactory signs of contamination were not observed in the USTs pit and septic tank pit excavations following removal. Post demolition and UST removal sampling was completed by GHD and did not identify hydrocarbon contamination of concern in residual soil materials.

ACM has previously been reported in soil materials at the receiving station area and other areas including areas where buildings have previously been demolished.

A contaminated stockpile was previously located south of the receiving station and was removed as part of the demolition / remediation work undertaken.

7. Preliminary Conceptual Site Model and Data Gaps

7.1. Preliminary Conceptual Site Model

Based on the findings of previous investigations completed, the following Preliminary Conceptual Site Model (PCSM) was developed for the site, as presented in Table 18.

Post-completion of the demolition works by Sydney Metro, potential **primary sources** of contamination which are assumed to be present include PFAS contamination in soil, fill material, and demolition materials from historical buildings outside those removed within the demolition / remediation area.

It has been assumed that during the demolition and removal of infrastructure (including but not limited to USTs, pipes, workshops, flammable good storage, etc.) soil materials with visual / olfactory signs of contamination and ACM were removed.

Other potential **sources** of contamination potentially include off-site sources of PFAS which are discharging to the site and Thompsons Creek.

Contamination present in soil and other environmental media including groundwater as a result of the primary source are considered as a **secondary sources of contamination**.

Once in soil, contamination has the potential to be distributed through **transportation pathways** such as erosion and deposition (wind and water) and the leaching / migration of contaminants in groundwater and surface water, and construction activities which involve the movement of soil materials during the construction of the project.

Transportation pathways can also be considered as secondary sources of contamination (e.g., contamination in groundwater). During construction of the station box, contamination in groundwater has the potential to be drawn into the station box which requires management during construction.

Receptors could potentially be exposed to contaminants derived from the disturbance of contaminants present in within soil and groundwater, through disturbance of hazardous building materials, and through inhalation of gasses / vapours.

Potential receptors considered applicable during construction/operation works at the Aerotropolis Site include:

- 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 site.
- General public including persons who could be subject to contaminated media generated during redevelopment (e.g. dust) and future users of the site during its operational phase;
- Ecological receptors including terrestrial/aquatic flora and fauna; and
- Groundwater and surface water receptors.

Table 18: Preliminary Conceptual Site Model

Potential Contamination Source	Contaminants of Potential Concern and Affected Media	Media	Plausible Exposure Pathways & Transport Mechanisms	Receptors
Uncontrolled Fill Material	TRH, BTEX, heavy metals, PAH, pesticides (OCP/OPP), PCB and asbestos	Fill/soil materials	Inhalation of soil and fibres Ingestion of soil Dermal contact Plant Uptake Infiltration Lateral Groundwater Migration Surface Water Flow	Workers involved with the site construction work and maintenance of the rail infrastructure 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 site. General public including persons who could be subject to contaminated media generated during redevelopment, including those accessing the station Ecological receptors including terrestrial/aquatic flora and fauna Groundwater and surface water receptors.
Demolition materials form Previous Buildings and Structures	Asbestos and lead (lead-based paint)	Fill/soil materials	Inhalation of soil and fibres Ingestion of soil Plant uptake	
Off-Site sources of PFAS	PFAS	Fill/soil/rock Surface water Groundwater Terrestrial/aquatic flora and fauna	Inhalation of dust, vapour and fibres Ingestion of soil Dermal contact Plant Uptake Infiltration Lateral Groundwater Migration Surface Water Flow Bio-accumulation and magnification.	

Notes:
OCP: organochlorine pesticides
OPP: organophosphate pesticides
Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc.
TRH: Total Recoverable Hydrocarbons.
BTEX: Benzene, Toluene, Ethylbenzene, Xylene.
PAH: Polycyclic Aromatic Hydrocarbons.
PCB: Polychlorinated Biphenyls.

7.2. Data Gaps Identified

Based on the observations made during the site walkover and previous investigations, the data gaps and uncertainties identified at the time of the preparation of the SAQP are summarised in Table 19.

Data gaps 1 to 8 relate to Potential Areas of Concern (PAoC) associated with elevated concentrations of PFAS that were reported on the site in previous investigations. The location of the PAoCs are shown in Figure 6 and Figure 6A in Appendix 1.

For investigation planning purposes, concentrations greater than 0.005 mg/kg were interpreted as potential PFAS source areas.

Table 19: Data Gaps

Data Gap	Description
PAoC_01	**Former Flammable Storage:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_TP46, and TP26_Thuroona_2019. The vertical and horizontal extent of PFAS in this area has not been defined.
PAoC_02	**Former Fire Hose Shed:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_BH29, SMWSA_GHD_BH30 and SMWSA_GHD_MW06. The vertical and horizontal extent of PFAS in this area has not been defined.
PAoC_03	**Former Garage:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_TP52. The vertical and horizontal extent of PFAS in this area has not been defined.
PAoC_04	**South of Former Receiving Station:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_TP62. The vertical and horizontal extent of PFAS in this area has not been defined.
PAoC_05	**South East of Former Receiving Station:** an elevated concentration of PFAS is reported in the inter-laboratory duplicate soil in SMWSA_GHD_TP74 and was orders of magnitude higher than the result from the primary laboratory. Further investigation is required to confirm the concentration of PFAS reported and whether elevated concentrations are present.
PAoC_06	**Former Stockpile:** elevated concentrations of PFAS, ACM and other potential contaminants have been reported in previous investigations. The vertical and horizontal extent of PFAS and other potential contaminants beneath the land where the stockpile while located has not been investigated.
PAoC_07	**East of Workshop:** elevated concentrations of PFAS reported in soil in BH211_ERM_2021. This location is down-slope of PAoC01 to PAoC3. Only one sample location is available at this location and the previous result reported should be confirmed as it may indicate the potential horizontal extent of PFAS contamination extends out to the east.
PAoC_08	**North eastern drainage lines:** elevated concentrations of PFAS reported in soil/sediment/surface water in SMWSA_GHD_TP43, SMWSA_GHD_MW06 and SMWSA_GHD_SW01/SED01. The vertical and horizontal extent of PFAS in this area has not been defined.
PAoC_09	**Former Fire Pump House:** the use of the pump house may be associated with AFFF / PFAS. The potential for contamination in the vicinity of the pump house has not been investigated previously.
PAoC_010	**Former Incinerator:** the area where the former incinerator was located has not been previously investigated. There is potential for contamination in this area.
PAoC_011	**Demolition Area:** if improperly managed, demolition / remediation activities undertaken in 2022 have the potential to mobilise and spread contamination (e.g., PFAS, ACM, and hydrocarbons) from potential source areas. Investigation within the demolition / remediation areas was recommended to provide a new baseline for this area.

Data Gap	Description
PAoC_012	**Demolition Area with Hydrocarbon Odours:** an area with soil material with kerosene odours was observed during demolition / remediation activities. Investigation is required to establish whether hydrocarbons are present in this area.
MW04	Previous investigation (GHD, 2022) reported elevated TRH concentrations in the groundwater sample from MW04 (1.34 mg/l C10-C40). Other potential organic contaminations of concern (e.g., BTEX, PAH, Phenols, other VOC/SVOCs) were not detected and no hydrocarbon odours were reported in bore logs. The result is potentially a false positive and should be investigated through further groundwater investigation and TRH fingerprint analysis.
Organic false positives	Organic false positives (e.g., TRH/BTEX) have been reported in natural materials in previous investigations. Further investigation is required to investigate the potential for false positives associated with organic potential contaminants of concern.
Groundwater Levels and Quality	Further groundwater wells were recommended to confirm groundwater flow direction and quality, and groundwater which may be drawn into excavations.

The following assumptions were made during the development of the SAQP in regard to potential data gaps which are not considered to require investigation:

- **Demolition Areas and ACM**: It is assumed that post demolition sampling for ACM was previously completed for the demolition / remediation works and is not required for the DSI. However, as a precautionary measure the presence of asbestos was assessed in this DSI.
- **Former USTs, Septic Tanks, Workshops and other infrastructure**: It is assumed that in association with the removal of infrastructure from the site as part of demolition works, contaminated soil materials (if present) which were associated with the infrastructure were remediated and / or disposed off-site. It is assumed that validation sampling was previously undertaken for the demolition / remediation areas.
- **Former marine quarters**: ACM has been reported in samples from previous investigations at the former Marine Quarters. This area is outside the construction footprint, and it is assumed that ACM contamination in this area (if present) will be managed separate to the SBT Works.
- **PFAS within the Property**: PFAS has been reported in previous investigations in soil, sediment, surface water and groundwater throughout the site. The DSI will consider the potential for contaminated groundwater to be drawn into the excavation, however, the management of PFAS in soil / water outside the construction footprint is outside the scope of the DSI and SBT Works.

8. Adopted Assessment Criteria

8.1. General

To assess the significance of contaminant concentrations in soil, reference was primarily made to NEPM 2013, specifically 'Schedule B1 Guideline on Investigation Levels for Soil and Groundwater' (Schedule B1) for assessment criteria, where available. Schedule B1 provides a framework for the use of investigation and screening levels based on human health and ecological risks. In the absence of relative criteria in NEPM 2013, reference was made to other appropriate state, national or international guideline.

Schedule B1 states that '*the selection and use of investigation levels should be considered in the context of the iterative development of a Conceptual Site Model*'. Based on the information and drawings provided, TTMP has considered that the development of the assessment area will include a number of different receptor groups, including:

- Workers involved with the Site work;
- General public including persons who could be subject to contaminated media generated during redevelopment (e.g., dust);
- Ecological receptors including terrestrial flora and fauna; and
- Groundwater and surface water receptors.

Given the proposed use of the site, commercial / Industrial land use criteria and intrusive maintenance workers was adopted.

8.2. Soil

8.2.1. Health Based Criteria

Soil health investigation levels (HILs) and soil health screening levels (HSLs) for vapour intrusion (where applicable) were adopted from Schedule B1 of NEPM 2013 for commercial/industrial land CLAY 0 to <1m.

Direct Contact criteria for petroleum hydrocarbons was adopted from CRC CARE 2011 for commercial/industrial land.

Human health-based guidance values for direct contact were adopted from PFAS NEMP (HEPA 2020) for commercial/industrial land.

8.2.2. Asbestos

For asbestos in soil, a screening level of 0.1g/kg (0.01 % w/w equivalent) was adopted based on the laboratory detection limit for analysis of asbestos in non-homogenous samples using the methodology outlined in Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples (AS4964-2004). Furthermore, where trace analysis was carried out during analysis, an assessment criterion of 'no respirable fibres' was adopted; a detection of respirable fibres would indicate an exceedance of the assessment criteria.

8.2.3. Management Limits

In accordance with Section 2.9 of Schedule B1 of the ASC NEPM, consideration of Management Limits for petroleum hydrocarbons was also considered where appropriate. The Management Limits consider the potential for accumulation of explosive vapours, the potential risk to buried infrastructure, or the formation of phase separated hydrocarbons (PSH).

8.2.4. Ecological Criteria

To assess the impact on site vegetation and animals from contamination within the upper 2 m of the subsurface, ASC NEPM Schedule B1 presents ecological investigation levels (EILs) and ecological screening levels (ESLs) for different settings (e.g., areas of ecological significance, urban residential / public open space and commercial).

Section 3.5.1 of Schedule 5a of NEPM states that the aim of the EILs is that varying levels of protection will be provided to the following ecological receptors at all sites:

- 'Biota supporting ecological processed including microorganisms and soil invertebrates
- Native flora and fauna
- Introduced flora and fauna
- Transitory or permanent wildlife.

Consideration was given to the commercial / industrial ecological investigation levels (EIL) and Ecological Screening Levels (ESL) where appropriate.

Generic EILs were adopted for lead, arsenic, DDT and naphthalene while site specific EILs for copper, chromium, nickel and zinc were calculated using an average of relevant soil parameters.

These are the arithmetic mean of measured physico-chemical properties of the samples collected in the GHD investigation which were collected from natural soil materials at the northern and southern end of the Aerotropolis site:

- CEC: 8.7 meq/100g (range of 5.1-14.2)
- pH: 6.3 (range of 4.8 to 9.6)
- Clay content: 36% (range of 18 to 50%)

These soil samples and areas are considered appropriate for derivation of EILs as the materials are from natural soils and generally outside land historically used by Defence.

In calculating the EILs average ambient background concentrations were calculated from soil results in the northern and southern ends of the site. Where a concentration reported was a the limit of reporting (LOR), the equivalent LOR concentration was adopted.

EILs adopted are summarised in Table 20.

TTMP conducted a review of the background documents used to derive the ecological screening levels (ESLs) for benzo(a)pyrene as prescribed in Schedule B1 of the ASC NEPM 2013. The review identified that the ESLs were heavily based on the 1999 Canadian Soil Quality Guideline (SQG) values (Warne, 2010). Due to the availability of a significant amount of new toxicity data, the Canadian values were revised in 2010 (CCME, 2010), however these revisions were not considered in the ASC NEPM 2013.

As such, TTMP considers that the low reliability ESLs prescribed in Schedule B1 of the ASC NEPM 2013 are now outdated and as such the Canadian Soil Quality Guidelines for Environmental Health (SQGE) have been adopted (CCME, 2010) for this assessment. The Canadian SQGEs for B(a)P (72 mg/kg) for commercial / industrial land use) has been derived based on a similar methodology

to that prescribed in Schedule B5b of the ASC NEPM 2013 (i.e., based on the species sensitivity distribution approach).

Ecological criterial adopted from the PFAS NEMP in soil include:

- direct exposure (all landuses)
- indirect exposure for intensively developed sites with no secondary consumers and minimal potential for indirect exposure.

Table 20: Adopted EILs for commercial/industrial land

Potential Contaminant	Adopted EIL	Assumption
Zinc	410	Based on the sum of the Aged Contamination Limits (ACL) and Ambient Background Concentration (ABC) where: • ACL = 360 mg/kg (CEC of 5 meq/100g and pH of 6) • ABC = 52 mg/kg (arithmetic mean of sample results)
Copper	170	Based on the sum of the ACL and ABC where: • ACL = 140 mg/kg (CEC of 5 meq/100g) • ABC = 29 mg/kg (arithmetic mean of sample results)
Chromium III	675	Based on the sum of the ACL and ABC where: • ACL = 660 mg/kg (> 10% clay content was assumed • ABC = 17 mg/kg (arithmetic mean of sample results)
Nickel	68	Based on the sum of the ACL and ABC where: • ACL = 55 mg/kg (CEC of 5 meq/100g • ABC = 13 mg/kg (arithmetic mean of sample results)
Lead	1800	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	2500	Based on the generic ESL for commercial/industrial land and coarse soils
TRH >C34-C40	6600	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

8.2.5. Material Classification Criteria

8.2.5.1. NSW EPA Waste Classification Criteria

Concentrations of chemical analytes tested were compared against contaminant threshold (CT) values, specific contaminant concentration (SCC) values and TCLP test values presented in *Waste Classification Guidelines Part 1: Classifying Waste* (NSW EPA, 2014) and *Addendum to the Waste Classification Guidelines (2014) – Part 1: Classifying Waste* (NSW EPA, 2016).

These criteria are considered relevant for waste spoil which is disposed of at landfill in NSW.

Asbestos is pre-classified as Special Waste (Asbestos Waste) under the NSW EPA Waste Classification Guidelines.

8.2.5.2. Virgin Excavated Natural Material (VENM)

The Protection of the Environment Operations Act 1997 defines VENM as:

> *'natural material (such as clay, gravel, sand, soil or rock fines):*
>
> *(a) that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and*
>
> *(b) that does not contain any sulfidic ores or soils or any other waste.*
>
> *and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved for the time being pursuant to an EPA Gazettal notice.'*

8.2.6. Off-Site Material Reuse

Consideration was also be made in regard to the classification of natural soil material as VENM and / or the management to natural soil materials under a Resource Recovery Order (RRO).

It is anticipated that separate material classification / resource recovery / exemption reports will be prepared for soil to be re-use or disposed off-site.

8.2.7. Re-Use within Larger Airport Site and Import Material

Material for potential re-use within the larger Western Sydney Airport Site (FS01) and import material were assessed against the criteria specified in Airport Environmental Protection Regulations 1997 (AEPR) and those for a future commercial / industrial land use, as shown in the result tables in Appendix 5.

8.3. Groundwater

The groundwater data has been compared to appropriate guidelines including, not limited to the following guidelines:

- Protection of human health:
  - NHMRC (2022) Australian Drinking Water Guidelines 6 2011, Version 3.7 (ADWG)[10].
- Groundwater from the site discharges to Thompsons Creek. Thompsons Creek has been assumed as a moderately disturbed creek system based on its location in a rural residential catchment. The following water quality guidelines have been adopted with consideration to these environmental values:
  - ANZG (2018) Freshwater Ecosystems guideline for 95% species protection level default guidelines values, and 99% species protection levels for chemicals that bioaccumulate.
  - ANZECC/ ARMCANZ (2000) guideline values for physical and chemical stressors;
  - HEPA (2020) PFAS National Environmental Management Plan, Version 2.0.

9. Sampling Methodology

9.1. Overview

The sampling strategy for the site was established with consideration of the guidance provided in the ASC NEPM (NEPC, 2013) and the NSW *Contaminated Sites: Sampling Design Guidelines* (NSW EPA, 1995) (NSW Sampling Guidelines) and in consideration of existing information (Section 6) and data gaps / uncertainties identified (Section 7).

This DSI was undertaken with input from two main work packages which included:

- Geotechnical/Hydrogeological intrusive investigation locations being undertaken by TTMP for CPBG (Geotechnical Program); and
- Contaminated land intrusive locations being undertaken by TTMP for CPBG (Contaminated Land Program).

This section summarises the sampling undertaken by TTMP to support the preparation of this DSI. Further detail is presented within the SAQP (TTC, 2022b).

9.2. Soil

The Aerotropolis Site construction footprint (not including potential temporary stockpile areas) is shown in Figure 1, Appendix 1 and has an area of approximately 5.5 hectares. For a site of this size (in excess of 5 ha) the NSW Sampling Guidelines does not prescribe a recommended number of sampling points given the size of the area but recommends that sites of this size should be sub-divided into smaller areas for more effective sampling. Sample locations were selected to broadly

[10] Groundwater is not being used for potable water supply at Aerotropolis. The ADWG has been adopted as a conservative screening criteria to infer whether there is a potential risk via the vapour inhalation pathway for volatile/semi-volatile contaminants.

characterise soils and bedrock at the site and to assess AECs that had previously been identified or suspected in the EIS and SAQP. Soil sampling undertaken by TTMP was considered to supplement previous investigations which had been undertaken for the SBT Project by Cardno, Golder Associates and Douglas Partners, and GHD.

The soil sampling locations undertaken by TTMP are shown in Figure 6 and 6A, Appendix 1 and are summarised in Table 21.

Table 21: Investigation Locations

Location	Method	Depth	Completion Date
SBT-BH-4011	Geotechnical Rig	24	4/08/2022
SBT-BH-4012	Geotechnical Rig	35	9/08/2022
SBT-BH-4013	Geotechnical Rig	35	8/08/2022
SBT-BH-4014	Geotechnical Rig	28	1/08/2022
SBT-BH-4015	Geotechnical Rig	35	22/07/2022
SBT-BH-4016	Geotechnical Rig	37	22/07/2022
SBT-BH-4019	Geotechnical Rig	37	28/07/2022
SBT-BH-4235	Geoprobe	2	1/06/2022
SBT-BH-4236	Geoprobe	2	20/06/2022
SBT-BH-4237	Geoprobe	2	31/05/2022
SBT-BH-4238	Geoprobe	1	1/06/2022
SBT-BH-4239	Geoprobe	1	20/06/2022
SBT-BH-4240	Geoprobe	1	20/06/2022
SBT-BH-4241	Geoprobe	1	1/06/2022
SBT-BH-4242	Geoprobe	1	2/06/2022
SBT-BH-4247	Geoprobe	1	5/06/2022
SBT-BH-4248	Geoprobe	1	5/06/2022
SBT-BH-4249	Geoprobe	1	5/06/2022
SBT-BH-4251	Geoprobe	1	5/06/2022
SBT-BH-4252	Geoprobe	1	5/06/2022
SBT-BH-4253	Geoprobe	1	2/06/2022
SBT-BH-4254	Geoprobe	1	21/06/2022
SBT-BH-4255	Geoprobe	1	21/06/2022
SBT-BH-4256	Geoprobe	1	2/06/2022
SBT-BH-4257	Geoprobe	1	21/06/2022
SBT-BH-4258	Geoprobe	1	2/06/2022
SBT-BH-4259	Geoprobe	1	21/06/2022
SBT-BH-4260	Geoprobe	1	6/06/2022
SBT-BH-4261	Geoprobe	1	21/06/2022
SBT-BH-4262	Geoprobe	1	22/06/2022
SBT-BH-4263	Geoprobe	1	2/06/2022
SBT-BH-4264	Geoprobe	1	6/06/2022
SBT-BH-4265	Geoprobe	1	22/06/2022
SBT-BH-4266	Geoprobe	1	22/06/2022
SBT-BH-4267	Geoprobe	1	22/06/2022
SBT-BH-4268	Geoprobe	1	22/06/2022
SBT-BH-4269	Geoprobe	1	23/06/2022
SBT-BH-4270	Geoprobe	1	23/06/2022
SBT-BH-4271	Geoprobe	1	23/06/2022
SBT-BH-4272	Geoprobe	1	23/06/2022
SBT-BH-4273	Geoprobe	1	23/06/2022
SBT-BH-4274	Geoprobe	1	24/06/2022
SBT-BH-4275	Geoprobe	1	24/06/2022
SBT-BH-4277	Geoprobe	1	31/05/2022
SBT-BH-4280	Geoprobe	1	27/05/2022
SBT-BH-4281	Geoprobe	1	30/05/2022

Location	Method	Depth	Completion Date
SBT-BH-4282	Excavator	1	17/06/2022
SBT-BH-4283	Excavator	1	16/06/2022
SBT-BH-4287	Excavator	1	17/06/2022
SBT-BH-4289	Excavator	1	17/06/2022
SBT-BH-4292	Excavator	1	20/06/2022
SBT-BH-4296	Excavator	1	21/06/2022
SBT-BH-4304	Excavator	1	22/06/2022
SBT-CM-4018	Geotechnical Rig	10	1/08/2022
SBT-GW-4017	Geotechnical Rig	7	4/08/2022
SBT-TP-4284	Excavator	1	20/06/2022
SBT-TP-4285	Excavator	1	20/06/2022
SBT-TP-4288	Excavator	1	20/06/2022
SBT-TP-4291	Excavator	1	20/06/2022
SBT-TP-4293	Excavator	1	21/06/2022
SBT-TP-4297	Excavator	1	21/06/2022
SBT-TP-4301	Excavator	1	22/06/2022
SBT-TP-4276	Excavator	1	17/06/2022
SBT-TP-4277	Geoprobe	1	31/05/2022
SBT-TP-4278	Excavator	1	17/06/2022
SBT-TP-4279	Excavator	1	17/06/2022
SBT-TP-4286	Excavator	1	20/06/2022
SBT-TP-4290	Excavator	1	20/06/2022
SBT-TP-4294	Excavator	1	21/06/2022
SBT-TP-4295	Excavator	1	21/06/2022
SBT-TP-4297	Excavator	1	21/06/2022
SBT-TP-4298	Excavator	1	21/06/2022
SBT-TP-4299	Excavator	1	22/06/2022
SBT-TP-4300	Excavator	1	22/06/2022
SBT-TP-4302	Excavator	1	22/06/2022
SBT-TP-4303	Excavator	1	22/06/2022
SBT-VWP-4406	Sonic Rig	28	28/07/2022
A	Grab sample	0.1	9/08/2022
B	Grab sample	0.1	9/08/2022
C	Grab sample	0.1	9/08/2022
D	Grab sample	0.1	9/08/2022
E	Grab sample	0.1	9/08/2022
F	Grab sample	0.1	9/08/2022
G	Grab sample	0.1	9/08/2022
H	Grab sample	0.1	9/08/2022

A total of 85 locations were completed as part of the investigations undertaken by TTMP.

The sampling methodology undertaken is presented in Table 22.

Table 22: Sampling Methodology

Activity	Detail / Comments
Investigation Method	**Intrusive Locations to Target Depth of 1 m and 6 m bgs** Intrusive locations to a target depth of 1 or 6 m bgs were carried out using a Geoprobe drill rig with a solid flight auger attachment, and an excavator for 1 m bgs in select locations. For the 1 m locations the type of investigation method used was based on plant availability.

Activity	Detail / Comments
	Intrusive Locations Completed in Geotechnical Works Program The boreholes completed as part of the Geotechnical Work Program were drilled using geotechnical drill rig or sonic rig. Soil samples from the geotechnical rig were collected from the solid flight auger.
Sampling Frequency	Samples were collected from near surface 0-0.2 m bgs, and then 0.5 m intervals in fill material, and natural materials at the natural material interface directly underlying fill materials, and then 1 m intervals in natural to the target depth in the Contaminated Land Works program. Soil samples were collected at approximately 1 m intervals in the Geotechnical Works Program unless there was a requirement for geotechnical testing. Discrete soil samples were also collected where there were visual or olfactory signs of potential contamination.
Soil Sampling Containers	Soil samples were placed in clean acid washed glass jars supplied by the laboratory and sealed with a Teflon-lined lid. The laboratory provided 500 ml sample bags for soil samples for asbestos analysis in fill materials. Soil samples for PFAS analysis were placed in PFAS specific sample containers provided by the laboratory.
Sample collection	Each soil sample was collected with new nitrile gloves to reduce the potential for cross contamination.
Soil Logging	Soil samples were 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). Where applicable, signs of potential contamination or anthropogenic material recorded on the borehole logs.
Soil Screening	Soil samples were screened in the field for the presence of ionisable volatile organic compounds (VOCs) using a Photoionization Detector (PID) fitted with a 10.6eV lamp. The PID underwent a fresh air calibration at the beginning of each day of sampling. Calibration certificates provided by the equipment supplier are provided in Appendix 6. Headspace screening results were recorded on the logs.
Sample Handling and Transportation	Sample collection, storage and transport was conducted in general accordance with TTMP's SOP. Soil samples were placed into laboratory prepared and supplied glass jars, fitted with Teflon lined seals to limit possible volatile loss. Sample jars were filled to minimise headspace. Separate samples for asbestos analysis were collected and placed in double zip lock bags. The samples were placed into ice chilled coolers and dispatched to NATA accredited laboratories for analysis under chain of custody (COC) control. PFAS sample jars were stored in a separate esky from the glass jars and ziplock bags. Furthermore, the PFAS sample jars and bottles (for rinsate blanks) were separated from ice bricks in the esky with a sampling bag to minimise the risk of cross contamination.
QA/QC Samples	To measure the accuracy and precision of the data generated by the field and laboratory procedures for this assessment, TTMP collected and analysed quality assurance / quality control (QA/QC) samples in accordance with the DQI's set forth in Appendix 8.

Samples were analysed by laboratories holding accreditation to ISO 17025 General requirements for the competence of testing and calibration laboratories and using National Association of Testing Authorities (NATA) accredited methods (Eurofins and Australian Laboratory Services).

Soil samples were analysed for a range of potential COPC as summarised in the Table 23.

Table 23: Laboratory Analysis - Soil

Analyte	Fill	Natural
Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)	Representative samples	Representative samples
Total Recoverable Hydrocarbons (TRH), and benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)	Representative samples or where visual / olfactory signs of hydrocarbon are present	Representative samples or where visual / olfactory signs of hydrocarbon are present
Polycyclic Aromatic Hydrocarbons (PAH)	Representative samples or where visual / olfactory signs of hydrocarbon are present, or materials containing combustion by-products (e.g., ash, coke, slag) are observed	Where visual / olfactory signs of hydrocarbon are present
Phenolic Compounds	Representative samples or where visual / olfactory signs of hydrocarbon are present	Where visual / olfactory signs of hydrocarbon are present
Organochlorine Pesticides (OCPs) and Organophosphate Pesticides (OPPs)	Representative samples	Natural materials at interface of fill / natural materials
Volatile organic compounds (VOC) including chlorinated hydrocarbons and Semi-Volatile Compounds (SVOC)	Where visual/olfactory signs of hydrocarbon are present	Where visual/olfactory signs of hydrocarbon are present, or elevated soil headspace measurements are recorded
PFAS Extended Suite	Representative samples	Representative samples
Asbestos	Representative samples or where ACM or demolition materials (e.g., building rubble) is observed	-
pH	-	Representative samples
Other	Other analyte as required based on site observations.	Other analyte as required based on site observations.

Representative soil samples were also analysed for particle size, pH, and cation exchange capacity (CEC) (mainly natural materials) to enable calculation of NEPM ecological investigation levels (EILs) for commercial / industrial land.

Toxicity Characteristic Leaching Procedure (TCLP) leachability tests were undertaken on selected soil samples for waste classification purposes.

Australian Standard Leaching Procedure (ASLP) tests with a pH neutral solution were also undertaken on selected soil samples to consider the risk of potential contaminants leaching from rainwater, if retained on-site for reuse.

Selected samples were tested for TCLP or ASLP for PFAS and metals with the aim being to provide leachability data for representative samples.

9.3. Decontamination procedures

The drill rigs were inspected to check that the equipment had been cleaned prior to the commencement of drilling.

Where applicable, the following procedures were applied for the decontamination of sampling equipment.

- Re-useable equipment (e.g. auger) was decontaminated prior to the first use each day at each site, and between each sampling location or at an increased frequency to provide a satisfactory level of decontamination suitable to meet the project requirements / site conditions.
- Disposable (single use) equipment such as nitrile gloves were disposed of appropriately following each use. This equipment was not re-used and therefore did not require decontamination.
- Care was taken to handle the cleaned equipment and samples only with new disposable nitrile gloves. Equipment was stored after decontamination and prior to use, in new polypropylene bags, to prevent the cleaned equipment coming into contact with materials that may introduce contamination to the equipment.
- Care was taken to prevent the decontamination process contributing to the spread of contamination of the site, stormwater or off site locations.
- Water used in drilling was flushed and replaced with fresh tap water at the completion each location.

The procedure noted below was followed as a minimum when decontaminating reusable equipment used to sample soil at the site.

- For equipment used to sample solids, adhered materials (such as soil, vegetation) were removed from the sampling equipment by gloved hand, paper towel or scrubbing brush.
- The equipment was washed in a bucket of potable water with Liquinox detergent.
- The equipment was rinsed thoroughly with potable water.
- The decontaminated equipment was dried with disposable paper towels or air dried on a surface that would not result in re-contamination of the equipment.
- Where equipment was being temporarily stored between sample locations (i.e., where another round of decontamination washing is not being undertaken) the equipment was stored in new polypropylene bags, to prevent re-contamination prior to its next use.

9.4. Management of excavated materials

Excavated soil from boreholes less than 6 m was backfilled in order of excavation, where practicable. Excavated soil from boreholes greater than 6 m was retained on-site and drums for off-site disposal and / or on-site reuse pending the results from analytical testing.

Liquid materials captured during non-destructive drilling, drilling, and groundwater well development and sampling were retained on-site in bulk containers for off-site disposal and / or on-site reuse pending the results from analytical testing.

9.5. Drilling Process Samples

During the investigation the following sample types were collected for the primary purpose of considering the potential for false positives from PFAS as a result of drilling processes. The following sample types were collected:

- Drilling greases and muds
- Drilling Tank Water: water used to supply drilling
- Drilling Sump: re-circulated water used in drilling; this water is changed between each borehole
- Monitoring well construction materials.

The results of this testing are discussed in Appendix 10.

In summary the data shows that the materials and methods used during drilling, and for the construction of monitoring wells are unlikely to have resulted in the occurrence of false positives regarding PFAS. With consideration to the results of the investigation for soil and groundwater samples collected, other lines of evidence including visual/olfactory signs of contamination, drilling materials and drilling process are also considered unlikely to have resulted in cross-contamination of samples and false positives of other analytes such as metals and organics.

It is noted that detection of organics (BTEX, PAH and TRH) were reported in driller sump water samples during drilling. These results are discussed further in Section 10.6.6.

9.6. Data Quality Assessment

A standalone data quality assessment is presented in Appendix 6. This assessment concluded that the field and laboratory data collected from this investigation is of suitable quality to assess potential contamination risks from this site.

9.7. Groundwater Monitoring

Groundwater monitoring wells which were installed on the site by TTMP are summarised in Table 24.

To inform the DSI, sampling from groundwater monitoring wells installed in previous investigations and by TTMP was undertaken. The monitoring wells sampled are summarised in Table 25.

In summary the monitoring wells which have been sampled include the following:

- North of station box
  - ERM_MW203
- South of station box
  - ERM_MW206
- West of Station Box
  - ERM_MW201
  - ERM_MW202
  - SBT-GW-4014
  - SBT-GW-4019
- East of Station Box
  - GHD_MW01
  - GHD_MW02

- GHD_MW03
- GHD_MW04
- GHD_MW06
- ERM_MW205
- SBT-GW-4017

The groundwater sampling locations are shown in Figure 7 in Appendix 1 and are summarised in Table 24 and Table 25. The sampling methodology is summarised in Table 26, and laboratory analysis undertaken is summarised in Table 27.

Table 24: Summary of Groundwater Monitoring Wells Installed for the DSI

Location ID	Rationale	Ground Level (m AHD)	Proposed Well Installation (Screened Interval m AHD)	Completed Well Screen Interval		Comment
				m bgs	m AHD	
SBT-GW-4014	Monitoring water quality to west of station within drawdown zone	73.890	63 to 72	5 to 14	68.89 to 59.89	Sampling has been undertaken from this monitoring well and from MW201_ERM_2021. MW201 is a monitoring well installed at similar depth and location.
SBT-GW-4017	Monitoring for changes in water quality due to impact from USTs and other potential source site features	70.868	59 to 69	2 to 12	68.87 to 58.87	Sampling has been undertaken from this monitoring well and GHD-MW04. GHD-MW04 is installed at similar location, however the well was screened at a deeper depth.
~~SBT-GW-4020~~	~~Monitor water quality and level to north of Station within predicted drawdown extent (replacement for SMGW-BH-D303 which will be destroyed)~~	~~71.198~~	~~56 to 68~~	~~N/A~~	~~N/A~~	Note SBT-GW-4020 was included in the SAQP as an error. The monitoring well was installed at Bringelly. Existing monitoring well ERM_MW201 was sampled and is located west of the station.
~~SBT-GW-4022~~	~~Monitoring groundwater quality and level to south of station as existing wells will be either destroyed or become dry.~~	~~74.437~~	~~60 to 72~~	~~N/A~~	~~N/A~~	Note SBT-GW-4022 was included in the SAQP as an error. The monitoring well was installed at Bringelly. Existing monitoring well ERM_MW206 was sampled and is located south of the station.
SBT-GW-4021	Groundwater level and EC monitoring to assess potential impact to a groundwater dependent ecosystem (GDE) to southeast.	61.821	54 to 63	2 to 11	50.82 to 59.82	This monitoring well is to be sampled to monitor potential impacts to a GDE. Sampling from this monitoring well is to be undertaken as part of the Groundwater Monitoring Plan[11].
SM-GW-4019	This monitoring well was not included in the SAQP and was installed at the southern end and west of the station box and at the location of the former Figure Pump House (refer to Figure 3).	75.875	Not included in SAQP	5 to 14	63 to 72	-

[11] Groundwater sampling under the Groundwater Monitoring Plan is to be undertaken by CPBG prior to the of commencement of construction and during construction.

Table 25: Existing Groundwater Monitoring Wells Sampled for the DSI

Location ID	Well Screen Interval		Comment
	m bgs	m AHD	
GHD_MW01	4 to 7	60.73 to 63.73	-
GHD_MW02	4 to 8	61.17 to 65.17	-
GHD_MW03	8 to 11	59.26 to 62.26	-
GHD_MW04	11 to 14	58.62 to 61.62	-
GHD_MW06	8 to 11	61.11 to 64.11	-
ERM_MW201	9 to 12	Note 1	-
ERM_MW202	17 to 20	Note 1	-
ERM_MW203	7 to 10	Note 1	-
ERM_MW205	7 to 10	Note 1	-
ERM_MW206	7 to 10	Note 1	-

Note 1: survey of these monitoring wells has not been undertaken to confirm spatial coordinates or relative elevation of top of well casing.

Table 26: Groundwater Installation and Sampling Procedure

Activity	Detail / Comments
Well Installation	The installation of the monitoring wells was completed in general accordance with TTMP's SOPs and with relevant parts of Section 8 and 9 of Schedule B2 in the ASC NEPM (2013). The wells were installed as follows: • Established in a 125 mm diameter boring by a mechanical drill. • 50 mm diameter Class PN18 uPVC casing with a slotted screen interval upward from the base of the well. The depth and length of the screened interval was confirmed in the field based on site observations. • 2 mm poorly graded sand backfill around and 0.5 m above the screened interval. • 500 mm thick layer of hydrated bentonite above the top of the sand backfill / well screen. • Backfilled with bore cuttings or concrete from the top of the bentonite to finish flush with the ground surface. • A gripper / cap was installed on top of the well string to minimise the potential for infiltration of water and other foreign matter into the well. • The monitoring well was finished with a monument or flush-fitted gatic cover. Wells were developed using a dedicated disposable bailer (or pump) to remove excess water and sediment introduced during drilling and improve connection with the surrounding water bearing zone. Well development was ceased when water was visibly cleared, or physio-chemical parameters had stabilised. The relative elevation of the top of monitoring well casing completed by TTMP was recorded using a Real-time Kinetic GPS equipment with a vertical accuracy of +/-10mm. The casing elevations were used to assess groundwater flow conditions and relate standing water level measurements to a relative elevation. Representative samples of materials used in well construction (bentonite, sand, concrete) and uPVC casing (as a rinsate sample) were collected for laboratory analysis.
Sampling Methods	Where groundwater was present in the monitoring well, a groundwater sample as collected using a Hydrasleeve. Approximately one week following deployment, the hydrasleeve was retrieved for sampling. HDPE sleeves were used in all monitoring wells. Field parameters (pH, electrical conductivity (EC), redox potential (Eh), dissolved oxygen (DO) and temperature) were recorded for each intake depth. Samples proposed for dissolved metals analysis were filtered in the field using 0.45um disposable filters. Prior to retrieval of the hydrasleeve, the wells were also dipped with a dual-phase interface probe (IP) to assess the standing water level (SWL) and presence / absence of Light Non-aqueous phase liquids (LNAPL). Groundwater samples collected also included QA/QC samples as detailed in Section 8.7 and Appendix 9. Sampling field records include the following: • Unique sample location identifier • Weather conditions • Water colour, turbidity, odour, present of surface layer • Other observations as considered relevant for the location

Activity	Detail / Comments
	Field measurements will include: • Time and date • Gauged depth prior to sampling • Water Quality parameters: pH, ORP, EC, DO and temperature • Depth of water sample

Table 27: Groundwater Laboratory Analysis

Analyte	Groundwater Samples
Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc)	All samples
Total Recoverable Hydrocarbons (TRH), and benzene, toluene, ethylbenzene, xylenes and naphthalene (BTEXN)	All samples
Polycyclic Aromatic Hydrocarbons (PAH)	All samples
Phenolic Compounds	All samples
Organochlorine Pesticides (OCPs) and Organophosphate Pesticides (OPPs)	All samples
Volatile organic compounds (VOC) and Semi-Volatile Compounds (SVOC)	All samples
PFAS Extended Suite	All samples
Polychlorinated Biphenyls (PCBs)	All samples
Cation and anions	All samples
Nutrients (ammonia, nitrate, nitrite, and phosphorus)	All samples

10. Results

Intrusive investigation locations from previous investigations and the investigation completed by TTMP are shown in Figure 8, Figure 8A, Figure 8B, Figure 8C and Figure 8D, Appendix 1.

Logs on the intrusive investigations locations completed by TTMP are provided in Appendix 4. A combined tabulated result table from the TTMP investigation, the GHD investigation, and investigations completed by Cardno, and Golder Associates/Douglas Partners is provided in Appendix 5.

Laboratory reports are provided in Appendix 9.

10.1. Conceptualisation of Aerotropolis Site

Based on the review of the GHD Investigation and TTMP data available the Aerotropolis Site which includes AEC46 (refer to Section 4) was conceptualised into four main areas based on site history, ground conditions, and analytical data. A summary of these areas based in information included in the Technical Memorandum is provided in Table 28 and the areas shown in Figure 6-A. These areas have also been adopted for the conceptualisation of the Aerotropolis Site in this DSI report.

Table 28: 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, 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. 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[12] was reported in this area in the GHD investigation.
Low Impact Area West (Western portion of AEC 46)	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. The western boundary also appears to be outside the operational area of the former OTC facility. Within this area no ACM observed in intrusive locations and/or positive detection of asbestos in soil. No gross contamination was reported in this area in the GHD investigation.
Low Impact Area South (Southern portion of AEC 46)	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 PAoC 06. 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 samples submitted for analysis. No gross contamination was reported in this area in the GHD investigation.

[12] Gross contamination is considered to be wide-spread contamination which exceeds commercial/industrial guidelines.

Area	Description
Medium Impact Area (Central portion of AEC 46)	The Medium Impact Area includes historical infrastructure associated with the former OTC facility, areas where the PAoCs were identified (refer to Section 7.2) and areas which have been subject to historical and recent demolition activities.

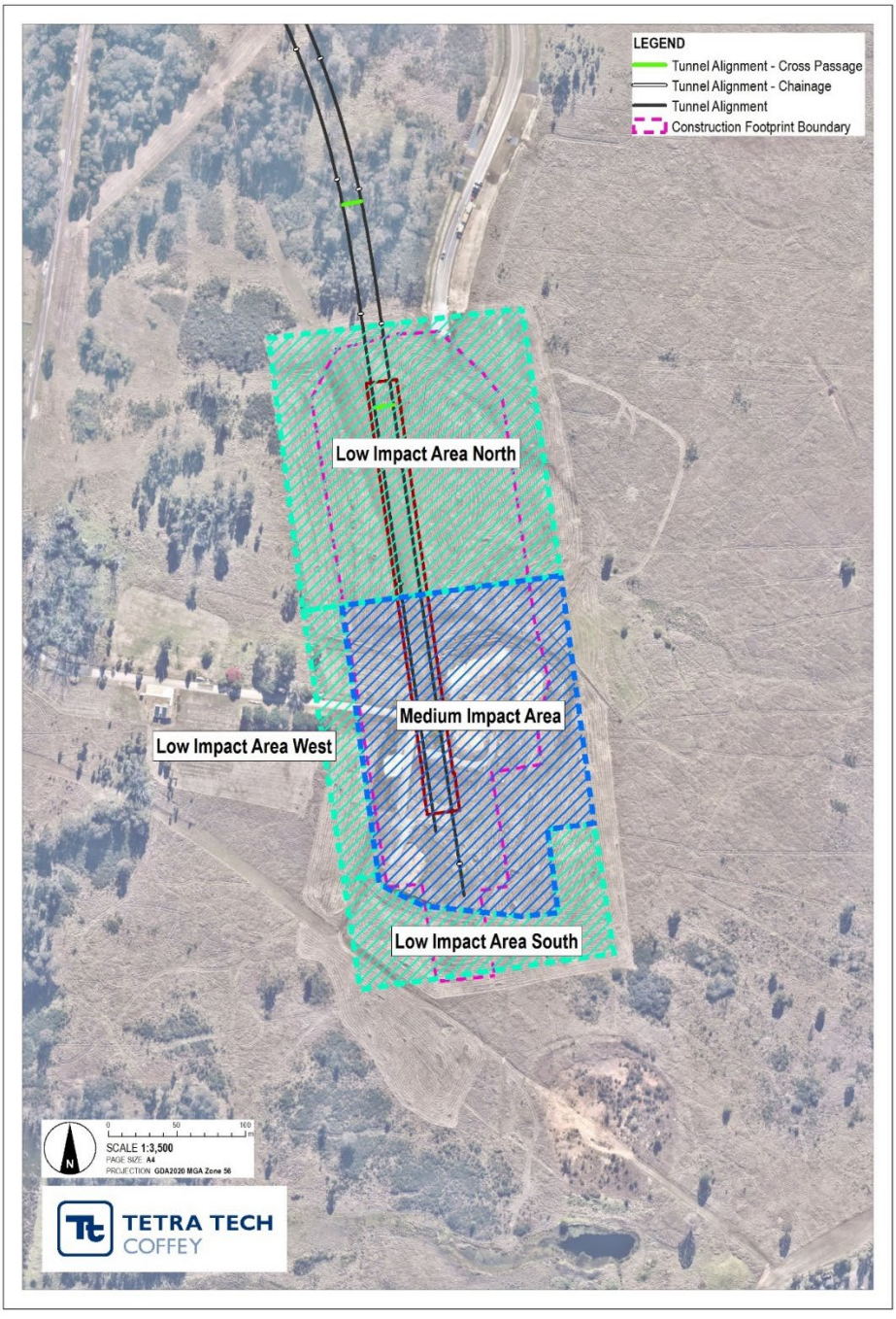


Figure 6-A Aerotropolis Low and Medium Impact Areas relative to the Construction Footprint based on available investigation data and former land uses

10.2. Ground Conditions

Logs on subsurface conditions encountered in the intrusive investigations completed by TTMP are provided in Appendix 4. The following sections provide a summary of the ground conditions reported in the investigation locations completed by TTMP, and from the review of logs included in previous investigations.

10.2.1. Low Impact Area North

The ground conditions encountered generally comprised between 0.2 m and 0.3 m of clay fill. Fill was underlain by natural clay residual 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 any of the test pits or boreholes, or site observations made during the intrusive investigation works.

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.

10.2.2. Low Impact Area West

The ground conditions encountered generally comprised between 0.1 m and 0.4 m of clay fill, overlying natural clay residual soils to depths of between 1.2 m and 1.5 m bgs.

Highly to moderately weathered Bringelly shale was encountered from depths of between 1.2 m and 1.5 m bgs.

Soil materials with visual / olfactory signs of suspected contamination and PACM were generally not observed in any of the test pits or boreholes, or site observations made during the intrusive investigation works. One exception was the presence of trace charcoal in the fill at one location (SMWSA-GHD-TP48).

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.

10.2.3. Low Impact Area South

The ground conditions encountered generally comprised between 0.1 m and 0.4 m of clay fill, overlying natural clay residual 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, encountered between depths of 2.0 m and 3.0 m bgs.

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

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.

10.2.4. Medium Impact Area

The ground conditions encountered generally 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 the area. The fill generally comprised clay 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 encountered.

Where rock 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. Natural soil materials with visual / olfactory signs of suspected contamination were not observed in any of the test pits, boreholes, groundwater monitoring wells, or site observations made during the intrusive investigation works and within identified Potential Areas of Concern (PAoC) presented in the SAQP.

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). Further discussion on asbestos is provided in Section 10.3.24. 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.

10.3. Soil Data

The following TTMP tables provided in Appendix 5 present a comparison of the analytical results and the adopted assessment criteria:

- Table 1 – Comparison against health investigation levels;
- Table 2 – Comparison against ecological investigation and screening levels;
- Table 3 – Comparison against Airport Regulations;
- Table 4 – Comparison against waste classification criteria;
- Table 5 – Field parameters.

The TTMP laboratory analytical certificates and associated chain of custody records are presented in Appendix 9.

The following sections present the analytical data and incorporate data from:

- the TTMP investigation
- GHD investigation with the exception of data from materials which have been removed
- Cardno and Golder Associates / Douglas Partners.

Section 10.3.1 to Section 10.3.4 provides a summary of the results for the Low Impact Area North, Low Impact Area South, Low Impact Area West, and Medium Impact Area.

Section 10.4 provides the groundwater data.

Section 10.5 provides contaminant leachability data

Section 11 provides preliminary waste classification.

10.3.1. Low Impact Area North

Table 29 provides a summary of the analytical results for Low Impact Area North.

Table 29: Summary of Analytical Result - Low Impact Area North

Analyte	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline (Note 2)	No. of Samples Exceeding Human Health Guideline	Ecological Guideline (Note 3)	No. of Samples Exceeding Ecological Guideline	Airport Regulation 1997 (Note 4)	No. of Samples Exceeding Airport Regulation 1997
Arsenic	154 / 137	<2	65	3000	Nil	160	Nil	500	Nil
Cadmium	154 / 2	<0.4	2	900	Nil		-	100	Nil
Chromium (III+VI)	154 / 151	<2	37		-	675	Nil		-
Copper	154 / 154	12	61	240000	Nil	170	Nil	5000	Nil
Lead	154 / 154	6	42	1500	Nil	1800	Nil	1500	Nil
Mercury	145 / 0	<0.1	<0.1	730	Nil		-	75	Nil
Nickel	154 / 152	<4	32	6000	Nil	68	Nil	3000	Nil
Zinc	154 / 154	12	120	400000	Nil	410	Nil	35000	Nil
Benzene	172 / 3	<0.1	0.2	3	Nil	3	Nil	1	Nil
Toluene	172 / 16	<0.1	3.4	99000	Nil	135	Nil	130	Nil
Ethylbenzene	172 / 13	<0.1	0.5	27000	Nil	185	Nil	50	Nil
Xylene (o)	172 / 18	<0.1	1.2		-		-		-
Xylene (m & p)	172 / 22	<0.2	4.8		-		-		-
Xylene Total	171 / 22	<0.3	6	230	Nil	95	Nil	25	Nil

Analyte	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline (Note 2)	No. of Samples Exceeding Human Health Guideline	Ecological Guideline (Note 3)	No. of Samples Exceeding Ecological Guideline	Airport Regulation 1997 (Note 4)	No. of Samples Exceeding Airport Regulation 1997
Naphthalene (VOC)	142 / 7	<0.1	0.9	11000	Nil	370	Nil		-
C10 - C40 (Sum of total)	170 / 4	<25	252		-		-		-
F1 (C6 - C10)	170 / 9	<10	39	800	Nil		-		-
F1 (C6 - C10) less BTEX	170 / 3	<10	30	260	Nil	215	Nil	260	Nil
F2 (C10 - C16)	170 / 2	<25	72	1000	Nil		-		-
F2 C10 - C16 (minus Naphthalene)	170 / 2	<50	70.5	20000	Nil	170	Nil		-
F3 (C16 - C34)	170 / 4	<100	180	5000	Nil	2500	Nil		-
F4 (C34 - C40)	170 / 0	<100	<100	10000	Nil	6600	Nil		-
PAHs (Sum of total)	139 / 4	<0.05	0.9	4000	Nil		-	100	Nil
Benzo(a)pyrene TEQ (LOR)	139 / 138	<0.5	1.2	40	Nil		-		-
Perfluorooctanesulfonic acid (PFOS)	212 / 23	<0.1	1.4		-	140	Nil		-
Perfluorooctanoic acid (PFOA)	212 / 1	<0.1	1.7	50000	Nil	10000	Nil	10000	Nil
Sum (PFHxS + PFOS)	212 / 23	<0.1	1.6	20000	Nil		-	1000	Nil
Sum of PFASs (n=28)	212 / 24	<0.1	16		-		-		-

Notes:
1. Analytes in in mg/kg with the exception of PFAS analytes which are in µg/kg
2. Human guideline is the most conservative guideline value for each analyte in Table 1, Appendix 5
3. Ecological guideline is the most conservative guideline value for ach analyte in Table 2. Appendix 5
4. Airport (Environmental Protection) Regulations 1997, Schedule 3 includes human health commercial/industrial and direct ecological exposure guidelines for PFAS. Direct ecological exposure guidelines are more conservative and are shown in the table.

In summary:

- laboratory results were below the adopted commercial/industrial human health guidelines, ecological guidelines, and the Airport Regulations criteria.
- 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.
- trace PFAS analytes were reported in shallow soil deposits to approximately 0.2 m bgs, and were non-detect in the majority of samples collected between 0.2 m bgs and 6 m bgs. Trace PFAS was reported in rock samples in previous investigations.

10.3.2. Low Impact Area South

Table 30 provides a summary of the analytical results for Low Impact Area South.

Table 30: Summary of Analytical Result - Low Impact Area South

Analyte	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline (Note 2)	No. of Samples Exceeding Human Health Guideline	Ecological Guideline (Note 3)	No. of Samples Exceeding Ecological Guideline	Airport Regulation 1997 (Note 4)	No. of Samples Exceeding Airport Regulation 1997
Arsenic	82 / 75	<2	70	3000	Nil	160	Nil	500	Nil
Cadmium	82 / 2	<0.4	10	900	Nil		-	100	Nil
Chromium (III+VI)	82 / 79	<2	41		-	675	Nil		-
Copper	82 / 82	9	68	240000	Nil	170	Nil	5000	Nil
Lead	82 / 81	<5	38	1500	Nil	1800	Nil	1500	Nil
Mercury	82 / 2	<0.1	0.2	730	Nil		-	75	Nil
Nickel	82 / 81	<4	32	6000	Nil	68	Nil	3000	Nil
Zinc	82 / 82	15	160	400000	Nil	410	Nil	35000	Nil
Benzene	82 / 1	<0.1	0.2	3	Nil	3	Nil	1	Nil
Toluene	82 / 6	<0.1	2.4	99000	Nil	135	Nil	130	Nil
Ethylbenzene	82 / 5	<0.1	0.3	27000	Nil	185	Nil	50	Nil
Xylene (o)	82 / 7	<0.1	0.7		-		-		-
Xylene (m & p)	82 / 7	<0.2	2.7		-		-		-
Xylene Total	82 / 7	<0.3	3.4	230	Nil	95	Nil	25	Nil
Naphthalene (VOC)	82 / 5	<0.5	1	11000	Nil	370	Nil		-
C10 - C40 (Sum of total)	82 / 0	<50	<100		-		-		-
F1 (C6 - C10)	82 / 1	<10	23	800	Nil		-		-
F1 (C6 - C10) less BTEX	82 / 0	<10	<20	260	Nil	215	Nil	260	Nil
F2 (C10 - C16)	82 / 0	<50	<50	1000	Nil		-		-
F2 C10 - C16 (minus Naphthalene)	79 / 0	<50	<50	20000	Nil	170	Nil		-
F3 (C16 - C34)	82 / 0	<100	<100	5000	Nil	2500	Nil		-
F4 (C34 - C40)	82 / 0	<100	<100	10000	Nil	6600	Nil		-
PAHs (Sum of total)	66 / 0	<0.5	<0.5	4000	Nil		-	100	Nil
Benzo(a)pyrene TEQ (LOR)	66 / 66	1.2	1.2	40	Nil		-		-
Perfluorooctanesulfonic acid (PFOS)	109 / 22	<0.1	4.2		-	140	Nil		-
Perfluorooctanoic acid (PFOA)	109 / 1	<0.1	0.2	50000	Nil	10000	Nil	10000	Nil
Sum (PFHxS + PFOS)	109 / 23	<0.1	4.6	20000	Nil		-	1000	Nil
Sum of PFASs (n=28)	109 / 22	<0.1	4.7		-		-		-

Notes:
1. Analytes in in mg/kg with the exception of PFAS analytes which are in µg/kg
2. Human guideline is the most conservative guideline value for each analyte in Table 1, Appendix 5
3. Ecological guideline is the most conservative guideline value for ach analyte in Table 2. Appendix 5
4. Airport (Environmental Protection) Regulations 1997, Schedule 3 includes human health commercial/industrial and direct ecological exposure guidelines for PFAS. Direct ecological exposure guidelines are more conservative and are shown in the table.

In summary:

- laboratory results were below the adopted commercial/industrial human health guidelines, ecological guidelines, and the Airport Regulations criteria.
- 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.
- trace PFAS analytes were reported in shallow soil deposits to approximately 0.2 m bgs, and were non-detect in the majority of samples collected between 0.2 m bgs and 6 m bgs. Trace PFAS was reported in rock samples in previous investigations.

10.3.3. Low Impact Area West

Table 31 provides a summary of the analytical results for Low Impact Area West.

Table 31: Summary of Analytical Result - Low Impact Area West

Analyte	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline (Note 2)	No. of Samples Exceeding Human Health Guideline	Ecological Guideline (Note 3)	No. of Samples Exceeding Ecological Guideline	Airport Regulation 1997 (Note 4)	No. of Samples Exceeding Airport Regulation 1997
Arsenic	23 / 21	<5	13	3000	Nil	160	Nil	500	Nil
Cadmium	23 / 0	<0.4	<1	900	Nil		-	100	Nil
Chromium (III+VI)	23 / 23	9	28		-	675	Nil		-
Copper	23 / 23	16	34	240000	Nil	170	Nil	5000	Nil
Lead	23 / 23	6	35	1500	Nil	1800	Nil	1500	Nil
Mercury	23 / 0	<0.1	<0.1	730	Nil		-	75	Nil
Nickel	23 / 23	7	23	6000	Nil	68	Nil	3000	Nil
Zinc	23 / 23	25	69	400000	Nil	410	Nil	35000	Nil
Benzene	23 / 0	<0.1	<0.2	3	Nil	3	Nil	1	Nil
Toluene	23 / 1	<0.1	0.7	99000	Nil	135	Nil	130	Nil
Ethylbenzene	23 / 0	<0.1	<0.5	27000	Nil	185	Nil	50	Nil
Xylene (o)	23 / 0	<0.1	<0.5		-		-		-
Xylene (m & p)	23 / 0	<0.2	<0.5		-		-		-
Xylene Total	23 / 0	<0.3	<0.5	230	Nil	95	Nil	25	Nil
Naphthalene (VOC)	23 / 0	<0.5	<1	11000	Nil	370	Nil		-
C10 - C40 (Sum of total)	23 / 0	<50	<100		-		-		-
F1 (C6 - C10)	23 / 0	<10	<20	800	Nil		-		-
F1 (C6 - C10) less BTEX	23 / 0	<10	<20	260	Nil	215	Nil	260	Nil
F2 (C10 - C16)	23 / 0	<50	<50	1000	Nil		-		-
F2 C10 - C16 (minus Naphthalene)	23 / 0	<50	<50	20000	Nil	170	Nil		-
F3 (C16 - C34)	23 / 0	<100	<100	5000	Nil	2500	Nil		-
F4 (C34 - C40)	23 / 0	<100	<100	10000	Nil	6600	Nil		-
PAHs (Sum of total)	23 / 0	<0.5	<0.5	4000	Nil		-	100	Nil
Benzo(a)pyrene TEQ (LOR)	23 / 23	1.2	1.2	40	Nil		-		-
Perfluorooctanesulfonic acid (PFOS)	23 / 7	<0.2	1.2		-	140	Nil		-
Perfluorooctanoic acid (PFOA)	23 / 0	<0.2	<5	50000	Nil	10000	Nil	10000	Nil
Sum (PFHxS + PFOS)	23 / 7	<0.2	1.6	20000	Nil		-	1000	Nil
Sum of PFASs (n=28)	23 / 7	<0.2	1.6		-		-		-

Notes:
1. Analytes in in mg/kg with the exception of PFAS analytes which are in µg/kg
2. Human guideline is the most conservative guideline value for each analyte in Table 1, Appendix 5
3. Ecological guideline is the most conservative guideline value for ach analyte in Table 2. Appendix 5
4. Airport (Environmental Protection) Regulations 1997, Schedule 3 includes human health commercial/industrial and direct ecological exposure guidelines for PFAS. Direct ecological exposure guidelines are more conservative and are shown in the table.

In summary:

- laboratory results were below the adopted commercial/industrial human health guidelines, ecological guidelines, and the Airport Regulations criteria.
- 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.
- trace PFAS analytes were reported in shallow soil deposits to approximately 0.2 m bgs, and were non-detect samples collected > 0.2 m bgs in the samples analysed.

10.3.4. Medium Impact Area

Based on the analytical data, the results of the Medium Impact Area has been divided into soil materials from surface to shallower than 2 m bgs, and soil materials deeper than 2 m bgs. The following sections summarise the analytical data for these materials.

10.3.4.1. Soil Materials 0 to ≤ 2 m bgs

Table 32 provides a summary of the analytical results for soil materials 0 to ≤ 2 m bgs.

Table 32: Summary of Analytical Result – Medium Impact Area 0 to ≤ 2 m bgs

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline (Note 2)	No. of Samples Exceeding Human Health Guideline	Ecological Guideline (Note 3)	No. of Samples Exceeding Ecological Guideline	Airport Regulation 1997 (Note 4)	No. of Samples Exceeding Airport Regulation 1997
Arsenic	456 / 368	<2	52	3000	Nil	160	Nil	500	Nil
Cadmium	456 / 12	<0.3	4	900	Nil		-	100	Nil
Chromium (III+VI)	456 / 455	<3	110		-	675	Nil		-
Copper	456 / 442	<4	422	240000	Nil	170	2	5000	Nil
Lead	479 / 471	<3	312	1500	Nil	1800	Nil	1500	Nil
Mercury	441 / 7	<0.05	0.1	730	Nil		-	75	Nil
Nickel	456 / 443	<2	72	6000	Nil	68	2	3000	Nil
Zinc	456 / 455	<5	3200	400000	Nil	410	7	35000	Nil
Benzene	466 / 0	<0.1	<0.5	3	Nil	3	Nil	1	Nil
Toluene	466 / 0	<0.1	<0.5	99000	Nil	135	Nil	130	Nil
Ethylbenzene	466 / 0	<0.1	<1	27000	Nil	185	Nil	50	Nil
Xylene (o)	466 / 1	<0.1	1.4		-		-		-
Xylene (m & p)	466 / 2	<0.2	3.7		-		-		-
Xylene Total	464 / 2	<0.3	5.1	230	Nil	95	Nil	25	Nil
Naphthalene (VOC)	443 / 0	<0.1	<1	11000	Nil	370	Nil		-
Total BTEX	356 / 2	<0.2	5.1		-		-		-
C10 - C36 (Sum of total)	431 / 13	<50	462		-		-	5000	Nil
F1 (C6 - C10)	464 / 0	<10	<100	800	Nil		-		-
F1 (C6 - C10) less BTEX	464 / 0	<10	<100	260	Nil	215	Nil	260	Nil
F2 (C10 - C16)	464 / 1	<25	52	1000	Nil		-		-
F2 C10 - C16 (minus Naphthalene)	457 / 1	<25	52	20000	Nil	170	Nil		-
F3 (C16 - C34)	464 / 10	<90	390	5000	Nil	2500	Nil		-
F4 (C34 - C40)	464 / 6	<100	240	10000	Nil	6600	Nil		-
PAHs (Sum of total)	328 / 4	<0.05	30.4	4000	Nil		-	100	Nil
Benzo(a) pyrene	330 / 1	<0.05	3	-	-	72	Nil	5	Nil
Benzo(a)pyrene TEQ (LOR)	330 / 290	<0.3	4.9	40	Nil		-		-
Perfluorooctanesulfonic acid (PFOS)	443 / 219	<0.1	1780	-	-	140	15		-
Perfluorooctanoic acid (PFOA)	443 / 79	<0.1	19.4	50000	Nil	10000	Nil	10000	Nil
Sum (PFHxS + PFOS)	443 / 245	<0.1	1790	20000	Nil	-	-	1000	1
Sum of PFASs (n=28)	437 / 236	<0.2	1810	-	-	-	-		-

Notes:
1. Analytes in in mg/kg with the exception of PFAS analytes which are in µg/kg
2. Human guideline is the most conservative guideline value for each analyte in Table 1, Appendix 5
3. Ecological guideline is the most conservative guideline value for ach analyte in Table 2. Appendix 5
4. Airport (Environmental Protection) Regulations 1997, Schedule 3 includes human health commercial/industrial and direct ecological exposure guidelines for PFAS. Direct ecological exposure guidelines are more conservative and are shown in the table.

Human Health Guidelines

Analytical results for the metals and organics were below the adopted commercial/industrial human health guidelines in samples. Asbestos was reported which exceeded the commercial/industrial human health guidelines and is discussed further on the following page.

Ecological Guidelines

Laboratory results exceeded the adopted ecological guidelines in adopted ecological guidelines in a limited number of samples for copper, nickel, zinc, benzo(a)pyrene, and PFOS.

Elevated concentrations of zinc and to a lesser extend copper were reported in post-demolition samples at PAoC 10 (former fire pump house) which exceeded the adopted ecological guidelines including SBT-TP_4288_0.00-0.1, and the following post demolition samples completed by GHD:

- SMWSA-G-V001A
- SMWSA-G-V002
- SMWSA-G-V003
- SMWSA-G-V004
- SMWSA-G-V005

Nickel marginally exceeded the adopted ecological guidelines in two samples in the location of the former stockpile in PAoC_10.

Benzo(a)pyrene marginally exceeded the adopted ecological guideline in SBT-BH-4257_0.10-0.2 at the PAoC_03 (former) garage.

PFOS exceeded the adopted ecological guidelines for indirect exposure in 15 samples in the following locations:

- PAoC_03 (former garage): SBT-BH-4258 and SMWSA-GHD-TP52
- PAoC_02 (former fire hose shed): SBT-BH-4259, SMWSA-GHD-BH30 and SMWSA-GHD-BH31
- PAoC_04 (South East of Former Receiving Station): SBT-BH-4272
- Overland flow path north east of former septic tank: SBT-TP-4297

Further discussion on the distribution of PFAS within the Medium Impact Area is provided in Section 10.4.2. Further discussion on contaminant leachability for PFAS is provided in Section 10.5 .

Airport Regulations

One sample where the maximum concentration of PFAS has been reported (SBT-BH-4259_0.10-0.2) exceeded the Airport Regulations commercial/industrial criteria (ecological guidelines for indirect exposure for intensively developed sites).

Asbestos

Within the Medium Impact Area positive detection of asbestos has been reported in the following locations:

- Positive detection of ACM was reported in SBT-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.
- Positive detection of ACM was reported in SBT-BH-4019 at surface
- Asbestos Fines (AF) and Fibrous Asbestos (FA) 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 (FA and AF) (refer to **Figure 8D, Appendix 1**). An excavator was used to complete this location and visual signs of ACM were not observed.
- SBT-BH-4264 and the location where potential ACM was observed on the ground surface is shown in Figure 8C, Appendix 1
- Friable asbestos (FA and AF) in the QC sample of SBT-BH-4292_0.9_1.0 (0.005 %w/w) (QC54-FL-17062022)
- Friable asbestos (FA and AF) in sample SMGWSA GHD BH16 / 0 - 0.2 (0.012 %w/w), asbestos fibres were detected and confirmed to be chrysotile.
- SWMSA-GHD-BH30 where bonded asbestos was observed at 0.4-0.5 m
- SWMSA-GHD-TP57 where bonded asbestos was observed at 0-0.1 m
- SWMSA-GHD-TP61 where FA and AF with a concentration of 0.007% was observed at 0-0.2 m.
- SWMSA-GHD-TP66 where bonded asbestos was observed at 0-0.1 m
- SWMSA-GHD-TP67 where bonded asbestos was observed at 0-0.1 m
- SWMSA-GHD-SP01_T85 where bonded asbestos was observed at surface
- SWMSA-GHD-SP01_T87 where bonded asbestos was observed at surface
- SWMSA-GHD-SP01_T88 where bonded asbestos was observed at surface
- SWMSA-GHD-SP01_T92 where bonded asbestos was observed at 0.6-0.9 m
- SWMSA-GHD-SP01_T93 where bonded asbestos was observed at 0.4-0.6 m and 0.9-1.1 m and FA and AF were also reported at these depths at concentrations of 0.13% and 0.23%, respectively.

These are shown in Figure 9C and 9D Appendix 1.

TTMP notes the existing site investigation data for this site demonstrates there is randomness to the presence/distribution of asbestos in soils.

In summary asbestos including ACM (bonded asbestos), 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. TTMP recommends that all fill material within this area (Medium Impact Area) be considered to potentially contain asbestos on a precautionary basis.

10.3.5.1. Soil Materials > 2 m bgs

Table 33 provides a summary of the analytical results for soil materials > 2 m bgs.

Table 33: Summary of Analytical Result – Medium Impact Area > 2 m bgs

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline (Note 2)	No. of Samples Exceeding Human Health Guideline	Ecological Guideline (Note 3)	No. of Samples Exceeding Ecological Guideline	Airport Regulation 1997 (Note 4)	No. of Samples Exceeding Airport Regulation 1997
Arsenic	111 / 81	<2	100	3000	Nil	160	Nil	500	Nil
Cadmium	111 / 0	<0.4	<1	900	Nil		-	100	Nil
Chromium (III+VI)	111 / 103	<5	23		-	675	Nil		-
Copper	111 / 110	<5	92	240000	Nil	170	Nil	5000	Nil
Lead	124 / 122	<5	41	1500	Nil	1800	Nil	1500	Nil
Mercury	104 / 7	<0.1	0.3	730	Nil		-	75	Nil
Nickel	111 / 110	<5	68	6000	Nil	68	1	3000	Nil
Zinc	111 / 111	20	180	400000	Nil	410	Nil	35000	Nil
Benzene	110 / 0	<0.1	<0.2	3	Nil	3	Nil	1	Nil
Toluene	110 / 15	<0.1	3.2	99000	Nil	135	Nil	130	Nil
Ethylbenzene	110 / 12	<0.1	0.6	27000	Nil	185	Nil	50	Nil
Xylene (o)	110 / 19	<0.1	1.5		-		-		-
Xylene (m & p)	110 / 25	<0.2	5.5		-		-		-
Xylene Total	110 / 25	<0.3	7	230	Nil	95	Nil	25	Nil
Naphthalene (VOC)	113 / 27	<0.5	2.3	11000	Nil	370	Nil		-
Total BTEX	24 / 2	<0.2	0.6		-		-		-
C10 - C36 (Sum of total)	107 / 17	<50	252		-		-	5000	Nil
F1 (C6 - C10)	114 / 2	<10	22	800	Nil		-		-
F1 (C6 - C10) less BTEX	114 / 2	<10	21	260	Nil	215	Nil	260	Nil
F2 (C10 - C16)	114 / 2	<50	75	1000	Nil		-		-
F2 C10 - C16 (minus Naphthalene)	113 / 2	<50	73.8	20000	Nil	170	Nil		-
F3 (C16 - C34)	114 / 2	<100	200	5000	Nil	2500	Nil		-
F4 (C34 - C40)	114 / 0	<100	<100	10000	Nil	6600	Nil		-
PAHs (Sum of total)	116 / 26	<0.05	3	4000	Nil		-	100	Nil
Benzo(a) pyrene	116 / 0	<0.05	<0.5		-	1.4	Nil	5	Nil
Benzo(a)pyrene TEQ (LOR)	116 / 109	<0.5	1.2	40	Nil		-		-
Perfluorooctanesulfonic acid (PFOS)	213 / 21	<0.0001	11.2		-	140	Nil		-
Perfluorooctanoic acid (PFOA)	214 / 1	<0.0001	0.3	50000	Nil	10000	Nil	10000	Nil
Sum (PFHxS + PFOS)	213 / 26	<0.0001	18.5	20000	Nil		-	1000	Nil
Sum of PFASs (n=28)	209 / 26	<0.0001	24.4		-		-		-

Notes:
1. Analytes in in mg/kg with the exception of PFAS analytes which are in µg/kg
2. Human guideline is the most conservative guideline value for each analyte in Table 1, Appendix 5
3. Ecological guideline is the most conservative guideline value for ach analyte in Table 2. Appendix 5
4. Airport (Environmental Protection) Regulations 1997, Schedule 3 includes human health commercial/industrial and direct ecological exposure guidelines for PFAS. Direct ecological exposure guidelines are more conservative and are shown in the table.

In summary:

- laboratory results were below the adopted commercial/industrial human health guidelines, ecological guidelines and Airport Regulations criteria.
- lower concentrations of PFAS were reported in comparison to soil materials between 0-2 m bgs. Within the deeper samples collected by TTMP within the station box, PFAS was not detected in any of the samples tested. PFAS was previously detected in deeper samples in previous investigations completed by Golder Associates and Douglas Partners, and Cardno.
- low concentrations of TRH, toluene, xylene and PAHs were reported in some of the rock samples in the samples collected by TTMP, and in previous investigations.
- Further discussion on these results is provided in Section 10.6.4.

10.3.6. Drainage Line

Baseline sampling along the corridor to be used for the drain to discharge construction water to Thompsons Creek was undertaken (refer to Figure 12, Appendix 1). Surface soil samples collected (samples A to H) did not report the detection of asbestos, and reported trace concentrations of PFAS in four samples.

10.4. Groundwater Data

Groundwater sampling was undertaken by TTMP between 22 July and 15 September 2022. Monitoring wells sampled by TTMP for the DSI are summarised in Section 9.7 Groundwater monitoring well locations are shown in Figure 7 in Appendix 1.

Groundwater sampling field parameters for the monitoring wells sampled by TTMP are summarised in Table 34.

Groundwater levels reported ranged between approximately 65 m AHD and 70 m AHD. Groundwater levels and flow direction at Aerotropolis have been interpreted in the HIR as flowing east towards Thompsons Creek. Figure 10, Appendix 1 shows the groundwater flow direction presented in the HIR.

Groundwater field parameters were recorded as follows:

- Dissolved oxygen: 0.42 mg/L to 3.14 mg/L
- Electrical conductivity: 11,124 µS/cm and 18,994 µS/cm
- pH: 6.72 pH units and 7.68 pH units
- Redox potential: -5.3mV and -211.8mV (Ag/AgCL 3.5M)
- Temperature: 16.1°C and 18.3°C.

Groundwater was found to be neutral in pH, brackish to saline and slightly to moderately reducing.

Groundwater samples collected from GHD_MW04, GHD_MW06, ERM_MW202, ERM_MW203, and ERM_MW206 had a mild sulfur odour.

NAPL, sheens and other olfactory signs of hydrocarbons were not observed in any of the monitoring wells samples.

Table 34: Groundwater Field Parameters

Well ID	Water Level (mBTOC)	Water Level (m AHD)	Total Depth (mBTOC)	Screen (m bgs)	Sample depth (mBTOC)	Date Measured	Dissolved Oxygen (mg/L)	Electrical Conductivity (µS/cm)[1]	pH	Redox Potential (Ag/AgCL 3.5M)	Temperature (°C)	Comments
GHD_MW01	2.798	66.071	7.105	4 - 7	5.0	22/07/2022	3.14	13,617	7.26	-9.8	16.3	Clear, no odour
GHD_MW02	3.743	66.491	8.942	4 - 8	6.0	22/07/2022	1.45	18,742	7.25	-5.3	17.1	Clear, no odour
GHD_MW03	6.312	65.05	11.965	8 - 11	10.0	22/07/2022	0.52	18,994	7.01	-23.0	16.8	Clear, no odour
GHD_MW04	7.234	66.325	14.973	11 - 14	13.0	22/07/2022	1.06	15,647	7.68	-36.2	16.1	Clear, mild sulphur odour
GHD_MW06	6.604	66.556	12.058	8 - 11	10.0	22/07/2022	1.17	15,484	7.00	-68.3	17.9	Slightly cloudy pale brown, mild sulphur odour
ERM_MW201	7.314	Note 1	13.033	9 - 12	11.0	22/07/2022	0.89	12,498	7.47	-45.4	17.4	Clear, no odour
ERM_MW202	6.644	Note 1	20.273	17 - 20	17.3	22/07/2022	1.04	13,404	7.32	-211.8	17.3	Slightly cloudy pale brown, moderate sulphur odour
ERM_MW203	6.331	Note 1	10.914	7 - 10	9.0	22/07/2022	1.22	14,022	7.23	-162.7	18.2	Clear, moderate sulphur odour
ERM_MW205	5.322	Note 1	10.970	7 - 10	9.0	22/07/2022	0.42	11,124	7.11	-132.3	17.2	Cloudy pale brown, mild sulphur odour
ERM_MW206	4.725	Note 1	10.967	7 - 10	8.5	22/07/2022	1.83	17,046	7.33	-46.2	18.3	Clear, mild sulphur odour
SBT-GW-4014	6.779	67.1	-	5 - 14	8	15/09/2022	2.24	13,878	6.72	-89.9	17.7	Clear, no odour
SBT-GW-4017	7.011	64.3	-	2 - 12	8	15/09/2022	2.44	12,639	6.99	-159.8	16.9	Clear, strong sulphuric odour
SBT-GW-4019	8.921	70.0	-	20 - 30	10	15/09/2022	1.12	12,810	7.09	-192.3	19	Clear, strong sulphuric odour

Notes:
1) Elevation of monitoring well not surveyed. Water levels in m AHD estimated from ground elevation.

Tabulated groundwater monitoring results for the groundwater samples which have been collected are provided in Appendix 5.

The following provides a summary of the groundwater monitoring results.

10.4.1.1. Metals

Low concentrations of dissolved phase metals including arsenic, cadmium, chromium, copper, nickel, and zinc were reported in groundwater. These concentrations were generally consistent with the ranges reported in groundwater monitoring from previous sampling events with the exception of arsenic which was reported in MW04 at higher concentrations than previously, while nickel and zinc were previously reported at higher concentrations in the monitoring wells.

Gross areas of elevated concentrations of metals of concern in soil have not been identified from the DSI and previous investigations. Metals in groundwater are likely to be attributed to a combination of natural and diffuse urban/industrial sources in the area.

10.4.1.2. Hydrocarbons

Hydrocarbons were not reported in groundwater samples collected by TTMP, and no hydrocarbon odours were observed during sampling. Previous groundwater monitoring by GHD (2022) reported TRH fractions in MW-04 below assessment criteria. Previous groundwater monitoring near the removed USTs did not report any impact.

10.4.1.3. BTEX, PAH, Phenols, OCP/OPPs, PCBs

BTEX, PAH, Phenols, OCP/OPPs and PCBs were not detected in the groundwater samples analysed, consistent with previous investigations.

10.4.1.4. PFAS

PFAS was detected in all the groundwater samples analysed, with total PFAS concentrations reported ranging between 0.001 to 0.301 µg/L. PFAS detections in most wells related to the compound 6:2 Fluorotelomer sulfonic acid. PFAS concentrations reported in groundwater are shown in Figure 11, Appendix 1.

The highest PFAS concentration was reported in MW-01, which primarily contained the PFAS compounds:

- Perfluorobutane sulfonic acid (PFBS)
- Perfluorohexanoic acid (PFHxA)
- Perfluoropentane sulfonic acid (PFPeS)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorooctanesulfonic acid (PFOS)
- Perfluoropentanoic acid (PFPeA).

The concentration of PFOS in MW-01 (0.0004 µg/L) and MW-205 (0.0005 µg/L) exceeded the PFAS NEMP 2020 Freshwater 99% criteria and the sum of PFHxS + PFOS in MW-01 (0.107 µg/L) exceeded the Australian Drinking Water Guideline for Health.

These reported concentrations are consistent with the AFFF compounds previously used on the site.

Detection limits used in the ERM (2021) and GHD (2022) groundwater investigations were higher than those adopted by TTMP with a LOR of 0.01 µg/L. ERM (2021) and GHD (2022) did not detect concentrations of PFOS + PFHxS or PFOA above the drinking water guidelines.

10.4.1.5. Nutrients

Elevated concentrations of ammonia exceeding the ANZG 95% freshwater quality guidelines were reported. The concentrations reported ranged from 480 – 4910 µg/L, which is generally consistent with previous investigations.

Ammonia could derive from biological processes and/or other anthropogenic sources.

The highest concentration of ammonia reported was in MW-202 located hydraulically upgradient of the station box site.

10.4.1.6. Other VOCs

Low concentrations of chloroform were reported in groundwater samples from SBT-GW-4017 and SBT-GW-4019. Chloroform is a by-product formed during the chlorination of water and may indicate there is a leaky water pipe located on-site or off-site.

10.5. Contaminant Leachability

Where contaminants were reported exceeding NSW 2014 General Solid Waste CT1 (No Leaching) the samples were further analysed for TCLP. Only Nickel and Benzo(a) pyrene were reported above CT1 guidelines at the Aerotropolis site in 1 sample each and the TCLP of these was below the LOR. Therefore, no samples exceeded NSW 2014 General Solid Waste SCC1 (leached) Guidelines.

TCLP PFAS Data

TCLP PFAS leachability tests were undertaken on 48 samples by TTMP and are included in Table 4, Appendix 5, and summarised in Table 35. In summary all TCLP and Total results were below the NSW 2014 General Solid Waste SCC1 (leached) Guidelines including the maximum concentration reported in SBT-BH-4259_0.10-0.2.

Table 35: Leachability of PFAS compounds by TCLP

Field ID	Total PFOS + PFHxS (ug/kg)	TCLP PFOS + PFHxS (ug/l)	PFOA (ug/kg)	TCLP PFOA(ug/l)
General Solid Waste SCC1	*1800*	*50*	*18000*	*500*
SBT-BH-4259_0.10-0.2	1790	19.7	5.1	0.1
SBT-BH-4272_0.10-0.2	880	14	1.8	0.08
SBT-BH-4258_0.0-0.1	522	5.99	1.6	0.03
SBT-BH-4259_0.50-0.6	264	14.6	19.4	0.68
SBT-TP_4297_0.40-0.5	250	11.6	0.9	0.06
QC83-JY-21062022	238	15.2	17.4	0.55
SBT-BH-4258_0.4-0.5	211	18.1	0.4	0.06
SBT-BH-4259_1.00-1.1	208	15.1	12.4	1.12

Field ID	Total PFOS + PFHxS (ug/kg)	TCLP PFOS + PFHxS (ug/l)	PFOA (ug/kg)	TCLP PFOA(ug/l)
SBT-BH-4261_0.50-0.6	169	4.81	11.3	0.36
SBT-BH-4239_0.50-0.6	133	2.73	4.8	0.13
SBT-BH-4261_0.10-0.2	112	3.12	2.4	0.1
SBT-BH-4261_1.00-1.1	93.4	5.52	1.3	0.07
SBT-BH-4254_0.0-0.1	89.4	0.54	0.8	0.02
SBT-BH-4272_0.50-0.6	77.4	2.51	2.8	0.12
SBT-TP_4297_0.00-0.1	74.5	0.6	1.5	0.02
SBT-BH-4269_0.50-0.6	72.5	3.8	0.9	0.1
QC32-FL-1062022	60.5	0.99	0.4	0.02
SBT-BH-4239_0.10-0.2	53.1	0.53	0.4	<0.01
SBT-TP-4297_0.40-0.5	50.2	0.93	1	0.03
SBT-BH-4263_0.4-0.5	39	1.27	0.8	0.04
SBT-BH-4262_0.10-0.2	33.8	0.52	0.7	0.02
SBT-TP-4299_0.00-0.1	31.6	0.46	0.2	0.01
SBT-BH-4255_0.9-1.0	27.1	0.9	<0.2	<0.01
SBT-TP-4299_0.90-1.0	27	0.99	<0.2	<0.01
SBT-BH-4265_0.10-0.2	25.6	0.18	<0.2	<0.01
SBT-BH-4266_0.50-0.6	24.9	1.21	<0.2	<0.01
SBT-BH-4262_1.00-1.1	22.6	0.58	<0.2	<0.01
SBT-BH-4269_0.10-0.2	21.5	1.59	<0.2	<0.01
SBT-BH-4242_0.9-1.0	20.1	0.12	0.2	<0.01
SBT-BH-4239_3.00-3.1	18.5	0.42	0.3	0.01
SBT-BH-4253_0.0-0.1	17.8	0.18	<0.2	0.01
SBT-BH-4265_0.50-0.6	17	0.42	0.3	<0.01
SBT-BH-4262_0.50-0.6	15.2	0.59	0.4	0.02
SBT-BH-4256_0.0-0.1	15	0.12	<0.2	<0.01
SBT-BH-4266_1.00-1.1	13.9	0.52	<0.2	<0.01
SBT-BH-4259_6.00-6.1	13.5	0.36	<0.2	<0.01
QC45-FL-06062022	11.4	0.17	0.8	0.03
SBT-BH-4264_0.0-0.1	10.8	0.54	0.6	0.02
SBT-BH-4267_0.10-0.2	9.2	0.22	0.4	0.01
SBT-BH-4261_5.00-5.1	8.3	0.25	<0.2	<0.01
SBT-TP-4300_0.00-0.1	6.4	0.04	<0.2	<0.01
SBT-BH-4239_4.00-4.1	5.3	0.21	<0.2	<0.01
SBT TP 4277 0.4-0.5	5.2	0.12	<0.2	<0.01
SBT TP 4276 0.0-0.1	4.9	0.21	<0.2	<0.01
QC19-FL-1062022	4.6	0.07	<0.2	<0.01
SBT-BH-4257_0.0-0.1	4.5	0.05	<0.2	<0.01
SBT TP 4278 0.0-0.1	3.9	0.1	<0.2	<0.01

Field ID	Total PFOS + PFHxS (ug/kg)	TCLP PFOS + PFHxS (ug/l)	PFOA (ug/kg)	TCLP PFOA(ug/l)
SBT-BH-4239_6.00-6.1	1.3	0.02	<0.2	<0.01
SMWSA_GHD_BH30_0.4-0.5m	715	16.2	1.1	0.03
SMWSA_GHD_BH30_0.9-1m	261		2	
SMWSA_GHD_BH31_0-0.1m	190		0.3	
SMWSA_GHD_BH31_0.2-0.3m	840	21.2	3.8	0.11
SMWSA_GHD_BH31_0.5-0.6m	215		3.1	
SMWSA_GHD_BH31_1.8-2.1m	183		0.6	
SMWSA_GHD_TP52_ 0-0.1m	154		0.8	
SMWSA_GHD_TP52_0.5-0.6m	554	22.2	5	0.18

ASLP PFAS Data

Australian Standard Leaching Procedure (ASLP) leachability tests were undertaken on 40 samples and the results of these tests is provided in Table 7, Appendix 5. The leach test is intended to approximate leaching in response to a pH neutral solution such as rainwater.

A scatter plot of the leachability tests completed for PFOS + PFHxS is provided in Figure 7-A, and PFOS and in Figure 8-A. The figures show an approximate linear relationship between the concentration of these analyte in soil and the analyte leached.

The ASLP leach data exceeds the Cardno (2021) *Human Health and Ecological Risk Assessment (HHERA): Spoil Re-use Sydney Metro and Western Sydney Airport, 29 June 2021* General use criteria for standard commercial/industrial use which adopted a criteria for PFOS+PFHxS of 0.005µg/l.

Section 6.3.2 of the Cardno HHRA notes that where these generic criteria are exceeded further site specific risk assessment may be required to assess the suitability of the soil material for on-site reuse.

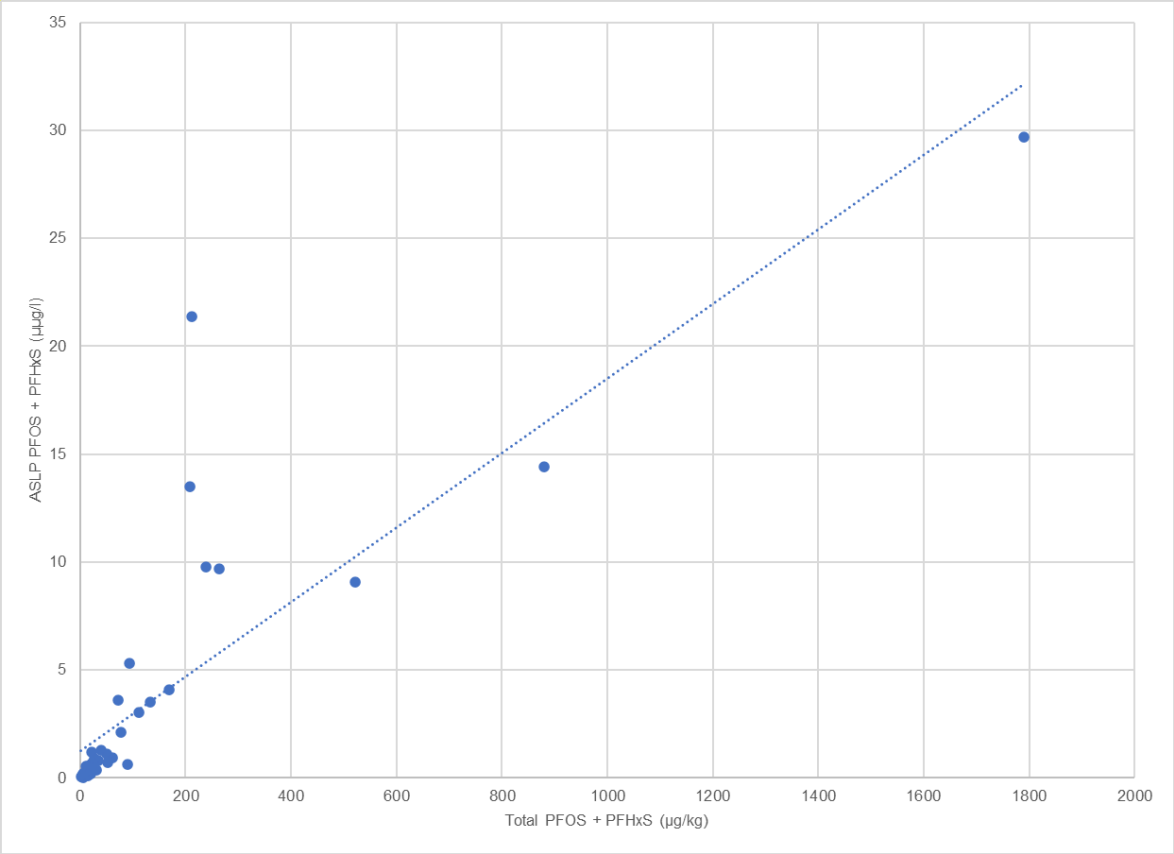


Figure 7-A PFOS + PFHxS ASLP Leachability Data

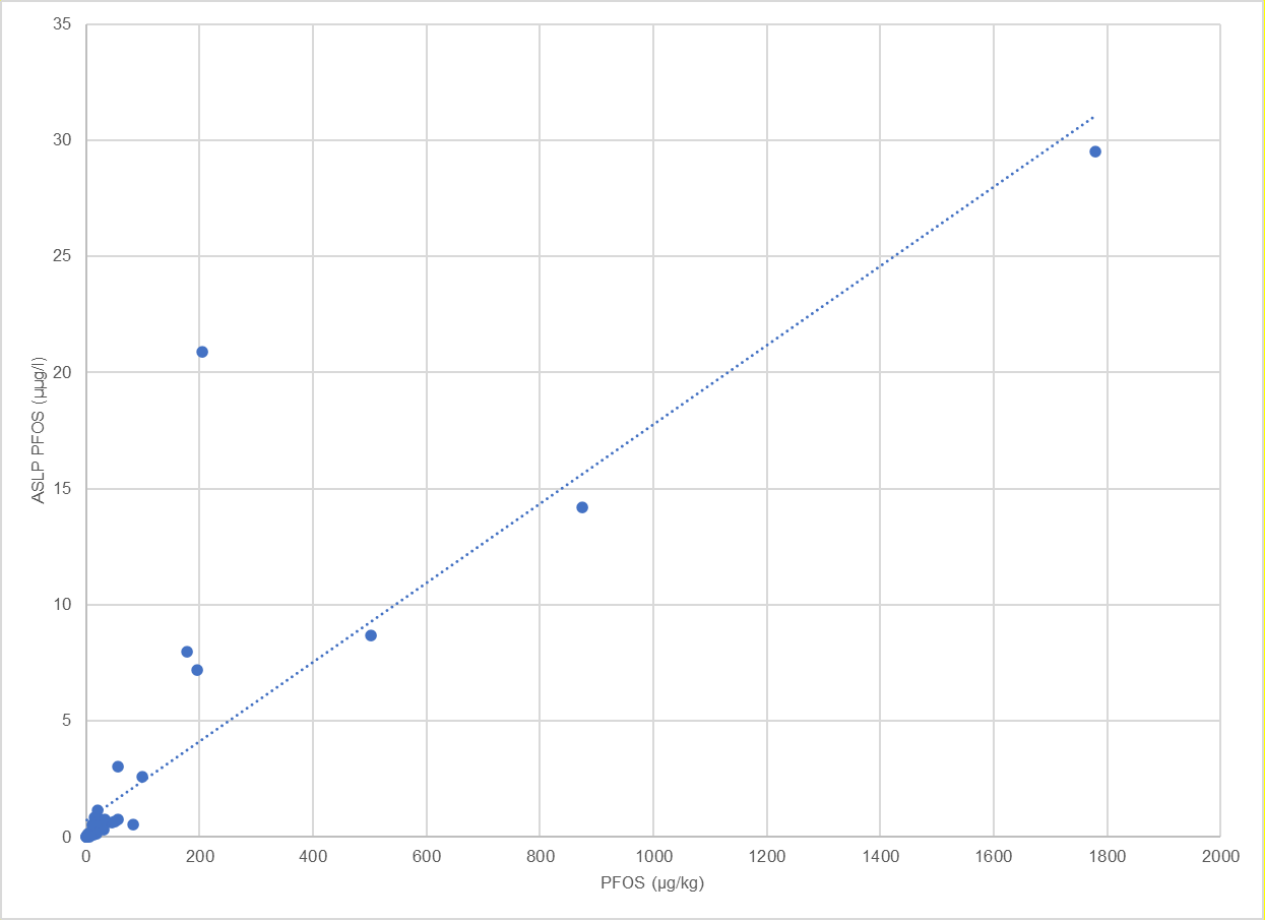


Figure 8-A PFOS ASLP Leachability Data

10.6. Discussion of Results

This section provides a discussion of the analytical results.

Section 10.6.1 provides a discussion of the findings of DSI in relation to data gaps and PAoC described in Section 7.2.

Section 10.6.2 to Section 10.6.5 provides discussion of the analytical results in relation to PFAS.

Section 10.6.6 to Section 10.6.6 provides a discussion of the analytical results for the Bringelly Shale in regard to organics and metals.

Section 10.6.8 and Section 10.6.9 provide a qualitative discussion of the potential risk to human health and the environment.

10.6.1. Data Gaps and Potential Areas of Concern

As noted in Section 7.2, twelve PAoCs were identified during the development of the SAQP. The location of the PAoCs are shown in Figure 6 and Figure 6A in Appendix 1.

Table 37 provides a summary of the findings relative to these PAoCs.

Table 36: Potential Areas of Concern and DSI findings

Data Gap	Description	DSI Finding
PAoC_01	**Former Flammable Storage:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_TP46, and TP26_Thuroona_2019. The vertical and horizontal extent of PFAS in this area has not been defined.	PAoC_01 to PAoC_08 relate to Potential Areas of Concern (PAoC) associated with elevated concentrations of PFAS which have been reported on the site in previous investigations. Based on the findings of the DSI these areas have been refined and consolidated into three PFAS Areas of Concern (PFAS AC) including PFAS AC_A, PFAS AC_B and PFAS AC_C (refer to Section 10.6.1). Section 10.6.3 provides a discussion on PFAS results in groundwater. Section 10.6.4 provides a discussion on the vertical extent of PFAS. Potential risk to human health and risk to the environment from PFAS is discussed in Section 10.6.8 and Section 10.6.9.
PAoC_02	**Former Fire Hose Shed:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_BH29, SMWSA_GHD_BH30 and SMWSA_GHD_MW06. The vertical and horizontal extent of PFAS in this area has not been defined.	
PAoC_03	**Former Garage:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_TP52. The vertical and horizontal extent of PFAS in this area has not been defined.	
PAoC_04	**South of Former Receiving Station:** elevated concentrations of PFAS reported in soil in SMWSA_GHD_TP62. The vertical and horizontal extent of PFAS in this area has not been defined.	
PAoC_05	**South East of Former Receiving Station:** an elevated concentration of PFAS is reported in the inter-laboratory duplicate soil in SMWSA_GHD_TP74 and was orders of magnitude higher than the result from the primary laboratory. Further investigation is required to confirm the concentration of PFAS reported and whether elevated concentrations are present.	
PAoC_06	**Former Stockpile:** elevated concentrations of PFAS, ACM and other potential contaminants have been reported in previous investigations. The vertical and horizontal extent of PFAS and other potential contaminants beneath the land where the stockpile while located has not been investigated.	
PAoC_07	**East of Workshop:** elevated concentrations of PFAS reported in soil in BH211_ERM_2021. This location is down-slope of PAoC01 to PAoC3. Only one sample location is available at this location and the previous result reported should be confirmed as it may indicate the potential horizontal extent of PFAS contamination extends out to the east.	
PAoC_08	**North eastern drainage lines:** elevated concentrations of PFAS reported in soil/sediment/surface water in SMWSA_GHD_TP43, SMWSA_GHD_MW06 and SMWSA_GHD_SW01/SED01. The vertical and horizontal extent of PFAS in this area has not been defined.	
PAoC_09	**Former Incinerator:** the area where the former incinerator was located has not been previously investigated. There is potential for contamination in this area.	The DSI investigation location (SBT-TP-428) within this area has not reported contaminants of concern which could be expected to be associated with the use of an incinerator including metals and PAHs and is consistent with investigation location from previous investigations in this area. Trace concentrations of PFAS were reported in this area. The findings of the DSI are that PAoC_09 should no longer be considered an area of concern in relation to the use of this area for incineration. This area is located with the Medium Risk Area and accordingly there is potential for asbestos in fill materials.
PAoC_010	**Former Fire Pump House:** the use of the pump house may be associated with AFFF / PFAS. The potential for contamination in the vicinity of the pump house has not been investigated previously.	Elevated concentrations of PFAS have been reported in soil and groundwater at this location. Based on the findings of the DSI this area has been confirmed as a PFAS area of concern and is referred to as PFAS AC_D. The basis for this area being confirmed as a PFAS area of concern is provided in Section 10.6.1.
PAoC_011	**Demolition Area:** if improperly managed, demolition / remediation activities undertaken in 2022 have the potential to mobilise and spread contamination (e.g., PFAS, ACM, and hydrocarbons) from potential source areas. Investigation within the demolition / remediation areas is recommended to provide a new baseline for this area.	DSI investigation locations have not identified an apparent appreciable change in the distribution of contamination within the demolition area (i.e. the detection of elevated concentrations of PFAS in an area where it was not reported pre-demolition) as a result of demolition activities. However demolition activities which have disturbed soils containing PFAS have potentially resulted in an increase in PFAS in groundwater (refer to Section 10.6.3) and therefore increased the mobilisation of PFAS.
PAoC_012	**Demolition Area with Hydrocarbon Odours:** an area with soil material with kerosene odours was observed during demolition / remediation activities. Investigation is required to establish whether hydrocarbons are present in this area.	DSI investigation locations completed within this area (SBT-BH-4235, SBT-BH-4236, SBT-BH-4237, SBT-BH-4238, SBT-BH-4239, SBT-BH-4240, SBT-BH-4241, SBT-BH-4242, SBT-BH-4265, SBT-BH-4275, SBT-TP-4293) reported non-detects for TRH/BTEX/PAH/Phenols with the exception of sample SBT-BH-4242_0.0-0.1 which reported low concentrations of the PAHs including benzo(g,h,i)perylene (0.7 mg/kg) and pyrene (0.6 mg/kg). It is understood that the materials with hydrocarbons were removed as part of demolition activities (refer to Section 3.3.2) and the DSI findings support this finding.
MW04	Previous investigation (GHD, 2022) reported elevated TRH concentrations in the groundwater sample from MW04 (1.34 mg/l C10-C40). Other potential organic contaminations of concern (e.g., BTEX, PAH, Phenols, other VOC/SVOCs) were not detected and no hydrocarbon odours were reported in bore logs. The result is potentially a false positive and should be investigated through further groundwater investigation and TRH fingerprint analysis.	Hydrocarbons were not detected in the groundwater sample taken from MW-04 on the 25/7/22 (refer to Section 10.4.1.2). Gross areas of hydrocarbon impact i.e. in association with the USTs) have not been identified in previous investigations or the investigation undertaken by TTMP.

Data Gap	Description	DSI Finding
Organic false positives	Organic false positives (e.g., TRH/BTEX) have been reported in natural materials in previous investigations. Further investigation is required to investigate the potential for false positives associated with organic potential contaminants of concern.	Refer to Section 10.6.6.
Groundwater Levels and Quality	Further groundwater wells are recommended to confirm groundwater flow direction and quality, and groundwater which may be drawn into excavations.	Refer to Section10.4 and Section 10.6.3.

10.6.2. Distribution of PFAS in Soil

To assist with the conceptualisation of the distribution of PFAS in soil the maximum concentration of PFAS reported at each intrusive sample location was mapped and are shown in Figure 7-A, and in Figure 9, Figure 9A, Figure 9B, Figure 9C, and Figure 9D, Appendix 1.

Based on the analytical data for soil and with consideration to the groundwater data, four PFAS Areas of Concern (PFAS AC) have been identified. These areas are shown in the aforementioned figures.

PFAS ACs are considered to be areas where PFAS concentrations in soil have been consistently reported in soils with concentrations greater than 5 µg/kg (and therefore indicating PFAS impact from historic site uses rather than low level PFAS detections indicative of background concentrations) and/or other lines of evidence to support the area being considered as a PFAS AC including historical activities which occurred in the area which may be associated with the use of AFFF and groundwater data.

These areas are summarised as follows:

- PFAS AC_A: PFAS in soil in this area is potentially associated with historical releases from the former septic system (e.g. releases during periods of rainfall) and/or stormwater runoff. PFAS contamination appears to be migrating in a north easterly direction along an overland flow path and extends beyond the boundary of the Aerotropolis site. Transport mechanisms for the migration of PFAS will be predominately be driven by leaching/mobilisation of PFAS in soil to surface water runoff and groundwater (as a result of surface water infiltration) during rainfall events.
- PFAS AC_B: PFAS in soil in this area is appears to be associated with the former fire hose shed where AFFF products were historically observed. PFAS contamination appears to be migrating in a north easterly direction (assumed to be along an overland flow path) and extends beyond the boundary of the Aerotropolis site. Transport mechanisms for the migration of PFAS will be predominately be driven by leaching/mobilisation of PFAS in soil to surface water runoff and groundwater (as a result of surface water infiltration) during rainfall events.
- PFAS AC_C: PFAS in soil in this area is appears to be associated with the former stockpile (PAoC 6) and an undetermined activity which resulted of PFAS contamination at the southern end of the OTC. The highest concentration of PFAS was found to occur in the north-eastern corner of this area (the location of PAoC 4). The highest concentration reported was in SBT-BH-4272 0.1-0.2 m bgs.
- PFAS AC_D: PFAS in soil in this area is appears to be associated with the former fire pump house (PAoC 10). The extent of PFAS in soil in this area appears to be limited in extent and concentrations reported are substantially lower than AC_A, AC_B, and AC_C. This area has been considered as a PFAS AC based on the concentration of PFAS reported in soil, the concentration of PFAS in groundwater in SBT-GW-4019 which is higher than concentrations in monitoring wells west of the site (SBT-GW-4013, MW-201 and MW-202), and the use of this area in association with fire suppression equipment.

Table 37 provides a summary of the maximum concentration of PFAS reported in these areas.

Table 37: Maximum Concentration of PFAS reported in Potential PFAS Areas of Concern

Analyte (µg/kg unless shown)	PFAS AC_A	PFAS AC _B	PFAS AC _C	PFAS AC _D
Perfluorobutane sulfonic acid (PFBS)	0.2	3.8	0.6	24.2
Perfluoropentane sulfonic acid (PFPeS)	0.9	11.7	1.6	<0.2
Perfluorohexane sulfonic acid (PFHxS)	124	194	58.1	<0.2
Perfluoroheptane sulfonic acid (PFHpS)	3.5	21	3.2	<0.2
Perfluorooctanesulfonic acid (PFOS)	241	1780	875	0.3
Perfluorodecane sulfonic acid (PFDS)	5.1	19.5	1.3	<0.2
Perfluorobutanoic acid (PFBA)	<5	1	1	<1
Perfluoropentanoic acid (PFPeA)	1.3	1.9	1.1	<0.2
Perfluorohexanoic acid (PFHxA)	8.5	21.3	4.7	<0.2
Perfluoroheptanoic acid (PFHpA)	1.9	3.4	0.7	<0.2
Perfluorooctanoic acid (PFOA)	4.8	19.4	2.8	<0.2
Perfluoropropanesulfonic acid (PFPrS)	<5	0.1	<0.1	
Perfluorononanesulfonic acid (PFNS)	<5	<5	<0.1	
Perfluorononanoic acid (PFNA)	0.3	0.3	<1.6	<0.2
Perfluorodecanoic acid (PFDA)	0.3	1.1	<1.6	<0.2
Perfluoroundecanoic acid (PFUnDA)	0.3	0.3	<1.6	<0.2
Perfluorododecanoic acid (PFDoDA)	0.5	0.6	<1.6	<0.2
Perfluorotridecanoic acid (PFTrDA)	<5	<5	<1.6	<0.2
Perfluorotetradecanoic acid (PFTeDA)	<5	<5	<5	<0.5
Perfluorooctane sulfonamide (PFOSA)	2.7	3.2	<1.6	<0.2
N-Ethyl perfluorooctane sulfonamide (NEtFOSA)	<8	<5	<8	<0.5
N-ethylperfluorooctanesulfonamidoethanol (NEtFOSE)	<16	<5	<16	1.2
N-ethyl-perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	<10	0.9	0.3	<0.2
N-methylperfluorooctane sulfonamidoacetic acid (NMeFOSAA)	<10	<10	<8	<0.2
N-Methyl perfluorooctane sulfonamide (NMeFOSA)	<8	<5	<8	<0.5
N-Methylperfluorooctanesulfonamidoethanol (N-MeFOSE)	<16	<5	<16	<0.5
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	<5	<5	<1.6	<0.5
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	<10	0.9	<0.5	<0.5
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	<5	<5	<1.6	<0.5
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	<5	<5	<0.5	<0.5
Sum of enHealth PFAS (PFHxS + PFOS + PFOA)*	125.8	287	0.2	
Sum of US EPA PFAS (PFOS + PFOA)*	31.3	187	4	
Sum of PFAS (WA DER List)	254	1800	888	24.2
Sum (PFHxS + PFOS)	250	1790	880	0.3
Sum of PFASs (n=28)	255	1810	890	24.2

GHD sample location SMWSA_GHD_A_V023[13] had an elevated concentration of PFAS (Total PFAS 12.8 µg/kg) in comparison to background levels. This location is not considered to be a PFAS AC based its isolated occurrence and no apparent association with historical activities where AFFF is likely to have been used in association with fire suppression systems.

In the northern Low Impact Area a concentration of Total PFAS of 16 µg/kg was reported in SMWSA-GHD-TP21 0.9-1.0 m bgs. This location is not considered to be a PFAS AC based its isolated occurrence, no detection of PFAS in the overlying soil sample (SMWSA-GHD-TP21 0.5-0.6 m bgs) and no apparent association with historical activities where AFFF is likely to have been used in association with fire suppression systems.

[13] Note in previous revisions to this DSI report this location was referred to as PFAS AC_D. This no location is no longer referred to as PFAS AC. Previous revision of the DSI report referred to PFAS AC_E. This has now been renamed PFAS AC_D in this version of the DSI Report.

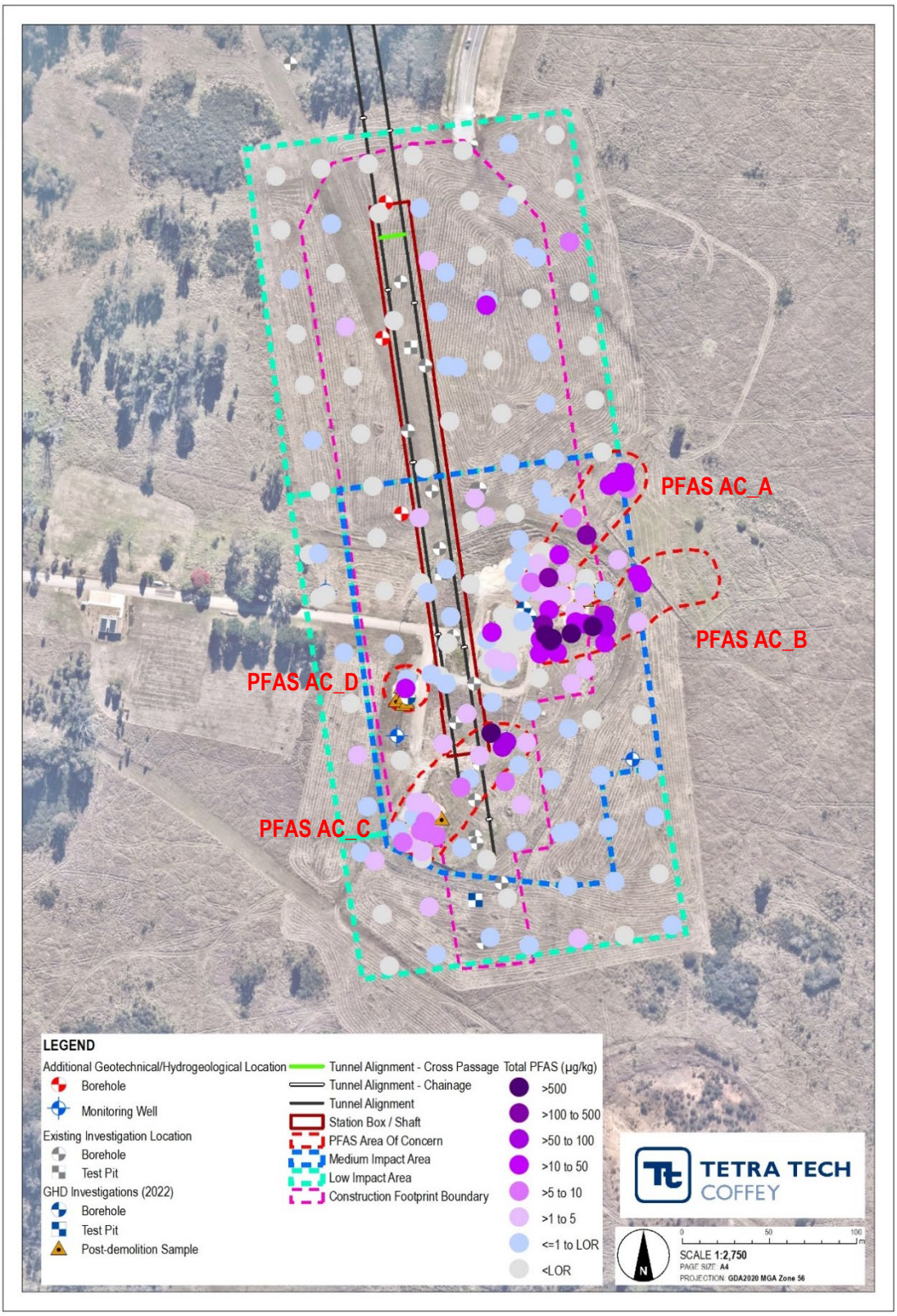


Figure 9-A Conceptual Distribution of PFAS in Soil

10.6.3. PFAS in Groundwater

Groundwater monitoring at Aerotropolis conducted by TTMP reported the presence of PFAS in the groundwater related to several PFAS compounds. The compound 6:2 Fluorotelomer sulfonic acid (6:2 FTS) was reported in all sampled wells except MW-06. Other PFAS compounds detected were Perfluorobutane sulfonic acid (PFBS), Perfluoropentane sulfonic acid (PFPeS), Perfluorohexane sulfonic acid (PFHxS), Perfluorooctanesulfonic acid (PFOS), Perfluoropentanoic acid (PFPeA), Perfluorohexanoic acid (PFHxA) and Perfluorooctanoic acid (PFOA), which were found to be present in specific wells, but not across the whole site.

The reported concentrations likely relate to the use of AFFF compounds on the site, the variability in PFAS analytes reported reflect the use of different AFFF products within the site. Ecological and human health criteria adopted for the site were exceeded in two wells. Specifically, the concentration of PFOS in MW-01 and MW-205 exceeded the PFAS NEMP 2020 Freshwater 99% criteria and the sum of PFHxS + PFOS in MW-01 exceeded the Australian Drinking Water Guideline for Health.

PFAS concentrations in groundwater show an increase in concentrations hydraulically down-gradient of the former OTC site in comparison to monitoring well locations up-gradient of this facility.

Previous investigations of these wells by GHD and ERM did not report PFAS detection in these monitoring wells except for the presence of 6:2 FTS in MW-04 (GHD, 2022). However, the detection limits for these investigations were higher than those adopted by TTMP.

The highest concentration of PFAS reported in the groundwater samples collected by TTMP was in in MW-01, and the concentrations at this location were higher than sampling completed by GHD. This is potentially attributed to an increase in mobilisation of PFAS in response to rainfall and/or potentially disturbance to soil material on the site in association with demolition work. MW-01 is down-gradient of PFAS AC_A and potentially PFAS AC_B.

The other previous investigation by Cardno/Golder reported PFOS (0.0002 µg/L) in BH-D308 and Perfluoroheptanoic acid (PFHpA) (0.001 µg/L) and 6:2 FTS (0.006 µg/L) BH-D324.

10.6.4. Vertical Extent of PFAS

Higher concentration of PFAS impact were generally reported in the first 1 m of soil material in PFAS AC_A, PFAS AC_C, and PFAS AC_E, and within the first 2 m in PFAS AC_B

Within PFAS AC_A and PFAS AC_B positive detection of PFAS has been confirmed to the maximum depth investigated by TTMP in these areas at 6 m bgs. At 6 m bgs the maximum Total PFAS concentration reported was 13.8 µg/kg in sample SBT-BH-4259_6.00-6.1. SBT-BH-4259 has the highest reported concentration (Total PFAS 1810 µg/kg) of PFAS at the site in sample SBT-BH-4259_0.10-0.2.

Within PFAS AC_C positive detection of PFAS was reported in SBT-BH-4272_3.00-3.1 and SBT-TP_4277_0.9-0.1_3.00-3.1. The vertical extent of PFAS at these locations was not determined. PFAS was not detected in samples greater than 2 m bgs in samples from SBT-BH-4269 and SBT-CM-4018.

Within PFAS AC_E PFAS was not detectable in samples greater than 2 m bgs based on the results for SBT-BH-4274. PFAS was detected in SBT-BH-4019 (SBT-GW-4019) at 1.50-1.6 m bgs, and was non-detect at 3-3.1 m bgs. SBT-BH-4019 is located in between PFAS AC_E and PFAS AC_C.

The vertical extent of PFAS in PFAS AC_D was not determined however it is unlikely to be at depth (> 2m) based on the comparatively lower concentrations of PFAS reported in the surface sample at this location.

10.6.5. PFAS Detections in the Station Box Samples and their Origins

In the investigation work undertaken by TTMP, PFAS was detected in surface samples however PFAS was not detected in the samples collected from 0.5 m[14] to maximum depth investigated at 34.5 m bgs. This includes but not limited to data from the following locations:

- SBT-BH-4016 which is located in close proximity to PFAS AC_D
- SBT-CM-4018 which Is located within PFAS AC_C.

Previous investigations by Golder Associates / Douglas Partners, and Cardno identified trace concentrations of PFAS (mainly Perfluorobutane sulfonic acid (PFBS)) in deeper samples within the station box. PFBS was also detected in groundwater and in shallow soil samples by TTMP.

Noting that PFAS is present in groundwater it is plausible that PFAS is potentially present within the saturated soil/rock on the site beneath the groundwater table.

However, the investigation data by TTMP suggests an apparent change in the concentration of PFAS reported in the deeper samples, that is PFAS was not detectable within the laboratory limits of reporting adopted for this investigation which are comparable to previous investigations.

The investigation undertaken by TTMP included boreholes located in close proximity to investigation locations where PFAS was previously reported. For example:

- SBT-CM-4018 which is located approximately 17 m from SMGW-BH-D211
- SBT-BH-4016 which is located approximately 25 m from SMGW-BH-D325
- SBT-BH-4015 which is located approximately 25 m from SMGW-BH-D324
- SBT-BH-4013 which is located approximately 21 m from SMGW-BH-D322
- SBT-BH-4012 which is located approximately 25 m from SMGW-BH-D321 and 34 m from SMGW-BH-D310
- SBT-BH-4012 which is located approximately 45 m from SMGW-BH-D310

The change could potentially be attributed to changes in site conditions and/or the potential for false positives in previous investigations.

Cardno (2022) noted the occurrence of false positive PFAS results from drilling/sampling at Aerotropolis, though Cardno has not provided sufficient information to confirm the mechanism in which false positives could have occurred during drilling/sampling. Cardno (2022) also adopted site investigation practices which TTMP considers as potentially placing limitation on the interpretation of data from boreholes drilled in September 2021 (refer to the SAQP for further information). There is also not sufficient information to make conclusive inferences on the differences in investigation methods undertaken by TTMP and those from previous investigations and how these may have affected investigation results. TTMP does not consider that it will be practicable nor necessary to make such a comparison.

[14] The exception to this was SBT-BH-4013 where positive detection of PFAS was reported in 0.5 m.

TTMP consider that there could be numerous mechanisms which could result in a false positive for PFAS which include but not limited to:

- the presence of contamination on drilling and/or sampling equipment which results in cross-contamination of the sample
- cross-contamination from background sources of PFAS present in the environment including soil and groundwater materials
- cross-contamination during the laboratory analysis of samples
- laboratory error.

TTMP consider that the investigation completed for the DSI should be considered to be a new baseline for soil and Bringelly Shale materials within the station box where non-detects have been reported in the investigation undertaken by TTMP.

10.6.6. Organics in the Bringelly Shale

Previous investigations reported the presence of organics in the Bringelly Shale (mainly investigated within the footprint of the station box) including:

- TRH hydrocarbons in the F1 C6-C10 fractions, F2 C10-C16 fractions and F3 C16-C34 fractions
- BTEX (benzene, toluene, ethyl xylene and xylene)
- PAHs (mainly naphthalene)

These were interpretated in previous investigations as false positives from drilling on the basis that no confirmed source of hydrocarbons had been identified on the site.

Sampling completed by TTMP also reported the presence of organics in the Bringelly Shale including:

- TRH hydrocarbons in the F1 C6-C10 fractions, F2 C10-C16 fractions and F3 C16-C34 fractions
- toluene and xylene
- PAHs (phenanthrene and naphthalene)

The highest concentration of hydrocarbons reported was in SBT-BH-4016_19.10-19.2 (TRH C10-C40 180 mg/kg). Review of the chromatogram of this sample by ALS identified presence of shale oil.

Chromatograms were also reviewed for the following samples and were reported by ALS as having a range of aliphatic and aromatic hydrocarbons including: methyl butane, pentane, hexane, heptane, octane, methyl pentane, methyl hexane/heptane, cyclohexane, methylcyclohexane, dimethyl cyclohexane, trimethyl benzene, ethyl methyl benzene and cyclopentane. Samples reviewed by ALS included:

- SBT-BH-4019_12.50-12.6
- SBT-BH-4019_20.50-20.6
- SBT-BH-4011_10.90-11.0
- SBT-BH-4011-22.30-23.0
- SBT-BH-4011-24.00-24.1
- SBT-BH-4012_22.40-22.5
- SBT-BH-4012_26.40-26.5
- SBT-BH-4012_30.40-30.5.

No gross anthropogenic sources of hydrocarbons were identified on the site associated with former site activities including USTs, workshops, sheds etc. have been identified on the site, and TRH, BTEX and PAH analytes were not detected in the groundwater samples collected.

Samples from the water sump[15] used in drilling (Appendix 10) reported detections of TRH, non-detects for BTEX and minor detections of PAHs (phenanthrene and naphthalene) during drilling. Non-detects for BTEX and PAH in the sump water at the start of drilling and non-detects of these compounds associated with water used in drilling and drilling additives suggest that the detection of these compounds in the water sump during drilling is more likely to be derived from the materials cored during drilling (i.e. the Bringelly Shale) rather than an anthropogenic source introduced during drilling (i.e. a false positive).

Accordingly petrogenic sources of organic compounds in the shale need to be considered.

In the PhD thesis by Ezzat (2015) which investigated engineering properties of the Bringelly Shale, samples of the Bringelly Shale were collected from over a wide-ranging area west of Sydney including:

- Mulgoa (approximately 8 km west south west of Orchard Hills SBT site)
- Horsley Park (Austral Bricks and Pavers) approximately 8.3 km east south east of Orchard Hills SBT site)
- Badgerys Creek (Boral Brickworks located approximately 3.3 km north east north of Aerotropolis)
- Kemps Creek (Brandown Quarry located approximately 4 km west of WSA).

Organic matter was measured using former Australian Standard AS1289.D1.1 1977. Organic matter in the shale was estimated to be approximately 1.4% and 2.9%. Organic matter was also observed in microscopic examination of the shale. Organic matter in the shale is likely with this geological formation as a former fluvial flood basin.

Similar amounts of organic matter in the Bringelly Shale (0.94% to 1.47%) were noted in Lovering (1954).

Hydrocarbons form from organic materials through a process referred to as thermal maturation. The transformation is associated with heat-driven reactions which occur as a result of progressive burial of these materials. Factors including temperature, pressure and the duration of these conditions are key factors which contribute to thermal maturation (Huddelstone-Holmes, et al, 2018).

Naturally derived hydrocarbons were identified in an investigation involving the analysis of 225 samples of the Ashfield Shale in Sydney (Halim, 2009). The investigation confirmed the presence of naturally derived petroleum hydrocarbons in the C6-C9, C10-C14, C15-C28 and C29-C36 fractions, and PAHs.

Shale and shale oils and other related geological formation such as coal are known to contain hydrocarbons including aromatic hydrocarbons observed in the Bringelly Shale such as:

[15] Water from the sump is used during drilling. Refer to Appendix 10 for further information on this water and the results of the samples collected.

- BTEX[16]
- PAH[17]
- phenols, aldehydes, ketones, and various carboxy-, hydroxyl- and methoxy- bearing compounds; and low molecular weight aliphatic hydrocarbons (Herbet, 2011).

Figure 10-A and Figure 11-A are photographs of the core logs from SBT-BH-4016. Darker grey shale materials can be observed in the materials where the maximum TRH concentration was observed at approximately 19 m bgs. As noted previously the chromatogram of this sample was interpreted by ALS as shale oil.

Figure 10-A Core log photograph from SBT-BH-4016

[16] https://environment.des.qld.gov.au/management/activities/non-mining/fraccing/btex-chemicals
[17] https://www.dcceew.gov.au/environment/protection/npi/substances/fact-sheets/polycyclic-aromatic-hydrocarbons

Figure 11-A Closeup of core log photograph from SBT-BH-4016

In summary the low concentrations of organics reported in the Bringelly Shale at Aerotropolis are considered to be naturally occurring based on the following lines of evidence:

- anthropogenic sources of contamination which could result in contamination to the Bringelly Shale have not been identified on the site
- hydrocarbon contamination which would result in groundwater contamination of the Bringelly Shale has not been identified
- drilling additives are considered to be an unlikely cause of the false positives (particularly BTEX and PAHs)
- the Bringelly Shale contains organic matter which can transform into hydrocarbons. Naturally occurring hydrocarbons including PAHs have been identified in similar shale formations in Sydney (Ashfield Shale)
- review of chromatograms from this investigation identified the presence of Shale Oil.
- the low hydrocarbons reported in this investigation including BTEX and PAHs can form in shale and shale oil.

The investigation of the Ashfield Shale presented in Halim (2009) resulted in the classification of the shale materials as virgin excavated natural material (VENM) despite the detection of low concentrations of hydrocarbons. The conclusion was endorsed by an independent NSW DECC Site Auditor.

TTMP consider that the detection of low concentrations of hydrocarbons in the Bringelly Shale at Aerotropolis should not preclude consideration to the classification of this material as VENM. This aspect is discussed further in Section 11.

10.6.7. Naturally Occurring Metals

An observation of the investigation is that in general, the concentration of metals in the Bringelly Shale appears to be higher than shallower natural soil materials (particularly for copper and zinc).

To illustrate differences the mean and standard deviation of metals were estimated for soil materials from 0 to 4 m in the Low Impact Areas North, South and West; and from >4 m bgs across the site. Natural materials from the Medium Impact Area from 0 to 4 m were excluded based on the higher potential for anthropogenic influence in this area within these materials. The calculated averages are summarised in the following table.

Table 38: Average concentration of metals in natural materials

	Arsenic	Chromium (III+VI)	Copper	Lead	Nickel	Zinc
0-4 m	10 ± 7	18 ± 6	26 ± 10	20 ± 7	11 ± 8	42 ± 18
>4 m	11 ± 15	11 ± 4	40 ± 15	15 ± 5	20 ± 9	75 ± 24

Notes:

1) analytes with non-detects were assumed to have a concentration equivalent to the limit of laboratory reporting.

2) the values listed are the mean ± standard deviation (assuming normal distribution)

Higher concentrations of metals in natural ground deposits >4m bgs (mainly the Bringelly Shale) were particularly notable for copper, nickel and zinc.

Conversely based on the data considered, higher concentration of lead and chromium were apparent in the natural material from 0 to 4 m.

The above discussed analysis of metal concentrations is considered to be relevant when considering the potential for materials from the Bringelly Shale as VENM, and noting the potential for a higher mineral content. When considering metals in the shale (and weathered materials) comparison of metals to generic ambient background concentrations is not considered to be appropriate.

10.6.8. Risk to Human Health

Low Risk Area North, West and South

Risk to human health for a commercial/industrial land use in the low risk areas, north, west and south were previously considered in the Technical Memorandum included in Appendix 11. The following provides a summary of these areas. For further information on the risk assessment completed for the low risk areas refer to Appendix 11.

Materials in these areas were considered to pose a low risk to human health for a commercial/industrial land use, and provided that the preparatory works in these areas where overseen by a competent person during disturbance of soil materials to visually monitored for signs of potential contamination and potential ACM. If evidence of potential ACM or other potential contamination are noted (e.g. stained or odorous soils, buried wastes, etc) work should cease pending further investigation of this material by TTMP. 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.

Medium Risk Area (AEC46)

Fill materials in the medium risk area are considered to pose an unacceptable risk to human health for a commercial/industrial land use based on the presence and/or potential for asbestos (of asbestos including:

- visible asbestos has being present in surface soil
- friable asbestos and asbestos fines with exceed the NEPM HSL of 0.001%.

Within the site other contaminants of concern including metals, PFAS, TRH/BTEX, PAH/Phenols and other organics are not considered to give rise to unacceptable health risks within commercial/industrial land uses.

Land East of Medium Risk Area (AEC46)

The NSW Government *Western Sydney Aerotropolis Precinct Pan March 2022* shows that surrounding the Aerotropolis the proposed land uses will be commercial/mixed used developments and residential land.

Previous investigations have identified that PFAS from the Medium Risk Area is migrating off-site in an easterly direction towards Thompsons Creek.

PFAS in soil materials at sampling site SMWSA-GHD-SED01 exceed human health investigations in the PFAS NEMP 2.0 for residential land use with garden/accessible soils (note these guidelines do not account for eggs from home poultry, nor milk or consumption of livestock).

PFHxS + PFOS in SMWSA-GHD-MW01 which is located off site was found with exceeded the Australian Drinking Water Guideline for Health.

Investigation of the extent and significance of PFAS contamination outside the site is not within the scope of this investigation. Further investigation and risk assessment may be required to consider the risk to human health for future residential areas which may be impacted by PFAS.

Land West of Medium Risk Area (AEC46)

Based on previous investigations potential exists for asbestos to be found in land west of the Medium Risk Area in association with the former married quarter. Consideration of potential risk to human health from asbestos in this area is outside the scope of this investigation.

10.6.9. Risk to Environment

PFAS in surface water and groundwater has been found to be migrating off-site in surface water and groundwater with concentrations which exceed the PFAS NEPM 99% species protection guidelines. The PFAS NEMP guidelines note that the 99% level of protection are to be used for moderately disturbed ecosystems to account for PFAS which can bioaccumulate and biomagnify in wildlife.

Within the project site PFAS has been found in soil which exceeds the ecological criterial adopted from the PFAS NEMP including guidelines for indirect exposure for intensively developed sites with no secondary consumers and minimal potential for indirect exposure.

PFAS has also been found to exceed PFAS NEMP 2.0 guidelines ecological indirect exposure in areas off the Project site.

However, if improperly managed PFAS in soil poses a potential risk to groundwater receptors, and terrestrial and aquatic ecological receptors. Consideration to PFAS in soil, groundwater, and surface water beyond the boundary of the site is outside the scope of this DSI.

Within the site other contaminants of concern including metals, TRH/BTEX, PAH/Phenols and other organics are not considered to pose an unacceptable risk to ecological receptors for a commercial/industrial land use.

10.7. Duty to Report Contamination under the Contaminated Land Management Act 1997

The DSI report has confirmed the presence of PFAS sources within the Aerotropolis site, the leachability of the PFAS compounds and the detection of PFAS in groundwater. Previous investigations have also reported the detection of PFAS in groundwater and surface water on the site.

The DSI has identified that the concentration of PFOS in MW-01 and MW-205 exceeded the PFAS NEMP 2020 Freshwater 99% criteria and the sum of PFHxS + PFOS in MW-01 exceeded the Australian Drinking Water Guideline for Health.

The NSW EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* provides guidelines for the notification of contaminated land in NSW. The following table provides a summary of these and whether notification may be triggered.

Table 39: Duty to report contamination.

Duty to report Contamination requirement	Comment
The level of the contaminant in, or on, soil is equal to or above a level of contamination set out in Schedule B1 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013)* or other approved guideline value with respect to a current or approved use of the land, and people have been, or foreseeably will be, exposed to the contaminant. OR	Contamination (asbestos) has been reported in soil which exceed the adopted guidelines for commercial/industrial land use, however on the basis that recent demolition works were undertaken by an experienced contractor who was aware of asbestos in soil, and planned site work for the SBT Works will be undertaken with controls and under an Asbestos Management Plan it is considered unlikely that an unacceptable human health risk has or will occur in the foreseeable future and therefore this notification requirement would not be triggered.
The contamination meets a criterion prescribed by the regulations. OR	Not applicable
The contaminant or a by-product has entered, or will foreseeably enter, neighbouring land, the atmosphere, groundwater or surface water, and is above, or will foreseeably be above, a level of contamination set out in National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013) or other approved guidelines and will foreseeably continue to remain equal to or above that level.	PFAS contamination in groundwater may trigger notification under Section 2.3.5 of the Duty to Report guidelines. This is discussed further following this table.

Section 2.3.5 of the Duty to Report Guidelines state:

For the purposes of section 60(3)(a) of the CLM Act, notification of actual or foreseeable contamination of groundwater or surface water on the site is required where:

- *the contaminant has entered or will foreseeably enter groundwater or surface water AND*
- *the concentration of the contaminant in the groundwater or surface water is, or will foreseeably be, above the groundwater investigation level for that contaminant as specified in Section 6, Schedule B1 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013) AND*
- *the concentration of the contaminant in the groundwater or surface water will foreseeably continue to remain above the specified concentration.*

Foreseeable is defined under Section 2.3.7 of the NSW Notification Guidelines and states: *Foreseeability depends on a number of considerations, including:*

- *the physical and chemical properties of the contaminants*
- *the quantity of the contaminants*
- *the location of the site*
- *the geological and hydrogeological conditions (soil stratigraphy, depth to groundwater, and direction and rate of groundwater or surface water flow)*
- *the potential fate and transport mechanisms.*

To determine the foreseeable movement of contaminants through various media, such as soil, groundwater, surface water or air, enough samples need to be collected to allow verification of the extent of contamination in the relevant media and the results compared with the appropriate references in these guidelines. Where relevant media have not been sampled, the potential movement of contaminants at levels above the notification trigger values should be assumed. An exception to this is when negligible amounts of contaminants that are unlikely to affect human health and the environment have been released into the environment.

TTMP considers that the concentrations of PFOS and PFHxS + PFOS reported in groundwater could trigger the duty to report contamination to the NSW EPA under Section 2.3.5 of the NSW EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*.

A recommendation has been included in Section 13.3 for Sydney Metro to discuss the findings of the DSI with Western Park City Authority (WPCA), and for Sydney Metro or WPCA to seek legal advice in whether the requirement for notification under Section 60 of the *Contaminated Land Management Act 1997* has been triggered.

11. Preliminary Waste Classification

This section provides a summary of the **preliminary waste classification** for soil materials at the Site.

Further consideration regarding waste classifications will be undertaken as part of the Material Classification Report prepared for materials requiring disposal.

It is understood that site won materials which require off-site disposal would include:

- topsoil stripped from the Medium Risk Area which cannot be reused within this area
- fill materials from piling and bulk excavations within the station box in the Medium Risk Area
- natural soils materials within the station Box in the Low Risk Area (north)
- natural soils within the station box in the Medium Risk Area
- Bringelly Shale generated from piling and bulk excavations within the station box in the Medium Risk Area and Low Risk Area.

Fill materials within the Medium Impact Area should be considered as potentially containing asbestos. TTMP notes that there is randomness to the presence/distribution of asbestos in fill and this has been demonstrated by the existing site investigation data for this site. Based on the current data and understanding of asbestos presence and distribution, it would be reasonable and practical to assume that fill materials in this area to potentially contain asbestos based on historical data.

Topsoil in Medium Risk Area

The Medium Risk Area has an area of approximately 3.6 hectares. Assuming a topsoil thickness of 0.2 m the volume of topsoil generated would be approximately 7,200 m^3. There have been approximately 215 samples from 0-0.2 m bgs in this area which results in an equivalent sample density of 1 per 34 m^3.

Based on the likely presence of asbestos in this area the topsoil material would be considered General Solid Waste, non-putrescible which must be managed as **Special Waste (Asbestos Waste)**.

Fill Materials in Station Box in Medium Risk Area

The depth of fill materials within the Station Box in the Medium Risk Area range from approximately 0.2m to 0.5 m. This area is approximately 3,800 m^2. Assuming a depth of fill of 0.4 m approximately 1,500 m^3 of fill would be generated. There have been approximately 35 samples from 0-0.4 m bgs in this area which results in an equivalent sample density of 1 per 43 m^3.

Based on the likely presence of asbestos in this area the fill material would be General Solid Waste, non-putrescible which must be managed as **Special Waste Asbestos**.

Natural soils within the Station Box in Low Risk Area (north)

Where practicable these materials should be retained on-site for re-use.

These materials are assumed to be from approximately 0.2 m to 2 m bgs. These soil materials have low concentrations of metals, non-detects for organics, and generally non-detects for PFAS. The nearest detect for PFAS is SBT-BH-4013 at 0.5 m.

Based on the results it is considered likely that the soil material could be considered **VENM**, provided it is not mixed with overlying fill or any other waste material. Confirmatory sampling would be required in regard to PFAS in the vicinity of SBT-BH-4013.

Natural soils within the Station Box in Medium Risk Area

Where practicable these materials should be retained on-site for re-use.

These materials are assumed to be from approximately 0.4 m to 2 m bgs.

These soil materials have higher concentrations of metals in comparison to the Low Risk Areas (suggesting anthropogenic influence), minor detects for organics, and infrequent detects for PFAS. PFAS was reported near the station box at SMWSA_GHD_TP61_0.5-0.6m (42 µg/kg) with a concentration which would exceed classification as ENM.

This area is approximately 3,800 m^2. Assuming a thickness of material of 1.6 m approximately 6,100 m^3 of material would be generated. There has been approximately 35 samples collected from 0.4 m to 2 m bgs in this area which results in an equivalent sample density of 1 per 175 m^3.

Conservatively a portion of this material may be **General Solid Waste** (GSW) however further consideration is required to consider whether portion of the material could be considered **ENM** (subject to further testing) or other material categories used by specific soil recycling facilities such as **GSW-Recyclable**[18].

Bringelly Shale within Station Box

Assuming an area of 7,300 m^2 and the excavation of approximately 18 m (to 20 m bgs) of material in this area approximately 132,000 m^3 of material will be generated. Approximately 150 samples have been collected with an equivalent sampling density of approximately 1 sample per 900 m^3 of material.

Based on the findings of the investigation and discussion of the results in Section 10.6 it is considered that the Bringelly Shale could be considered as **VENM**, or alternatively the material could be managed under a **Resource Recovery Order (RRO)** if a portion of the material is not considered VENM. In considering the Bringelly Shale as VENM the following key findings of the investigation should be noted:

- organics present in the Bringelly Shale are considered to be naturally occurring. Organics present in the shale would not pose an unacceptable risk to human health or the environment in a more sensitive residential land use setting with accessible gardens (refer to Table 40).
- PFAS was not detected in Bringelly Shale in samples by TTMP. These results are considered to supersede those from previous investigations (refer to **Section 10.6.5**).
- metals present in the Bringelly Shale are natural in origin, and should not be compared to ambient background concentrations for soil.

[18] Note GSW Recyclable is not a waste classification term recognised by the EPA. The term however is used by licenced soil recycling facilities.

Table 40: Organics in Bringelly Shale in comparison to residential landuse with gardens

Analyte (concentration values in mg/kg unless otherwise shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	Human Health Guideline Concentration	No. of Samples Exceeding Human Health Guideline	Ecological Guideline Concentration	No. of Samples Exceeding Ecological Guideline
Benzene	166 / 5	<0.1	0.5	0.5	Nil	50	Nil
Toluene	166 / 38	<0.1	4.6	160	Nil	85	Nil
Ethylbenzene	166 / 25	<0.1	0.6	55	Nil	70	Nil
Xylene (o)	166 / 42	<0.1	1.5		-		-
Xylene (m & p)	166 / 60	<0.2	5.5		-		-
Xylene Total	166 / 60	<0.3	7	40	Nil	45	Nil
Naphthalene (VOC)	144 / 24	<0.5	2.3	3	Nil	170	Nil
F1 (C6 - C10)	166 / 29	<10	47		-	180	Nil
F1 (C6 - C10) less BTEX	166 / 22	<10	40	45	Nil	180	Nil
F2 (C10 - C16)	166 / 4	<50	75		-	120	Nil
F2 C10 - C16 (minus Naphthalene)	165 / 4	<50	73.8	110	Nil	120	Nil
F3 (C16 - C34)	166 / 6	<100	200	2500	Nil	300	Nil
F4 (C34 - C40)	166 / 0	<100	<100	10000	Nil	2800	Nil
Acenaphthene	132 / 0	<0.5	<0.5		-		-
Acenaphthylene	132 / 0	<0.5	<0.5		-		-
Anthracene	132 / 0	<0.5	<0.5		-		-
Benz(a)anthracene	132 / 0	<0.5	<0.5		-		-
Benzo(g,h,i)perylene	132 / 0	<0.5	<0.5		-		-
Chrysene	132 / 0	<0.5	<0.5		-		-
Dibenz(a,h)anthracene	132 / 0	<0.5	<0.5		-		-
Fluoranthene	132 / 0	<0.5	<0.5		-		-
Indeno(1,2,3-c,d)pyrene	132 / 0	<0.5	<0.5		-		-
Phenanthrene	132 / 10	<0.5	1.5		-		-
Pyrene	132 / 0	<0.5	<0.5		-		-
PAHs (Sum of total)	132 / 30	<0.5	3.2	300	Nil		-
Naphthalene	168 / 48	<0.5	2.5	3	Nil	170	Nil
Benzo(a) pyrene	132 / 0	<0.5	<0.5		-	0.7	Nil
Benzo(k)fluoranthene	124 / 0	<0.5	<0.5		-		-
Benzo(b+j)fluoranthene	124 / 0	<0.5	<0.5		-		-
Benzo(a)pyrene TEQ (LOR)	132 / 132	1.2	1.2	3	Nil		-
Fluorene	132 / 0	<0.5	<0.5		-		-
Benzo(a)pyrene TEQ calc (Half)	132 / 132	0.6	0.6	3	Nil		-
Benzo(b+j+k)fluoranthene	8 / 0	<1	<1		-		-
Benzo(a)pyrene TEQ calc (Zero)	132 / 0	<0.5	<0.5	3	Nil		-

Notes: the adopted human health guideline is the most conservative guideline in the NEPM for residential landuse with accessible gardens and/or CRC Care guidelines for direct contact. Ecological guidelines are those in the NEPM for residential landuse.

Consideration of the classification of the material as ENM is not considered practicable based on the volume of material requiring off-site reuse, given formal classification as ENM would require of program of stockpiling and testing during construction that complies with the ENM Order 2014, or a further extensive drilling programme.

Reuse of Materials at FS01 Site

With the exception of fill materials from the Medium Risk Area and soil materials in the vicinity of sample location which exceeded import criteria for this site for PFAS (SBT-BH-4259_0.10-0.2), the results suggest that materials would be suitable for reuse at the FS01 site, provided WSA Co accepts this material.

12. Conceptual Site Model

12.1. Contamination Sources

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

- Asbestos in fill materials in the Medium Risk Area
- PFAS source areas with the Medium Risk Area. Based on the soil analytical dataset, five potential PFAS Areas of Concern (PFAS AC) have been identified.
- PFAS compounds detected in surface water and groundwater samples above the adopted investigation levels. Further investigation is considered warranted.

12.2. 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 site.
- General public including persons who could be subject to contaminated media generated during redevelopment, including those accessing the site
- Future human receptors which surround the 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.

12.3. Exposure Scenario & Risk Evaluation Discussion

12.3.1. Low Risk Areas

Materials in the low risk areas are not considered to pose an unacceptable risk to human health or the environment for a commercial/industrial land use.

Preparatory works in these areas where overseen by a competent person during disturbance of soil materials to visually monitored for signs of potential contamination and potential asbestos containing materials (ACM).

12.3.2. Medium Risk Areas

Asbestos in fill materials in the Medium Risk Area is considered to be pose an unacceptable risk to human health for a commercial industrial land use.

The DSI has identified areas of PFAS within the Medium Risk Area (mainly within the first 1 m of soil material) which pose a potential unacceptable risk to groundwater receptors, and terrestrial and aquatic ecological receptors.

PFAS also poses a potential risk to future off-site residential receptors (depending on land use and consumption of home grown produce, e.g. eggs from home grown poultry).

12.3.3. PFAS Compounds in Groundwater and Surface Water

Groundwater monitoring indicated PFAS at levels above the NHMRC (2022) Australian Drinking Water Guideline / HEPA (2020) PFAS NEMP for drinking water and ecological guidelines.

PFAS in groundwater has the potential impact aquatic receptors within Thompsons Creek east of the site. The impacted groundwater is also within the drawdown zone influenced by construction dewatering.

12.3.4. Nutrients in Groundwater

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. 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.

12.4. Refined CSM

The following table presents a refined CSM illustrating source-pathway-receptor linkages for the site based on a commercial/industrial 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 41: Refined Conceptual Site Model (Source-Pathway-Receptors)

Contamination Source	Contaminants of Concern	Media	Plausible Exposure Pathways	Receptors	Complete exposure pathway
Demolition materials form Previous Buildings and Structures	Asbestos	Fill in Medium Impact Area	Inhalation of soil and fibres	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 site. General public including persons who could be subject to contaminated media generated during redevelopment General public accessing the station if the future Terrestrial ecological receptors within the site	Likely Likely Likely Potential
Historical use of AFFF at former Defence facility	PFAS	Fill/soil in PFAS ACs in Medium Impact Area	Ingestion Dermal contact Biological uptake mechanisms	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 site. General public including persons who could be subject to contaminated media generated during redevelopment General public accessing the station if the future Terrestrial flora and fauna Aquatic flora and fauna including those Thompsons Creek	Unlikely Unlikely Unlikely Potential Unlikely
		Surface water from PFAS ACs	Ingestion Dermal contact Biological uptake mechanisms	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 site. General public including persons who could be subject to contaminated media generated during redevelopment General public accessing the station if the future Future residents hydraulically down-gradient of PFAS sources areas Terrestrial flora and fauna within the Property Aquatic flora and fauna including those Thompsons Creek	Unlikely (Note 1) Unlikely Unlikely (Note 1) Unlikely (Note 1) Potential Potential (Note 2)

Contamination Source	Contaminants of Concern	Media	Plausible Exposure Pathways	Receptors	Complete exposure pathway
				Domestic animals and livestock within the Property	Potential
		Groundwater from PFAS ACs	Ingestion Dermal contact Biological uptake mechanisms	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 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 1)
				Future residents hydraulically down-gradient of PFAS sources areas	Unlikely (Note 1)
				Terrestrial flora and fauna within the Property	Unlikely
				Aquatic flora and fauna including those Thompsons Creek	Potential (Note 2)
				Domestic animals and livestock within the Property	Unlikely (Note 1)
		Terrestrial biota within Property	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 (SSTOM) Work Package, workers during the operational and maintenance phase of the 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
				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

Contamination Source	Contaminants of Concern	Media	Plausible Exposure Pathways	Receptors	Complete exposure pathway
		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 (SSTOM) Work Package, workers during the operational and maintenance phase of the 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
				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) Receptor considered unlikely to ingest media based on use of potable water supply in area.

2) Receptor potentially exposed to contaminated media through migration of the media to the receptor.

13. Conclusions and Recommendations

TTMP conclude that the site can be made suitable, as per the requirements of *State Environmental Planning Policy (Hazards and Resilience) 2021,* for the proposed station box. The investigation has identified areas within the site within the Medium Risk Area that are affected by contamination that warrant further assessment to determine the need for and scope of remediation. This contamination is summarised as follows.

13.1. Summary of Key Findings

13.1.1. Demolition Activities

Demolition activities undertaken by Sydney Metro in March-April 2022 included but not limited to the removal of a contaminated soil stockpile, removal of USTs and a septic tank.

At the completion of demolition activities GHD completed a post demolition investigation. Post-demolition sampling results did not report hydrocarbon contamination associated with USTs pit and septic tank pit excavations. Visual/olfactory signs of contamination were also not observed in the excavations from these locations.

Demolition activities undertaken by Sydney Metro did not remediate the site and remove the contamination sources identified in the DSI undertaken by TTMP and the GHD Investigation. These sources are summarised in the following sections. Demolition activities potential resulted in an increase in PFAS mobilisation on the site in groundwater (refer to Section 13.1.3).

13.1.2. 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 risk areas are not considered to pose an unacceptable risk to human health or the environment for a commercial/industrial land use.

Preparatory works in these areas were overseen by a competent person during disturbance of soil materials to visually monitored for signs of potential contamination and ACM.

13.1.3. 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 would be reasonable and practical to assume that fill materials in this area would potentially contain asbestos based on historical data. Fill materials from the Medium Impact Area to be retained on-site within the Aerotropolis Station site will need to be encapsulated beneath hard-standing.

PFAS

In the Medium Impact Area, PFAS impact in soil has been reported in multiple locations associated with the historical use of the site including a former septic system, contaminated stockpile, and fire system used at the site. 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. PFAS in soil within the footprint of the Aerotropolis site is potentially 'low risk' if it is sealed beneath a hardstand. However, if improperly managed PFAS in soil at the 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-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.

The highest concentration of PFAS reported in the groundwater samples collected by TTMP was higher than sampling completed by GHD. This is potentially attributed to an increase in mobilisation of PFAS in response to rainfall and/or potentially disturbance to soil material on the site in association with demolition activities.

Consideration to PFAS in soil, groundwater, and surface water beyond the boundary of the Aerotropolis station box is outside the scope of this DSI.

Further discussion on PFAS in the station box and Bringelly Shale is provided in Section 13.1.4.

Other contaminants of concern

The other contaminants of concern (metals, TRH/BTEX, PAH/Phenols, other organics) in soil materials in the Medium Impact Area were below the adopted human health guidelines and are not considered to pose an unacceptable risk to human health and ecological receptors for a commercial industrial land use.

13.1.4. Station Box and Bringelly Shale

PFAS in the Bringelly Shale

Previous investigations by Golder Associates and Douglas Partners, and Cardno identified trace concentrations of PFAS (mainly Perfluorobutane sulfonic acid (PFBS) and Perfluorooctanesulfonic acid (PFOS)) in deeper samples within the station box.

The investigation data by TTMP suggests an apparent change in the concentration of PFAS reported in the deeper samples. That is, PFAS was not detectable within the laboratory limits of reporting adopted for this investigation which are comparable to previous investigations.

The change could potentially be attributed to changes in site conditions and/or the potential for false positives in previous investigations.

TTMP considers that the investigation undertaken for the DSI has provided adequate characterisation of Bringelly Shale materials within the station box where non-detects have been reported in the investigation undertaken by TTMP.

Organics in the Bringelly Shale

Previous investigations reported the presence of organics in the Bringelly Shale and were interpretated in these investigations as false positives from drilling on the basis that no confirmed source of hydrocarbons had been identified on the site.

Low and infrequent occurrences of organics which were generally consistent with previous investigations (mainly TRH, BTEX and PAHs) were also reported in the investigation undertaken by TTMP.

A review of the investigation results by TTMP (refer to Section 10.6.6) has concluded that the organics present are naturally occurring in the Bringelly Shale, and are derived from natural processes which result in the transformation of organic matter into hydrocarbons that are detected by standard laboratory analytical methods. Lines evidence supporting this conclusion include:

- anthropogenic sources of contamination which could result in contamination to the Bringelly Shale have not been identified on the site
- hydrocarbon contamination which would result in contamination of the Bringelly Shale has not been identified in groundwater
- drilling additives are considered to be an unlikely cause of the false positives (particularly BTEX and PAHs)
- the Bringelly Shale contained organic matter which has transformed into hydrocarbons
- review of chromatograms from this investigation identified the presence of shale oil
- the low hydrocarbons reported in this investigation including BTEX and PAHs can form in shale and shale oil.

Metals in the Bringelly Shale

Higher concentration of metals including copper, nickel and zinc were also observed in the Bringelly Shale in comparison to soil material in the area.

13.2. Implications for SBT Works

13.2.1. Requirement for Remediation

Key findings of the investigation have confirmed the presence of asbestos in fill materials in the Medium Risk Area which can pose an unacceptable risk to human health for a commercial industrial land use.

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

Remediation of the Medium Risk Area is therefore considered to be required to make the site suitable for commercial/industrial use and to manage potential risk to off-site receptors.

Potential remedial strategies could include but not limited to:

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

Redevelopment of the site with hardstanding is considered to be a potentially acceptable remedial strategy for the Medium Risk Area on the basis that hardstanding would:

- provide a barrier between future users of the site with fill materials in the Medium Impact Area that contains ACM and PFAS.
- provide a barrier to minimise surface water infiltration and subsequent mobilisation of PFAS contamination via surface water and groundwater migration pathways
- provide a barrier between ecological receptors and PFAS contamination in soil materials.

In consideration to the use of hardstand ground cover, it is noted that groundwater has been measured at approximately 2.7m to 7 m bgs within the Medium Risk Area. As noted in Section 10.6.9.1, PFAS contamination in soil in the Medium Risk Area is substantially lower in soil deeper than 2 m bgs which would come into direct contact with groundwater. Soil materials which are more impacted by PFAS (<1 m bgs) are located above the groundwater table.

Containment of contamination beneath hardstand would trigger the requirement for the implication of a Long-Term Environmental Management Plan.

A Remedial Action Plan (RAP) in accordance with NSW guidelines and the requirements of the Deed will need to be prepared to describe the remediation strategy for the site and management/mitigation measures to be implemented to make the site suitable for commercial industrial use.

13.2.2. Preparatory Works

Controls to be implemented in site preparatory works in low risk areas were documented in the Technical Memorandum (refer to Appendix 11).

Site preparatory works in the Medium Risk Area will include:

- Establishment of temporary offices, amenities, car parking and access roads for construction purposes
- Topsoil stripping
- Site levelling (refer to Figure 8, Figure 8A, Figure 8B, Figure 8C, Figure 8D).
- Piling.

Site levelling activities will result in a net deficit of fill and the requirement to import fill materials.

Any controls required for the preparatory works will need to be documented in the RAP.

On the understanding that the site will be covered in hardstand materials cut from the Medium Risk Area could be used as fill materials on the site. General principles which will need to be considered in the development of the RAP include but not limited to:

- the retention of materials cut from the Medium Risk Area within this area rather than placement in a Low Risk Area

- placement of materials such that the potential for unacceptable risk to human health and/or the environment does is not realised once the site has been redeveloped (e.g. placement of PFAS impacted soil beneath the groundwater table)
- use of temporary barriers during construction (e.g. use of geofabric marker layer, suitable soil material and/or temporary hardstand) to underlying fill material in the Medium Risk Area.

Excavation of fill materials from the Aerotropolis site 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. TTMP does not consider that further investigation is needed to develop the AMP.

13.2.3. Bulk Excavations

The station box will be excavated to approximately to 20 m bgs or 53 m AHD. Excavation of the station box is expected to generate approximately 132,000 m^3 (bank volume) of spoil which requires disposal off-site.

Preliminary classification of this material is discussed in Section 11.

Groundwater dewatered during bulk earthworks will require treatment to comply with Planning Condition E129 or an Environmental Protection License (EPL) approved by the NSW EPA. Surface water discharged from the construction site will also need to comply with these requirements.

13.2.4. Post-Construction

The RAP will provide a high level outline of the management controls to be implemented post construction which are assumed to include the construction and maintenance of an appropriate hardstand.

It is understood that station box will be a drained structure. A decision on whether the station box is to be undrained (tanked) is to be made by another contractor in-conjunction with Sydney Metro.

Sydney Metro should note that PFAS has been found in groundwater, and there would also be the potential from hydrocarbons in groundwater from the Bringelly Shale. Sydney Metro should consider whether groundwater entering the structure will require treatment prior to discharge. Consideration of this matter is outside the scope of this DSI.

13.3. Recommendations

The following recommendations are made in addition to these outlined in Section 13.2.

- Excavation of fill materials from the Aerotropolis site will need to be managed under an AMP, which will outline controls to mitigate health risks to workers and occupants of neighbouring land. TTMP does not consider that further investigation is needed to develop the AMP.
- Site levelling activities will result in a net deficit of fill and the requirement to import fill materials. CPB should consider whether any of the site won materials from within the footprint of the station box in Low Risk Areas can be used as fill on the site.

- A competent person will need to be present during disturbance of soil materials to visually monitor for signs of potential contamination and potential ACM. If evidence of potential ACM or other potential contamination are noted (e.g. stained or odorous soils, buried wastes, etc) work should cease pending further investigation of this material by TTMP. The competent person must be experienced in excavation and remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.
- Further investigation of the site is not considered to be required if fill materials from the Medium Risk Area are to be retained and encapsulated beneath hard-stand such as concrete or asphalt pavement and subject to the implementation of appropriate controls documented in the RAP.
- Recommendations for spoil management for the Preparatory Works in the Low Impact areas was included in the Technical Memorandum.
- Recommendation for spoil management in the Medium Impact Area will be documented in the RAP.
- TTMP considers that the concentrations of PFOS and PFHxS + PFOS reported in groundwater could trigger duty to report contamination to the NSW EPA under Section 2.3.5 of the NSW EPA (2015) *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*. It is recommended that Sydney Metro discuss the findings of the DSI with Western Park City Authority (WPCA), and for Sydney Metro or WPCA to seek legal advice in whether the requirement for notification under Section 60 of the *Contaminated Land Management Act 1997* has been triggered.

13.4. Closure

The DSI has assumed that the Project will be rail station which is predominately covered in hard landscaping with minimal soft landscaping (e.g. garden bed in a car park). The conclusions and recommendations in the DSI are specific to this land use and development scenario.

No consideration has been made in regard to the geotechnical suitability of materials on the site for future development scenarios; such consideration is outside the scope of this investigation.

14. References

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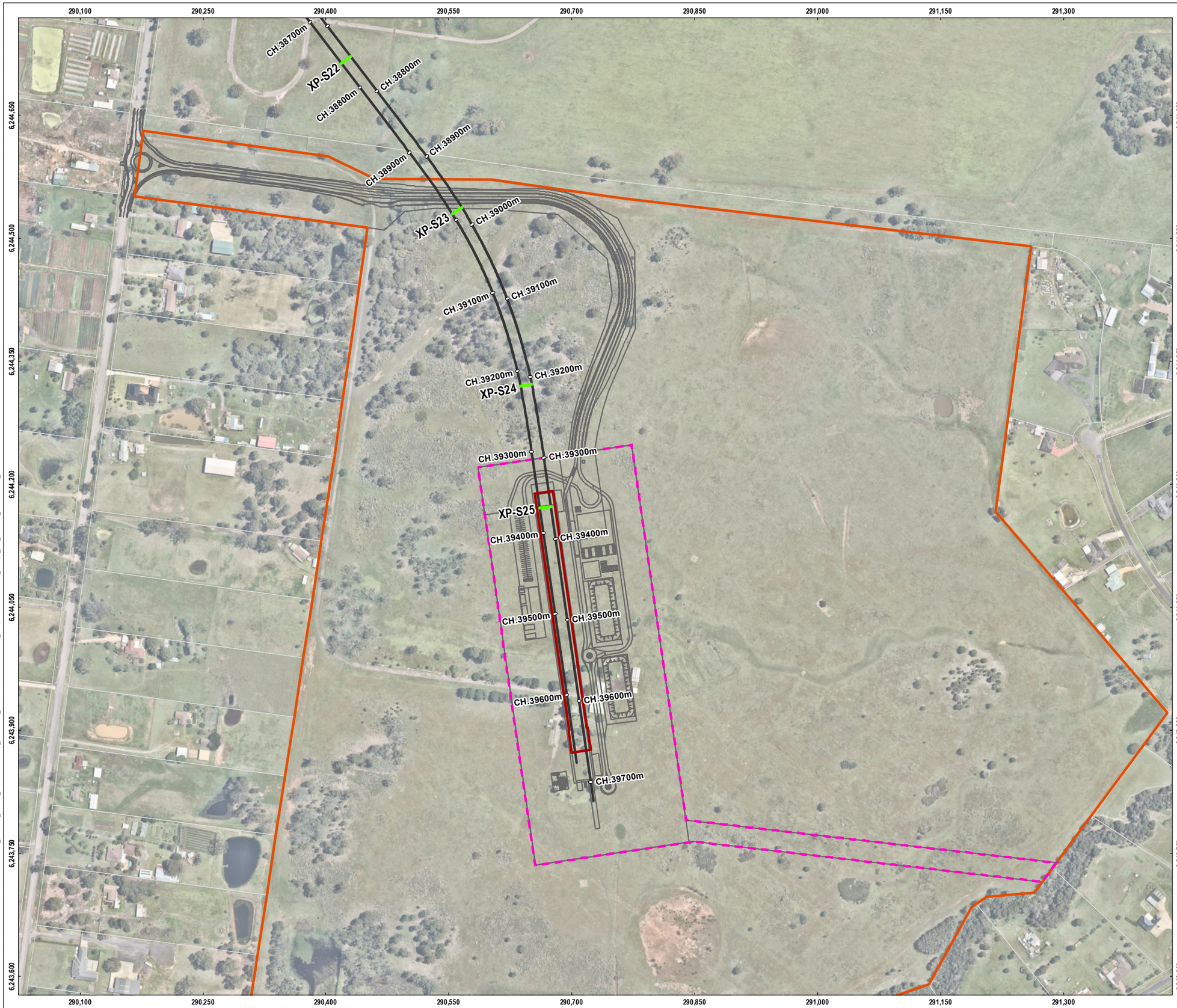
Appendix 1 Figures



LEGEND

- Aerotropolis Core Station Site Layout
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Cadastral Boundary
- Property Boundary
- 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).

N

0 75 150 m

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

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F001_GIS**

SAVED BY: EAMMON.MARHA 19.10.22 12:38:15 PM
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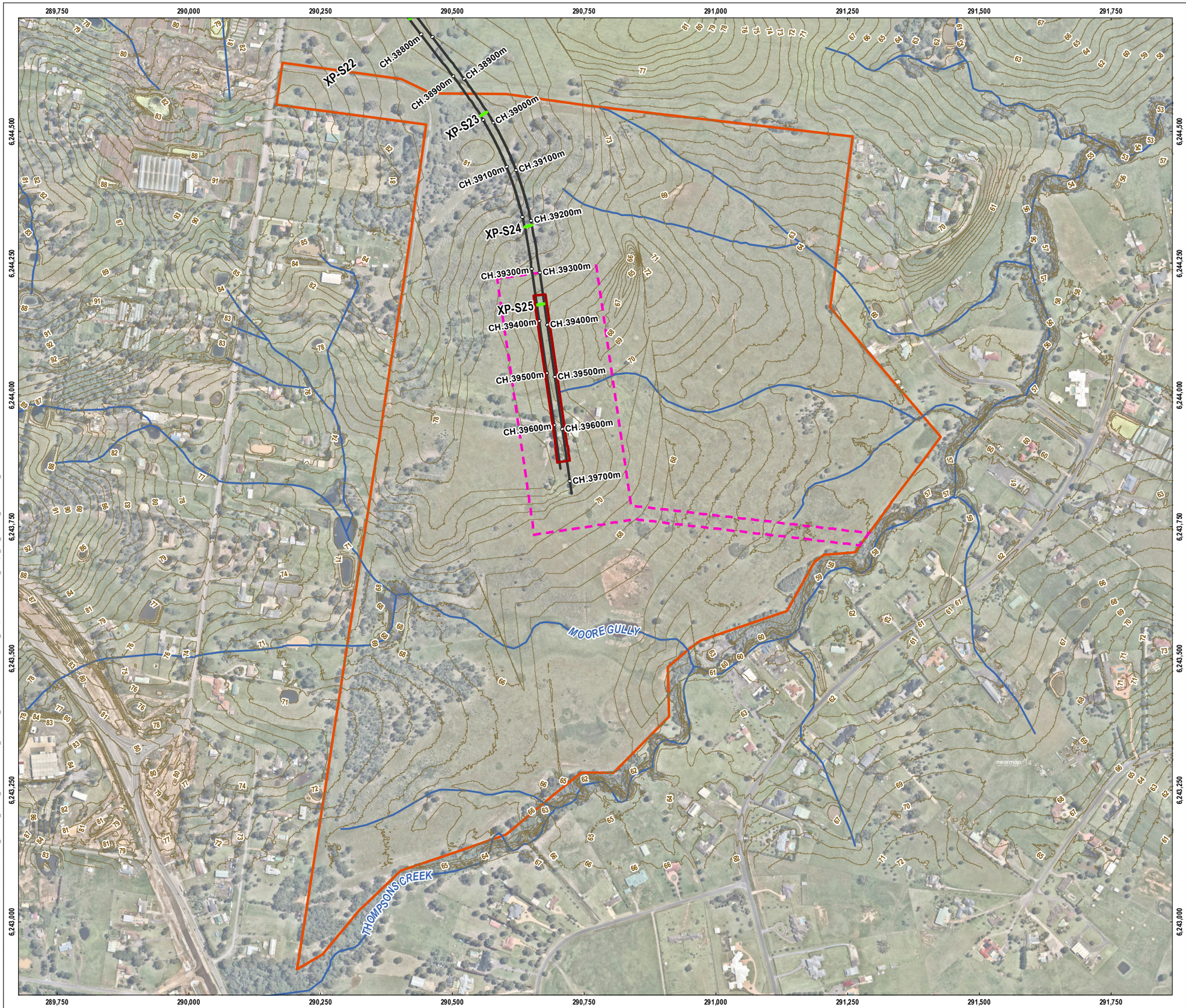


LEGEND

- Elevation Contour (mAHD)
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Non-perennial Watercourse Property
- Boundary
- 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).

N

0 125 250 m

SCALE **1:7,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

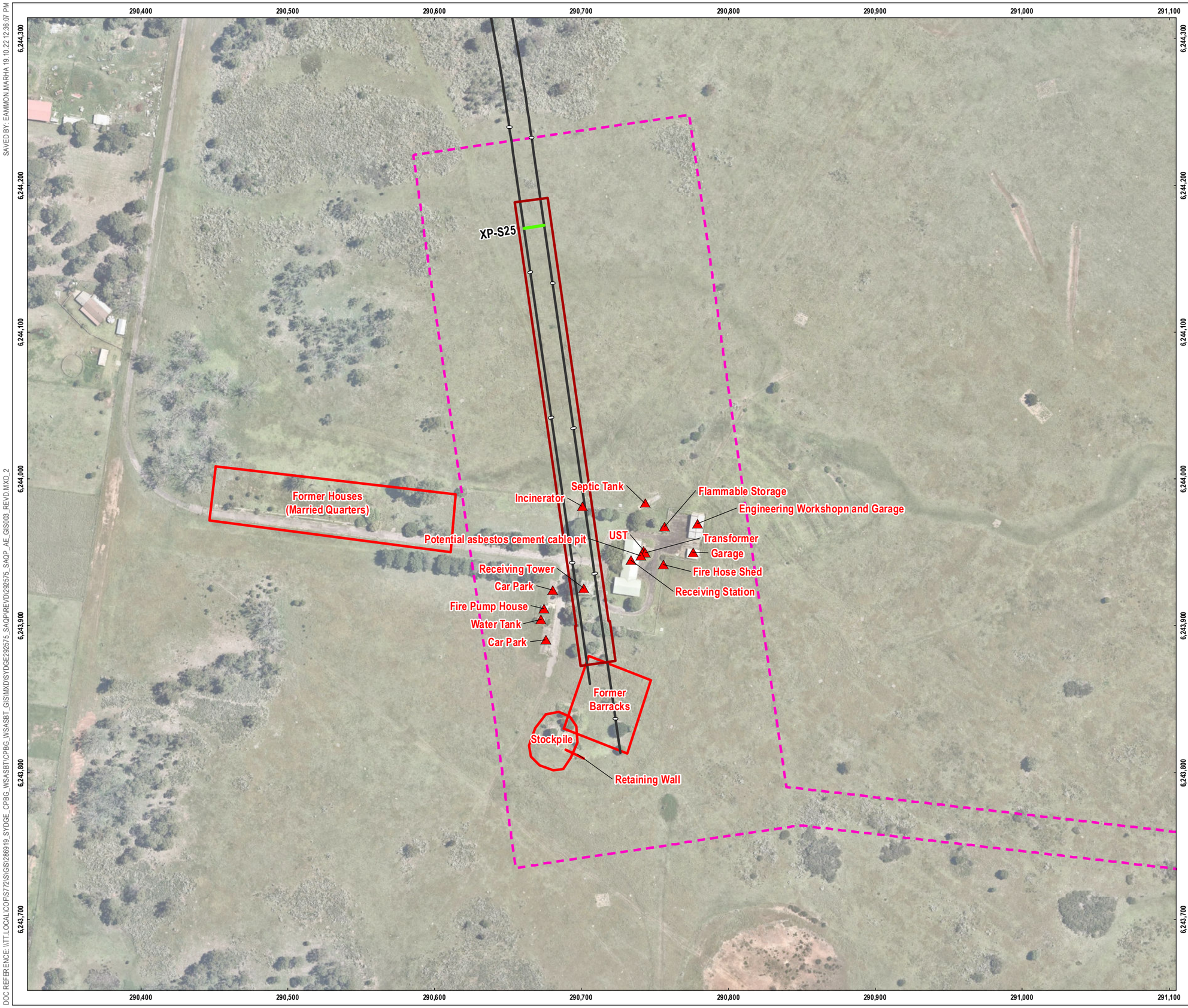
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 2

Topography and Surface Water Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **26.05.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F002_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Site 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).

N

0 50 100 m

SCALE **1:2,500**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

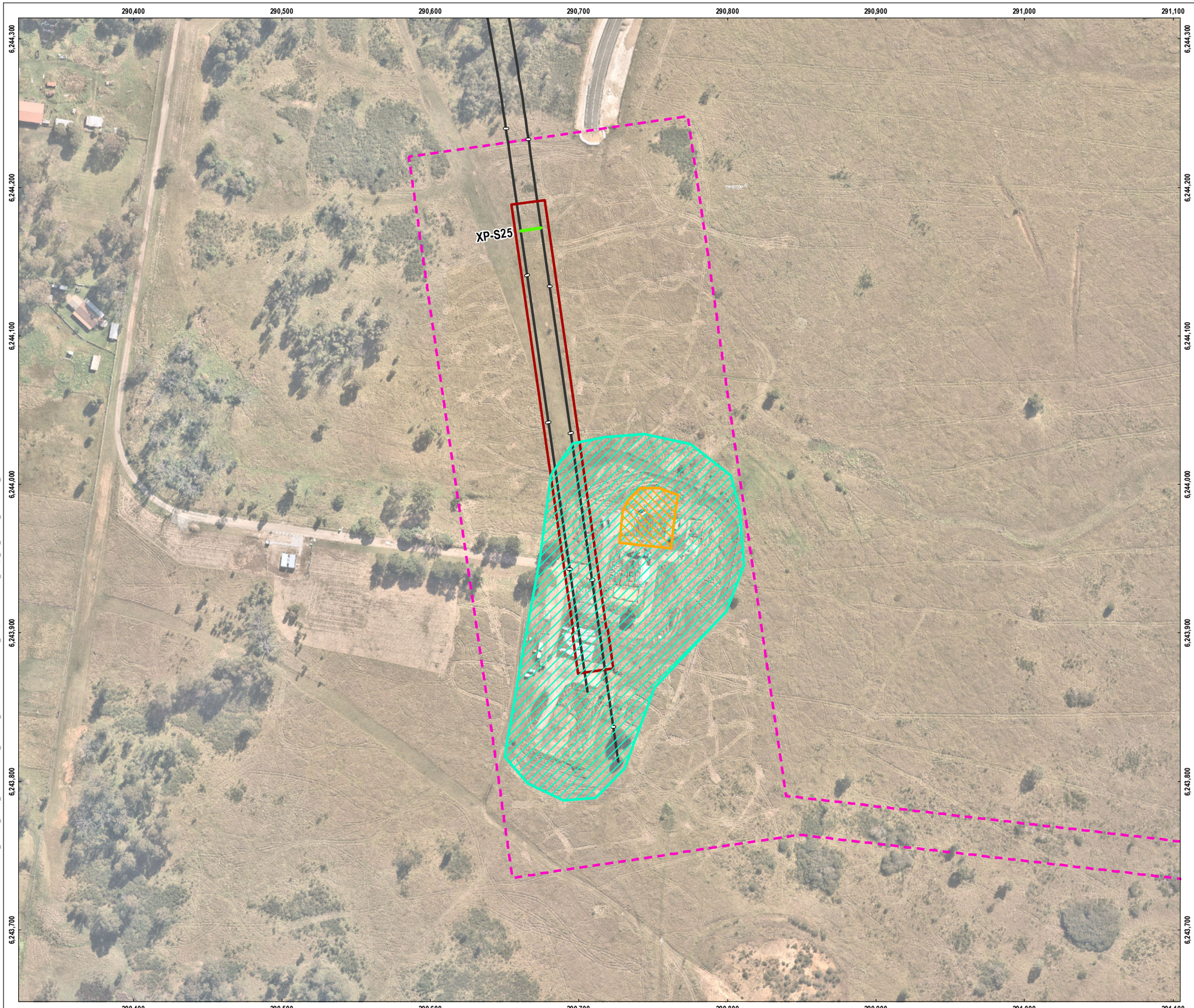
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 3

Historical Site Features
Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F003_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Site Boundary
- Station Box / Shaft
- Area With Kerosene Odours (10 May 2022)
- Demolition And Remediation Area Boundary

SOURCE
Site boundaries from Tetra Tech Coffey.
Station box, layouts and alignment supplied by CPBG.
Aerial imagery from Nearmap (capture date 22-03-2022).

N

0 50 100 m

SCALE **1:2,500**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

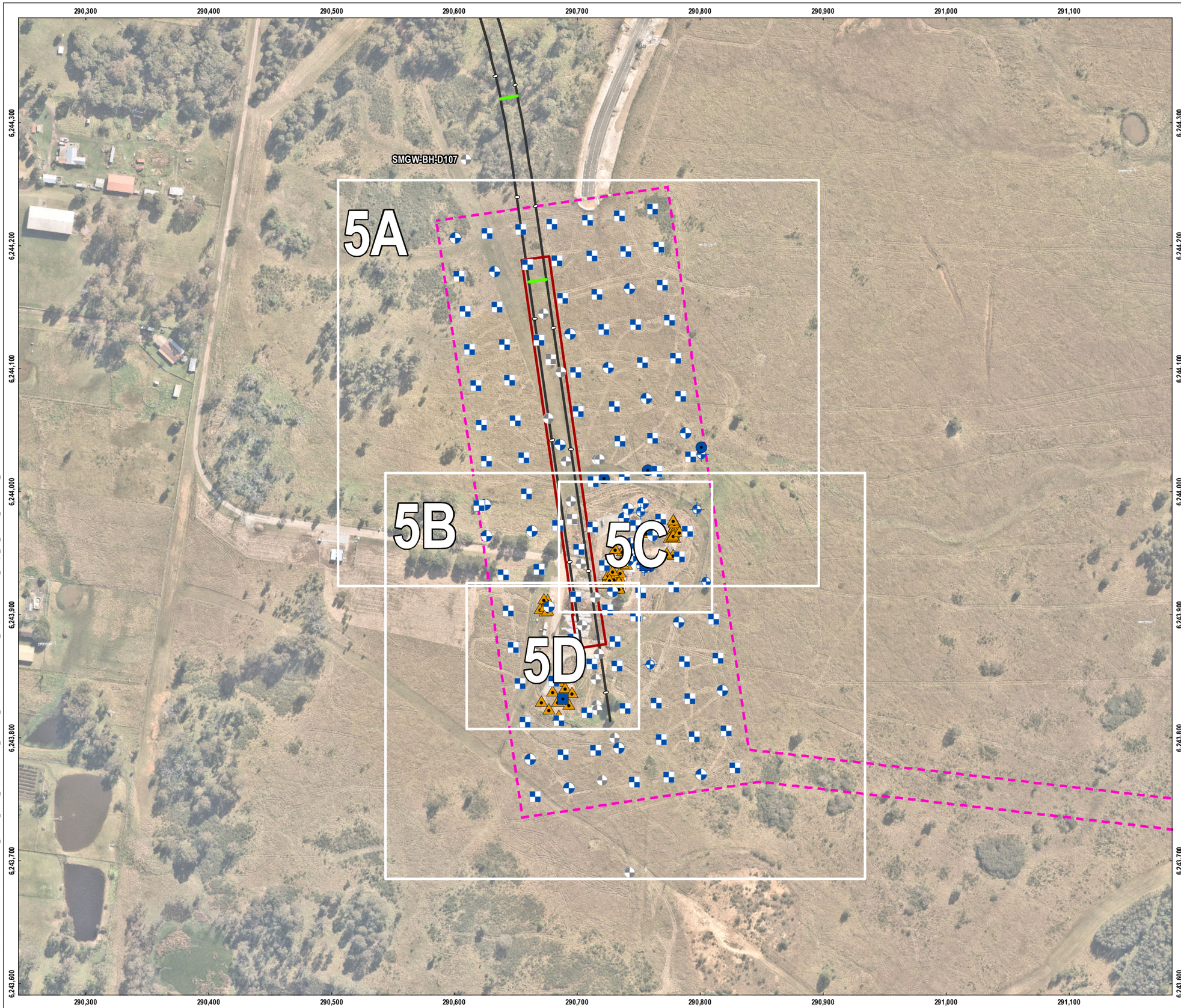
FIGURE 4

EPS Demolition / Remediation Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F004_GIS**

SAVED BY: EAMMON.MARHA 19.10.22 12:34:53 PM
DOC REFERENCE: \\TT-LOCAL\COFS172\SIGS\286919_SYDGE_CPBG_WSASBT\CPBG_WSASBT_GIS\MXD\SYDGE292575_SAQP\REV D\292575_SAQP_AE_GIS004_REVD.MXD_2



LEGEND

GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- Validation Sample

Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Site Boundary
- Station Box / Shaft

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

N

0 50 100 m

SCALE **1:3,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

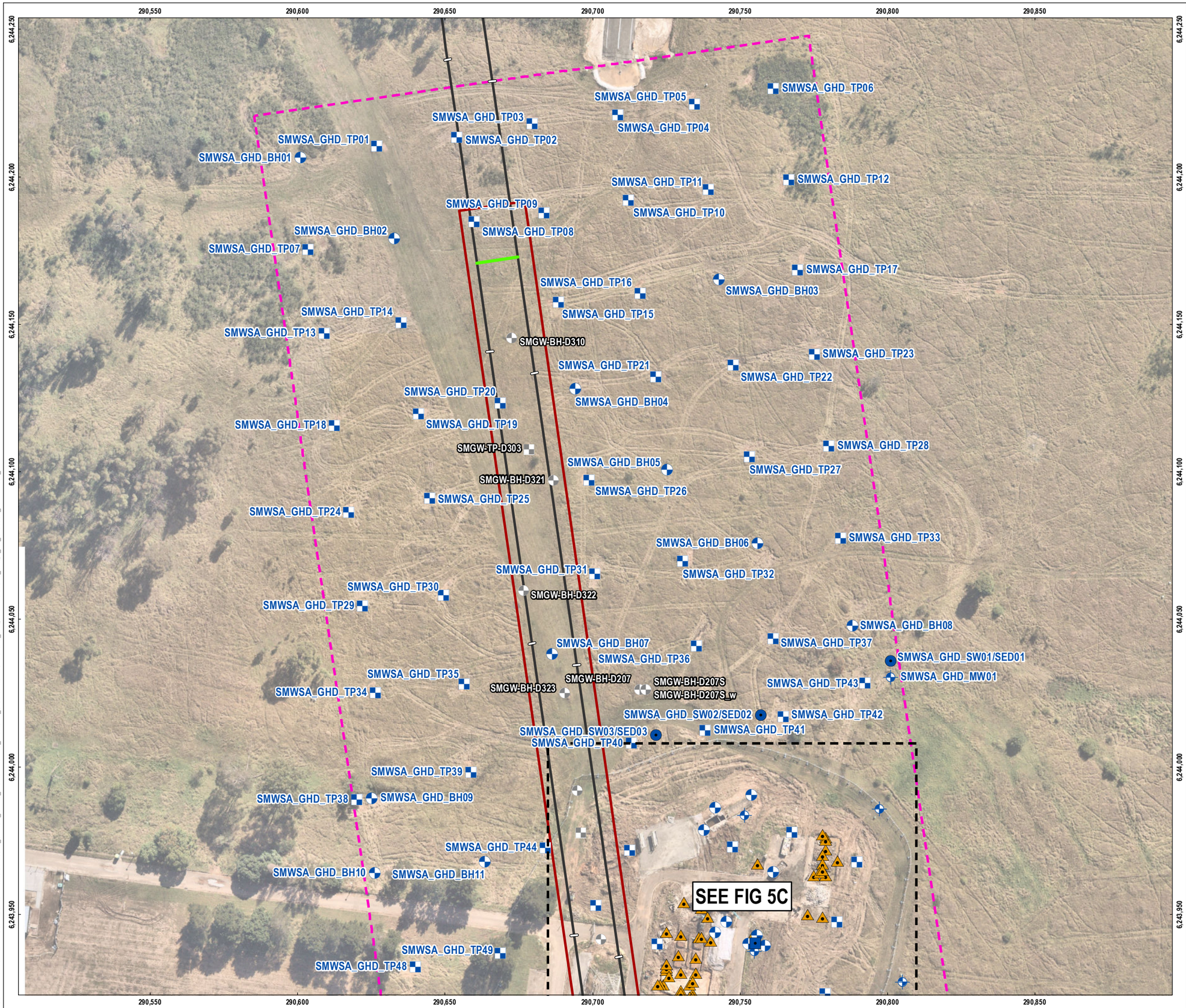
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 5

Previous Investigation Locations (GHD, Golder Associates / Douglas Partners and Cardno) Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **15.06.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F005_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- Validation Sample

Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage Tunnel
- Alignment - Cross Passage
- Site Boundary
- Station Box / Shaft

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

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 5A

Previous Investigation Locations (GHD, Golder Associates / Douglas Partners and Cardno) Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F005A_GIS**

SAVED BY: EAMMON.MARHA 19.10.22 12:32:28 PM
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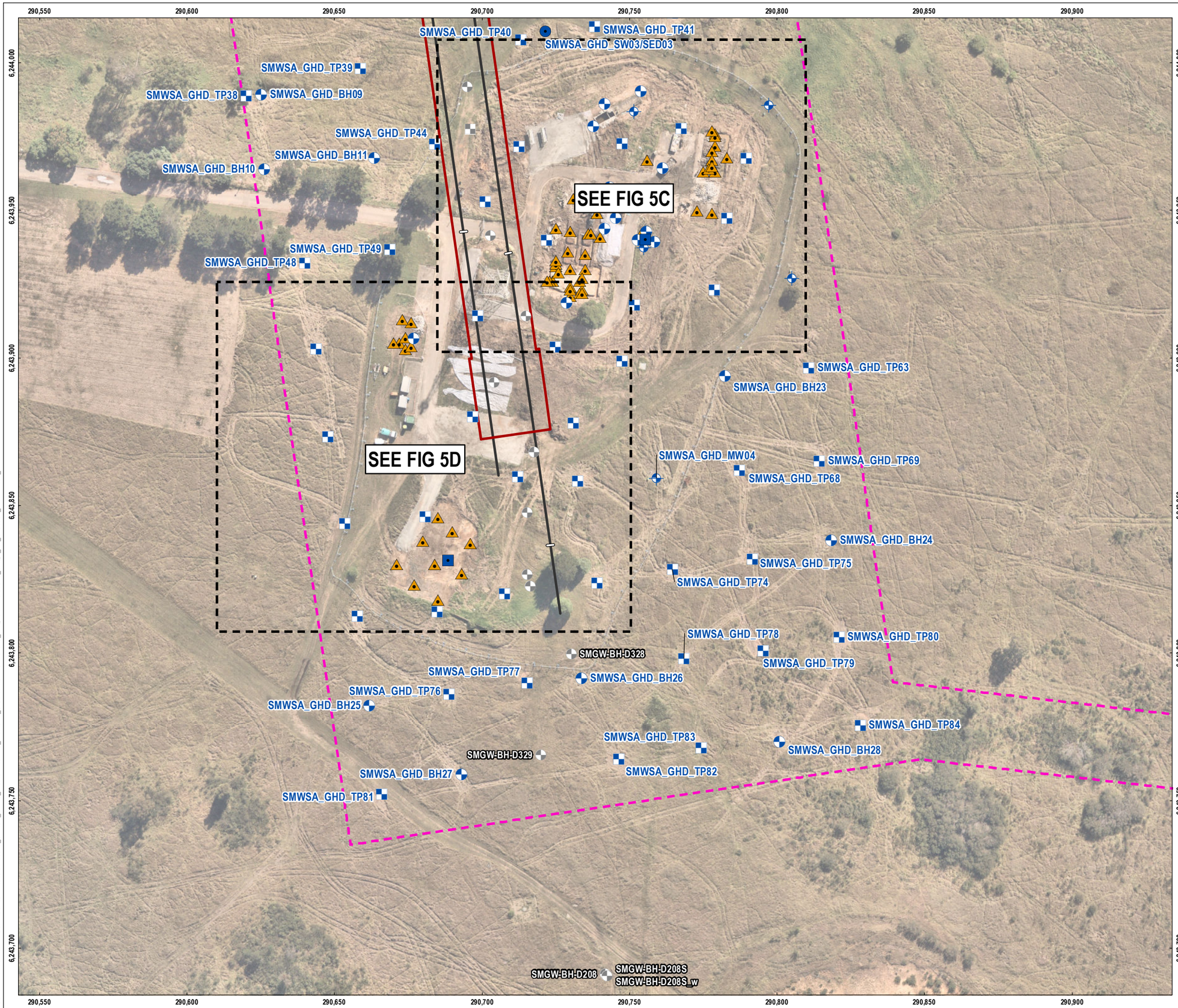

SAVED BY: EAMMON.MARHA 19.10.22 12:31:45 PM

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CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

GHD Investigations (2022)

- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- Validation Sample

Existing Investigation Location

- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Site Boundary
- Station Box / Shaft

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

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

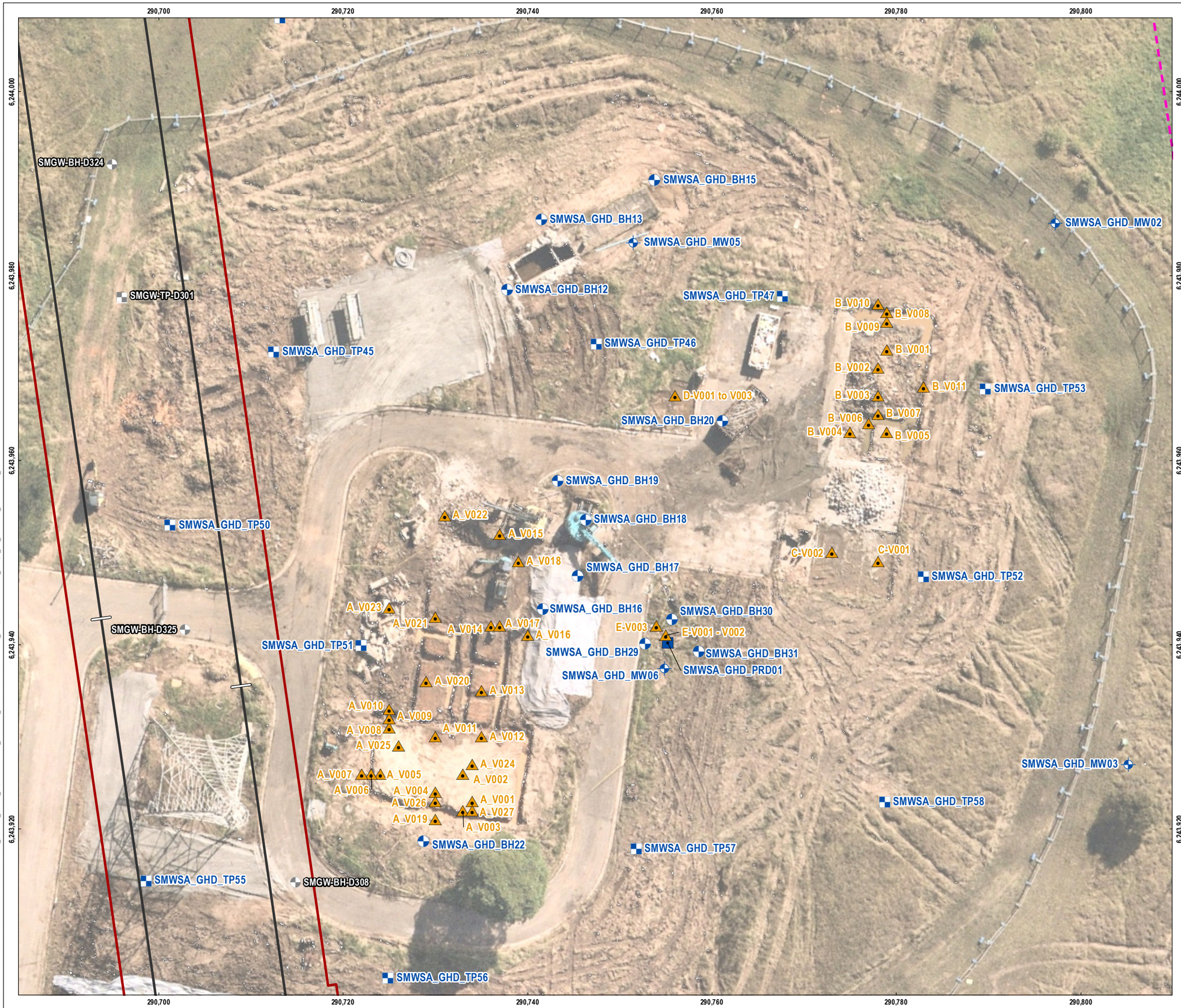
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 5B

Previous Investigation Locations (GHD, Golder Associates / Douglas Partners and Cardno) Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F005B_GIS**



LEGEND

GHD Investigations (2022)

- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- Validation Sample

Existing Investigation Location

- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Site Boundary
- Station Box / Shaft

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

0 5 10 m

SCALE **1:400**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 5C

Previous Investigation Locations (GHD, Golder Associates / Douglas Partners and Cardno) Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F005C_GIS**

SAVED BY: EAMMON.MARHA 19.10.22 12:30:43 PM
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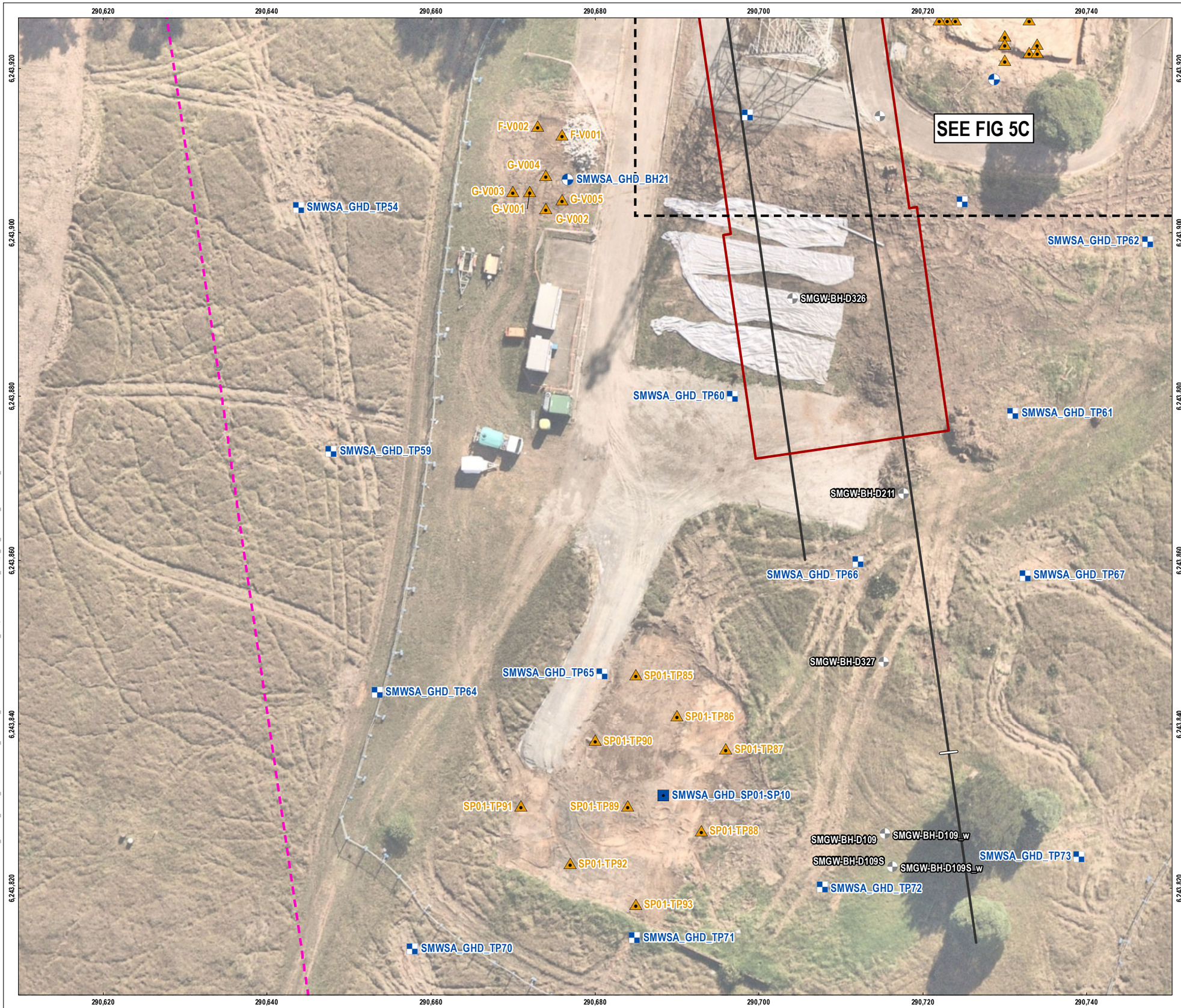


CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

GHD Investigations (2022)
- Borehole
- Test Pit
- Monitoring Well
- Surface Water Sample
- Other
- Validation Sample

Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Site Boundary
- Station Box / Shaft

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

N

0 10 20 m

SCALE **1:450**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

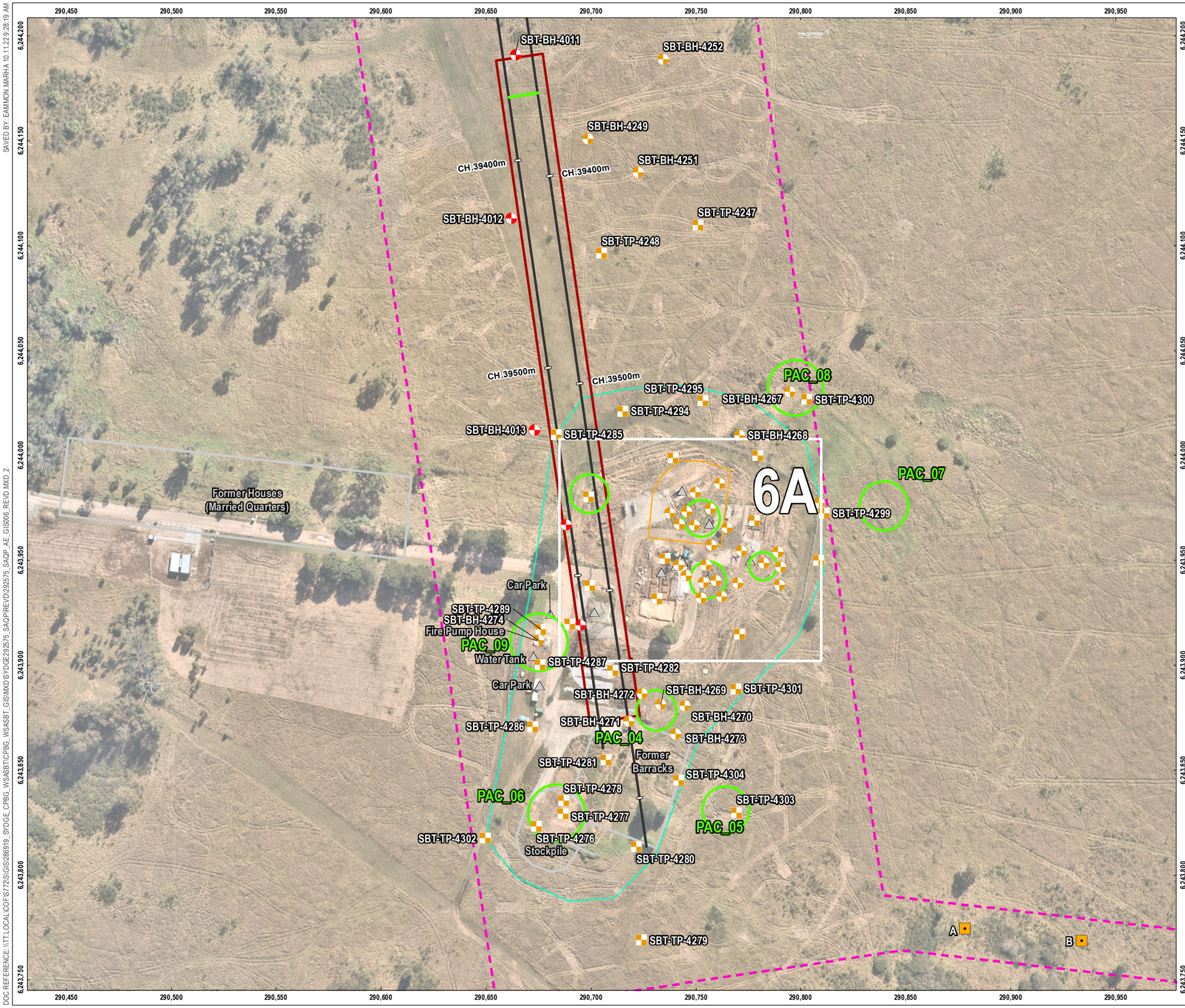
FIGURE 5D

Previous Investigation Locations (GHD, Golder Associates / Douglas Partners and Cardno) Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F005D_GIS**

SAVED BY: EAMMON.MARHA 19.10.22 12:29:13 PM
DOC REFERENCE: \\TTL.LOCAL\COFS772\SIGS\286919_SYDGE_CPBG_WSASBT\CPBG_WSASBT_GIS\MXD\SYDGE292575_SAQP\REVE\292575_SAQP_AE_GIS005D_REVE.MXD_2



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location

Additional Contaminated Land Location

- Borehole
- Test Pit
- Hand Sample

Additional Geotechnical/Hydrogeological Location

- Borehole
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Area With Kerosene Odours (10 May 2022)
- Demolition And Remediation Area Boundary
- Construction Footprint Boundary
- Historic Site
- Station Box / Shaft
- Potential Area Of Concern

SOURCE
Site boundaries, historic sites and proposed investigation locations from Tetra Tech Coffey.
Station box, layouts and alignment supplied by CPBG.
Aerial imagery from Nearmap (capture date 22-03-2022).

N

0 25 50 m

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

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 6

Soil Sampling Sites
Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **10.11.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F006_GIS**

LEGEND

- Historic Site Location

Additional Contaminated Land Location

- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location

- Borehole
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Area With Kerosene Odours (10 May 2022)
- Demolition And Remediation Area Boundary
- Construction Footprint Boundary
- Station Box / Shaft
- Potential Area Of Concern

SOURCE
Site boundaries, historic sites and proposed investigation locations from Tetra Tech Coffey.
Station box, layouts and alignment supplied by CPBG.
Aerial imagery from Nearmap (capture date 22-03-2022).

N

0 7.5 15 m

SCALE **1:400**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

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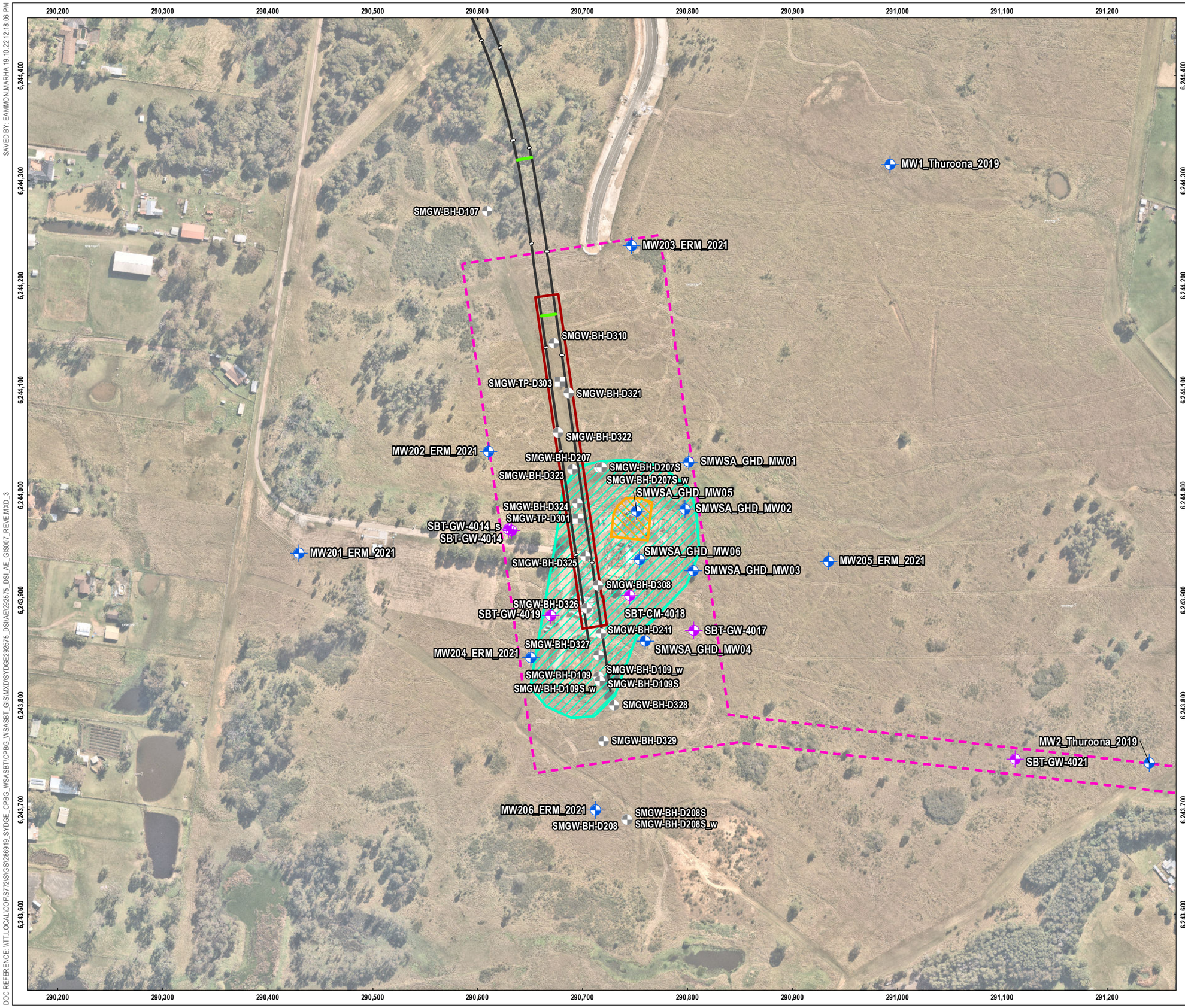
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 6A

Soil Sampling Sites
Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **10.11.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F006A_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Proposed Monitoring Well
- Existing Groundwater Monitoring Well

Existing Investigation Location

- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Site Boundary
- Station Box / Shaft
- Area With Kerosene Odours (10 May 2022)
- Demolition Area

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

N

0 50 100 m

SCALE **1:3,500**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

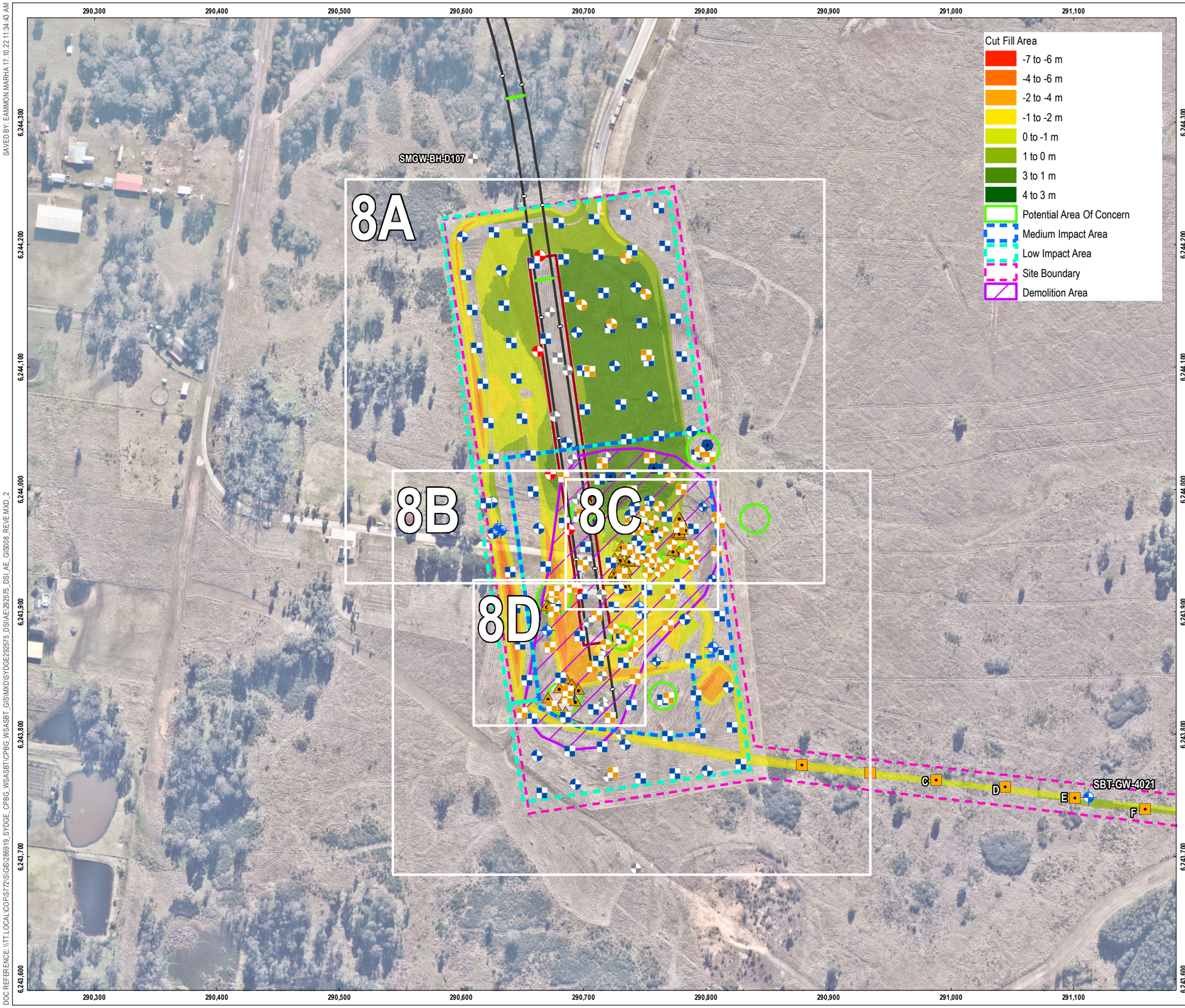
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 7

Groundwater Monitoring Well Locations Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F007_GIS**



LEGEND

Additional Contaminated Land Location
- Borehole
- Test Pit
- Hand Sample

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Station Box / Shaft

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 14-06-2022).

0 50 100 m

SCALE **1:3,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F008_GIS**

290,550 290,600 290,650 290,700 290,750 290,800 290,850

6,244,250 6,244,200 6,244,150 6,244,100 6,244,050 6,244,000 6,243,950

Cut Fill Area
- -7 to -6 m
- -4 to -6 m
- -2 to -4 m
- -1 to -2 m
- 0 to -1 m
- 1 to 0 m
- 3 to 1 m
- 4 to 3 m
- Potential Area Of Concern
- Medium Impact Area
- Low Impact Area
- Site Boundary
- Demolition Area

SMWSA_GHD_BH01
SMWSA_GHD_TP01
SMWSA_GHD_TP02
SMWSA_GHD_TP03
SMWSA_GHD_TP04
SMWSA_GHD_TP05
SMWSA_GHD_TP06
SMWSA_GHD_TP07
SMWSA_GHD_BH02
SMWSA_GHD_TP08
SBT-BH-4011
SMWSA_GHD_TP09
SMWSA_GHD_TP10
SMWSA_GHD_TP11
SMWSA_GHD_TP12
SBT-BH-4252
SMWSA_GHD_BH03
SMWSA_GHD_TP15
SMWSA_GHD_TP16
SBT-BH-4280
SMWSA_GHD_TP17
SMWSA_GHD_TP13
SMWSA_GHD_TP14
SBT-BH-4249
SMGW-BH-D310
SBT-BH-4251
SMWSA_GHD_TP21
SMWSA_GHD_TP22
SMWSA_GHD_TP23
SMWSA_GHD_BH04
SMWSA_GHD_TP18
SMWSA_GHD_TP19
SMWSA_GHD_TP20
SBT-BH-4012
SMGW-TP-D303
SBT-TP-4247
SMWSA_GHD_TP27
SMWSA_GHD_TP28
SBT-TP-4248
SMWSA_GHD_BH05
SMGW-BH-D321
SMWSA_GHD_TP26
SMWSA_GHD_TP25
SMWSA_GHD_TP24
SMWSA_GHD_BH06
SMWSA_GHD_TP33
SMWSA_GHD_TP32
SMWSA_GHD_TP31
SMGW-BH-D322
SMWSA_GHD_TP29
SMWSA_GHD_TP30
SMWSA_GHD_BH08
SMWSA_GHD_TP37
SMWSA_GHD_TP36
PAC_08
SMWSA_GHD_BH07
SMWSA_GHD_SW01/SED01
SBT-BH-4267
SMWSA_GHD_MW01
SMWSA_GHD_TP43
SMWSA_GHD_TP35
SMGW-BH-D207
SMGW-BH-D207S_w
SMGW-BH-D323
SMWSA_GHD_TP34
SBT-TP-4294
SBT-TP-4295
SBT-TP-4300
SMWSA_GHD_TP40
SMWSA_GHD_SW02/SED02
SMWSA_GHD_TP42
SBT-BH-4013
SBT-TP-4285
SBT-BH-4268
SMWSA_GHD_SW03/SED03
SMWSA_GHD_TP41
SMWSA_GHD_TP39
SMWSA_GHD_BH09
SMWSA_GHD_TP38
PAC_07
SMWSA_GHD_TP44
SMWSA_GHD_BH11
SBT-TP-4299
SBT-GW-4014_s
SMWSA_GHD_BH10
SBT-GW-4014
SEE FIG 8C
SMWSA_GHD_TP49
SMWSA_GHD_TP48

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

Additional Contaminated Land Location
- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Station Box / Shaft

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 14-06-2022).

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

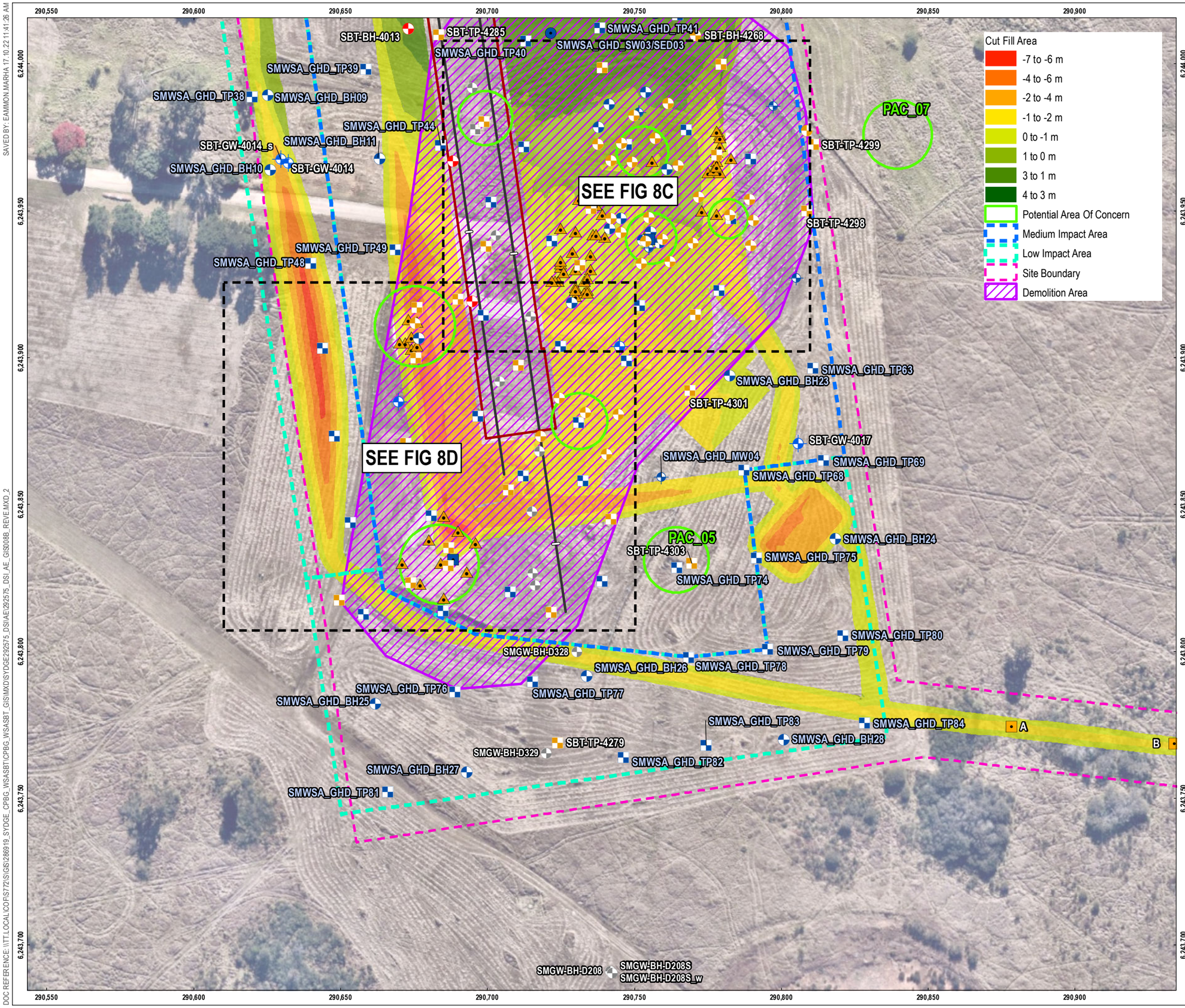
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8A

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F008A_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

Additional Contaminated Land Location
- Borehole
- Test Pit
- Hand Sample

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Station Box / Shaft

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 14-06-2022).

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

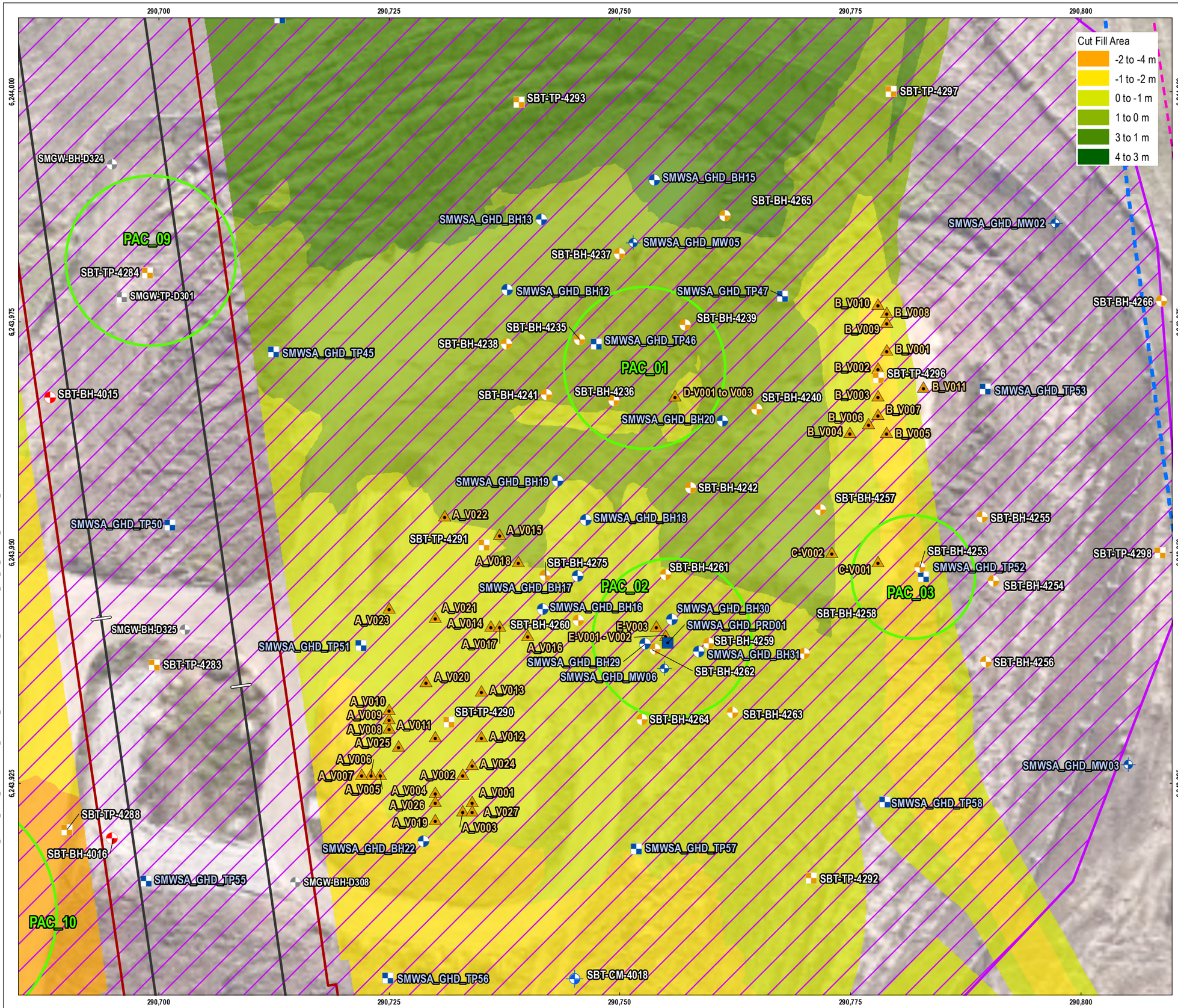
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8B

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F008B_GIS**



SAVED BY: EAMMON.MARHA 17.10.22 1:32:27 PM

DOC REFERENCE: \\TT-LOCAL\COPS\72\SIG\286919_SYDGE_CPBG_WSASBT\CPBG_WSASBT_GIS\MXD\SYDGE292575_DSI\AE\292575_DSI_AE_GIS008C_REVE.MXD_2

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

Additional Contaminated Land Location
- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Site Boundary
- Medium Impact Area
- Station Box / Shaft
- Potential Area Of Concern
- Demolition Area

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 14-06-2022).

N

0 7.5 15 m

SCALE **1:400**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

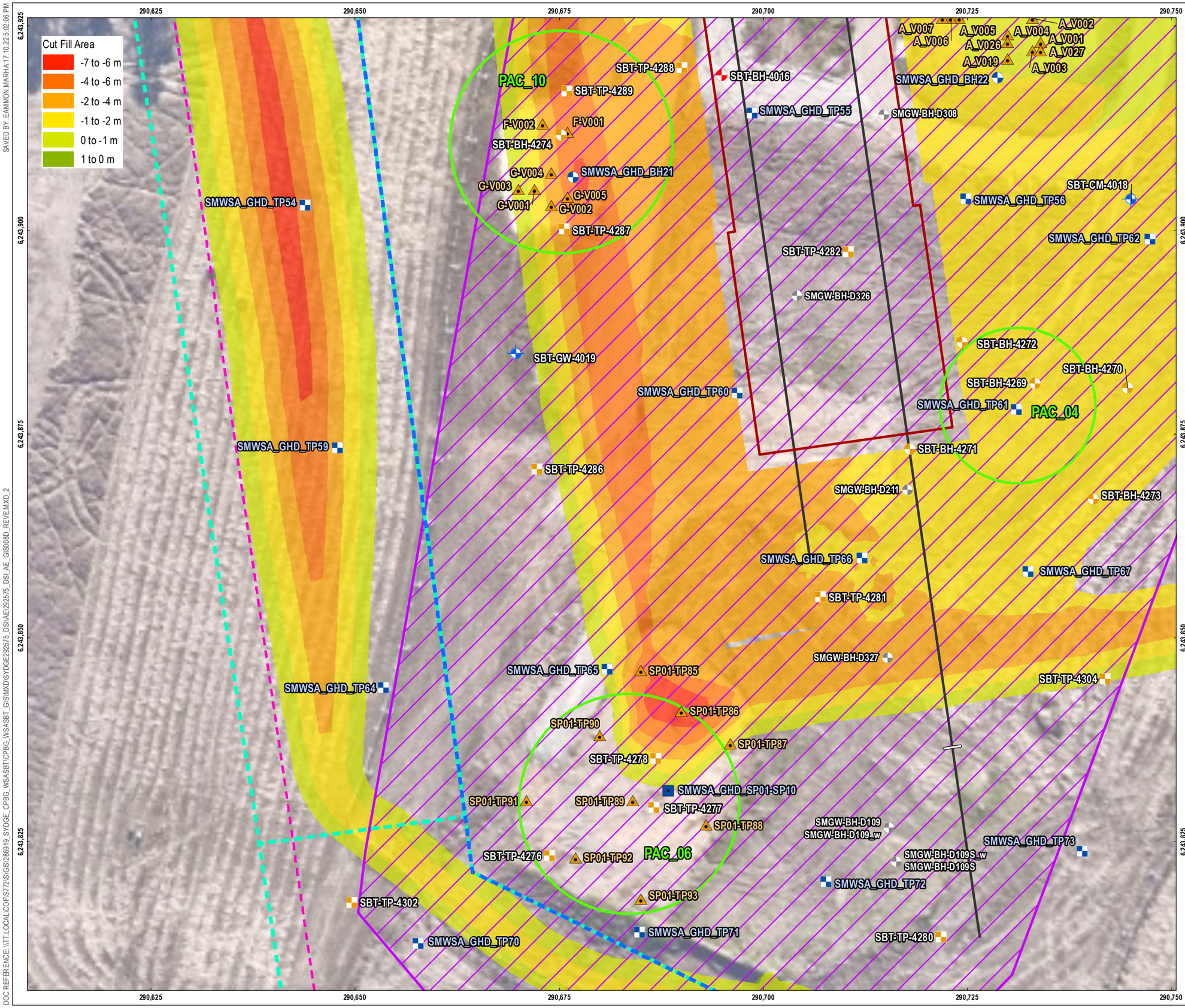
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8C

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F008C_GIS**



LEGEND

Additional Contaminated Land Location
- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

GHD Investigations (2022)
- Borehole
- Test Pit
- Other
- Post-demolition Sample

Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Site Boundary
- Medium Impact Area
- Low Impact Area
- Station Box / Shaft
- Potential Area Of Concern
- Demolition Area

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 16-04-2022).

N

0 7.5 15 m

SCALE **1:450**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

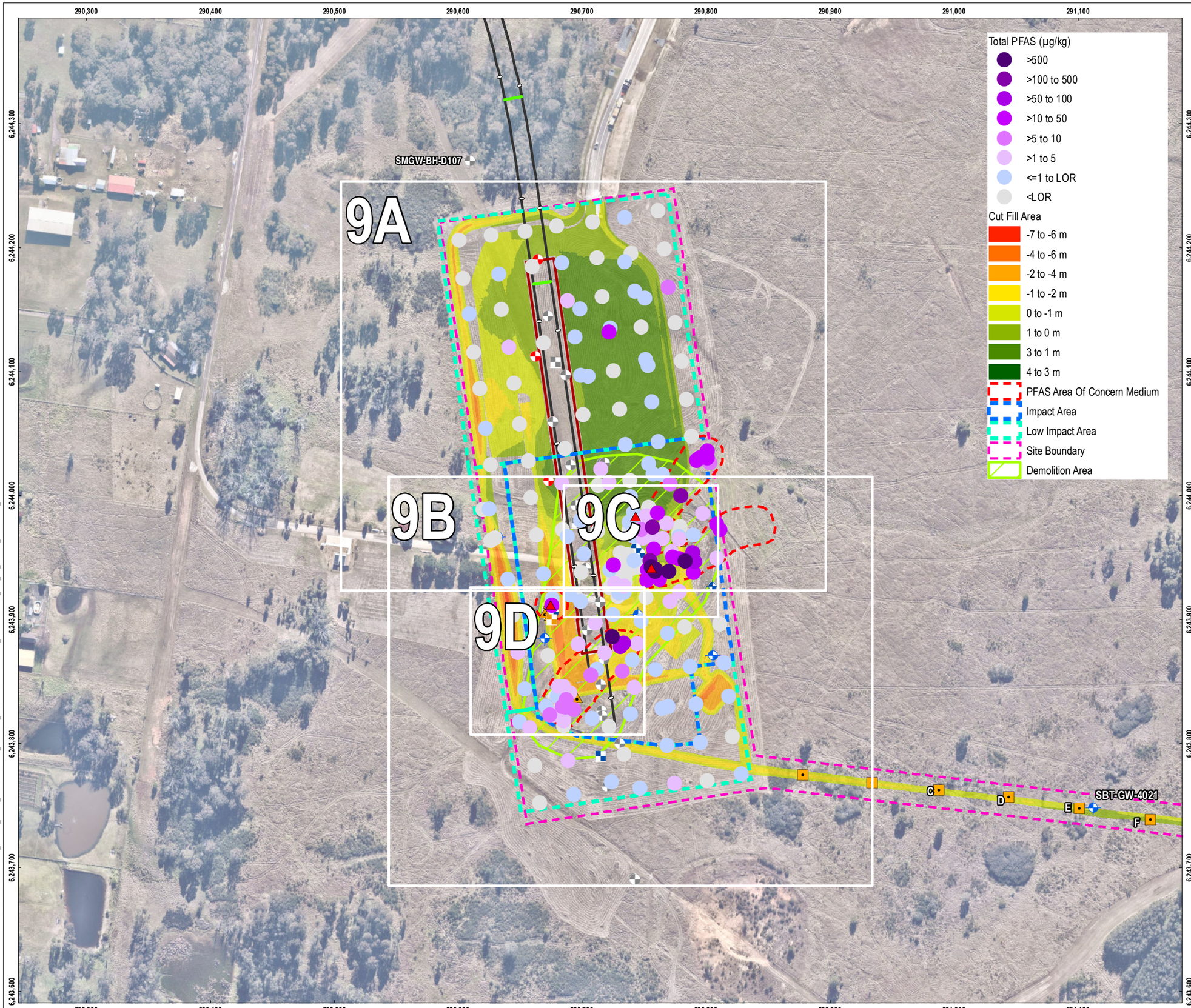
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8D

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F008D_GIS**



Total PFAS (µg/kg)
- >500
- >100 to 500
- >50 to 100
- >10 to 50
- >5 to 10
- >1 to 5
- <=1 to LOR
- <LOR

Cut Fill Area
- -7 to -6 m
- -4 to -6 m
- -2 to -4 m
- -1 to -2 m
- 0 to -1 m
- 1 to 0 m
- 3 to 1 m
- 4 to 3 m
- PFAS Area Of Concern Medium
- Impact Area
- Low Impact Area
- Site Boundary
- Demolition Area

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location

Additional Contaminated Land Location
- Borehole
- Test Pit
- Hand Sample

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Station Box / Shaft

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 14-06-2022).

N

0 50 100 m

SCALE **1:3,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

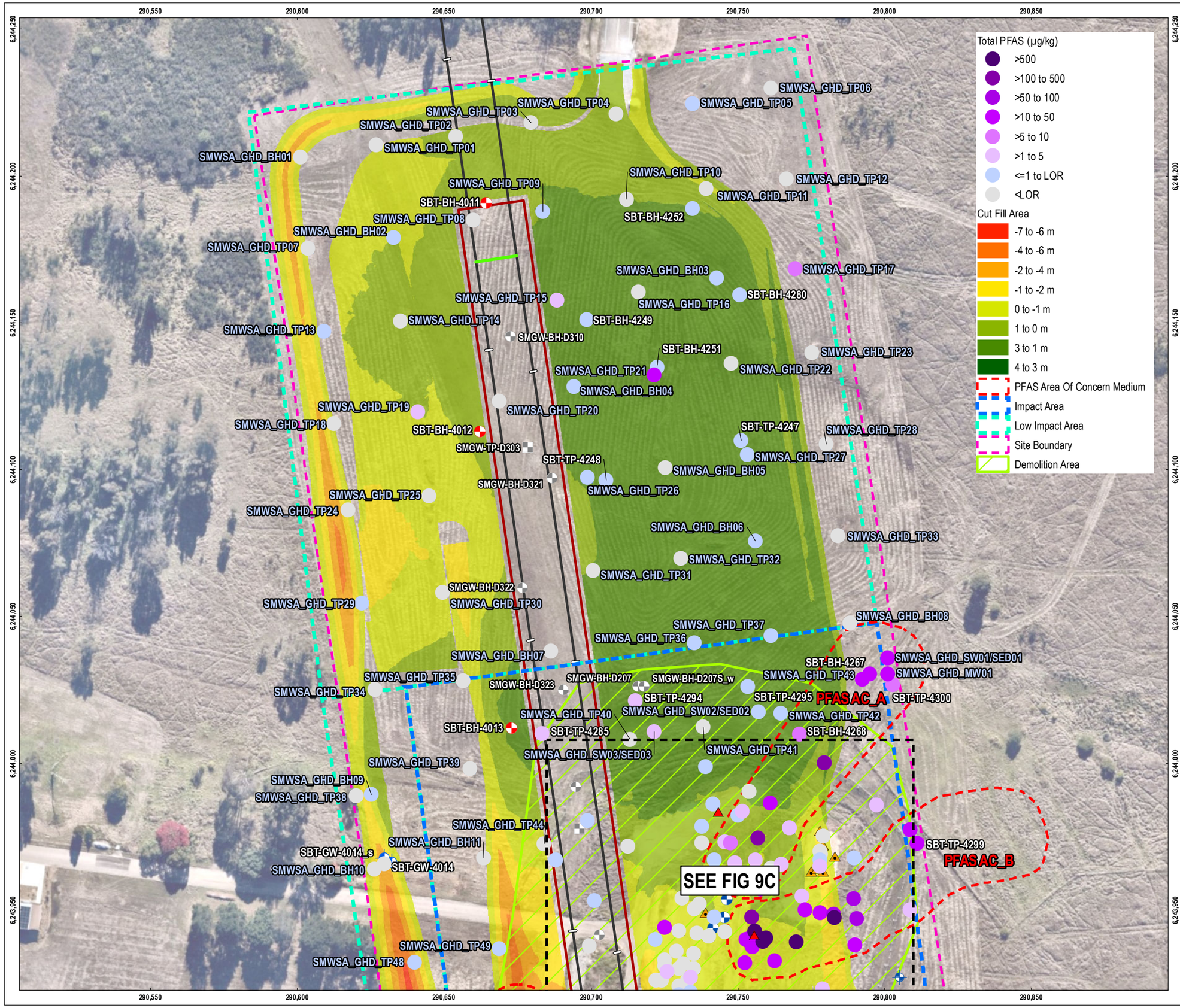
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 9

Maximum Total PFAS Concentration Reported - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F009_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location

Additional Contaminated Land Location
- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Station Box / Shaft

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 14-06-2022).

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 9A

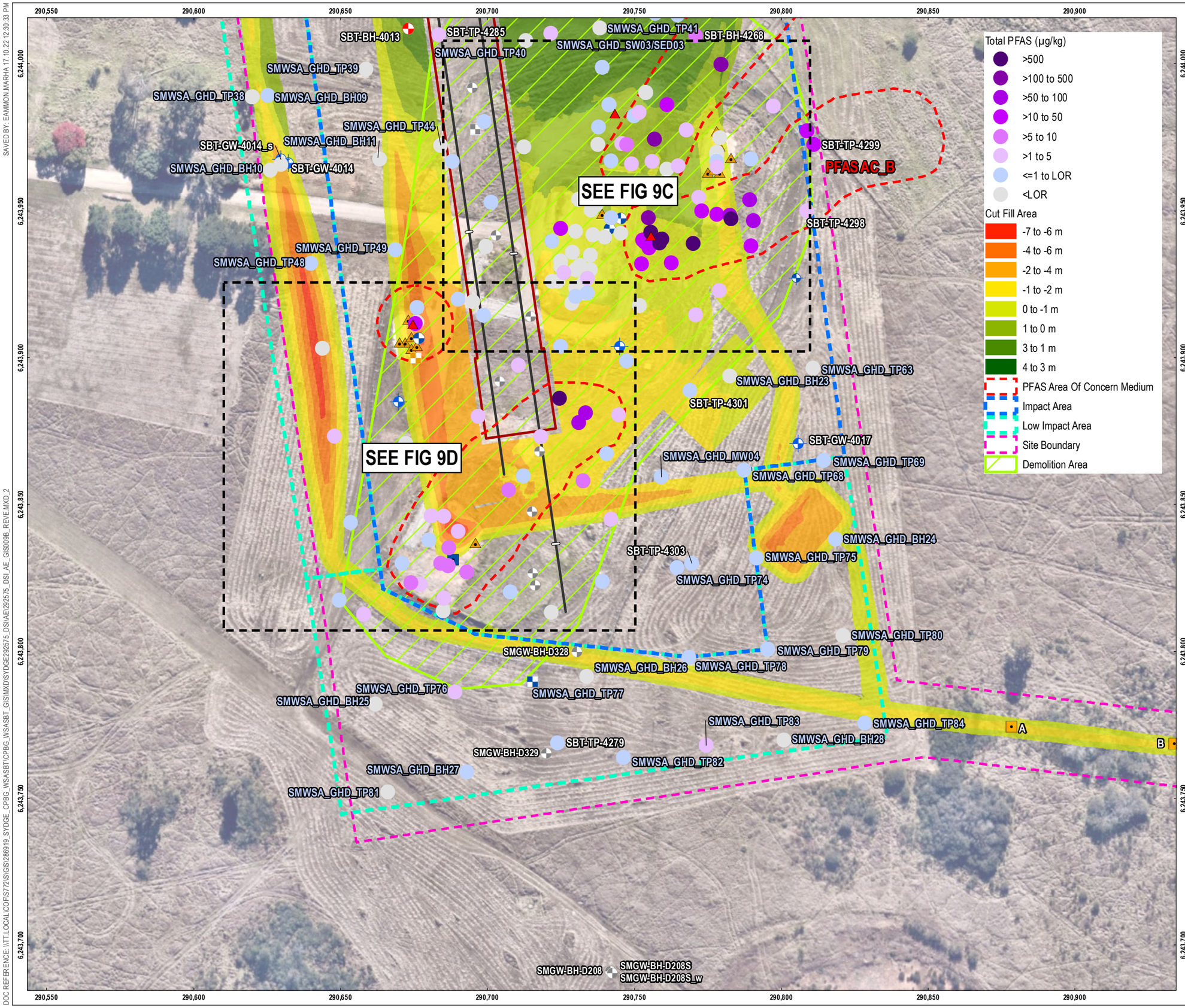
Maximum Total PFAS Concentration Reported - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F009A_GIS**

SAVED BY: EAMMON.MARHA 17.10.22 12:30:33 PM

DOC REFERENCE: \\TTLOCALCOR\S772\SIGIS\286919_SYDGE_CPBG_WSASBT\CPBG_WSASBT_GIS\MXD\SYDGE292575_DSIAE\292575_DSI_AE_GIS009B_REVE.MXD_2



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location

Additional Contaminated Land Location
- Borehole
- Test Pit
- Hand Sample

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Station Box / Shaft

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 14-06-2022).

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 9B

Maximum Total PFAS Concentration Reported - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **17.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F009B_GIS**

NOTE
ACM - Asbestos Containing Material
AF'FA - Asbestos Fines / Friable Asbestos

PFAS AC_A
PFAS AC_B
PFAS AC_D

SBT-TP-4293
SBT-TP-4297
SMGW-BH-D324
SMWSA_GHD_BH15
SBT-BH-4265
SMWSA_GHD_BH13
SMWSA_GHD_MW02
Septic Tank
SMWSA_GHD_MW05
SBT-BH-4237
SBT-TP-4284
SMGW-TP-D301
SMWSA_GHD_BH12
SMWSA_GHD_TP47
SBT-BH-4266
SBT-BH-4239
SBT-BH-4235
SMWSA_GHD_TP46
SBT-BH-4238
SMWSA_GHD_TP45
SBT-BH-4015
SBT-BH-4241
SBT-BH-4236
D-V001 to V003
SBT-BH-4240
SMWSA_GHD_TP53
SMWSA_GHD_BH20
SBT-TP-4296
SMWSA_GHD_BH19
SBT-BH-4242
SBT-BH-4257
SMWSA_GHD_TP50
A_V022
SMWSA_GHD_BH18
SBT-BH-4255
A_V015
SBT-TP-4291
SBT-BH-4275
SMWSA_GHD_BH17
SBT-BH-4253
SBT-TP-4298
A_V018
SBT-BH-4261
C-V002
C-V001
SMWSA_GHD_TP52
SBT-BH-4254
Fire Hose Shed
AF/FA 0-0.2 m bgs
ACM 0.4-0.5 m bgs
A_V021
SMWSA_GHD_BH16
SMWSA_GHD_BH30
SBT-BH-4258
A_V023
A_V014
SBT-BH-4260
E-V003
SMWSA_GHD_PRD01
SMGW-BH-D325
E-V001 - V002
SBT-BH-4259
A_V017
A_V016
SMWSA_GHD_BH31
SMWSA_GHD_TP51
SMWSA_GHD_BH29
SBT-BH-4256
SBT-TP-4283
SBT-BH-4262
SMWSA_GHD_MW06
A_V020
A_V013
A_V010
A_V009
SBT-TP-4290
SBT-BH-4263
A_V008
A_V011
ACM ground surface
SBT-BH-4264
ACM 0.9 m bgs
A_V012
A_V025
A_V006
A_V024
SMWSA_GHD_MW03
A_V007
A_V002
A_V005
A_V004
A_V001
SMWSA_GHD_TP58
A_V026
A_V027
SBT-TP-4288
A_V019
A_V003
SBT-BH-4016
SMWSA_GHD_BH22
ACM 0-0.1 m bgs
SMWSA_GHD_TP57
SMWSA_GHD_TP55
SMGW-BH-D308
AF/FA 0.9-1 m bgs
SBT-TP-4292
SMWSA_GHD_TP56
SBT-CM-4018

B_V010
B_V008
B_V009
B_V001
B_V002
B_V011
B_V003
B_V007
B_V006
B_V004
B_V005

290,700
290,725
290,750
290,775
290,800
6,244,000
6,243,975
6,243,950
6,243,925

Total PFAS (µg/kg)
>500
>100 to 500
>50 to 100
>10 to 50
>5 to 10
>1 to 5
<=1 to LOR
<LOR

Cut Fill Area
-2 to -4 m
-1 to -2 m
0 to -1 m
1 to 0 m
3 to 1 m
4 to 3 m

CPB CONTRACTORS
Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location

Additional Contaminated Land Location
- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

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
- Site Boundary
- PFAS Area Of Concern Medium
- Impact Area
- Station Box / Shaft
- Demolition Area

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 14-06-2022).

N

0 7.5 15 m

SCALE **1:400**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

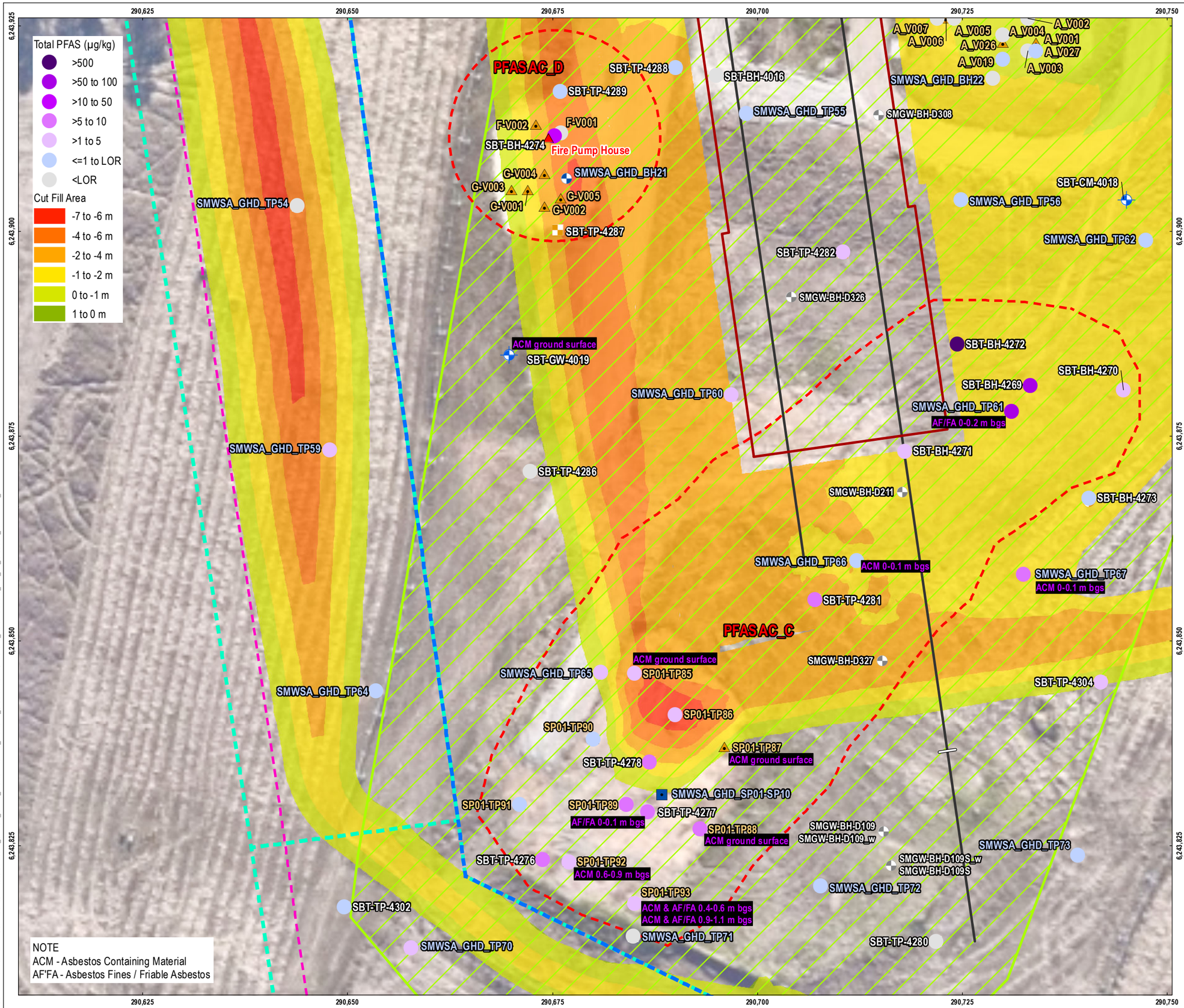
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 9C

Maximum Total PFAS Concentration Reported - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F009C_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

LEGEND

- Historic Site Location

Additional Contaminated Land Location
- Borehole
- Test Pit

Additional Geotechnical/Hydrogeological Location
- Borehole
- Monitoring Well

GHD Investigations (2022)
- Borehole
- Test Pit
- Other
- Post-demolition Sample

Existing Investigation Location
- Borehole
- Test Pit
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Site Boundary
- PFAS Area Of Concern Medium
- Impact Area
- Low Impact Area
- Station Box / Shaft
- Demolition Area

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 16-04-2022).

0 7.5 15 m

SCALE **1:450**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

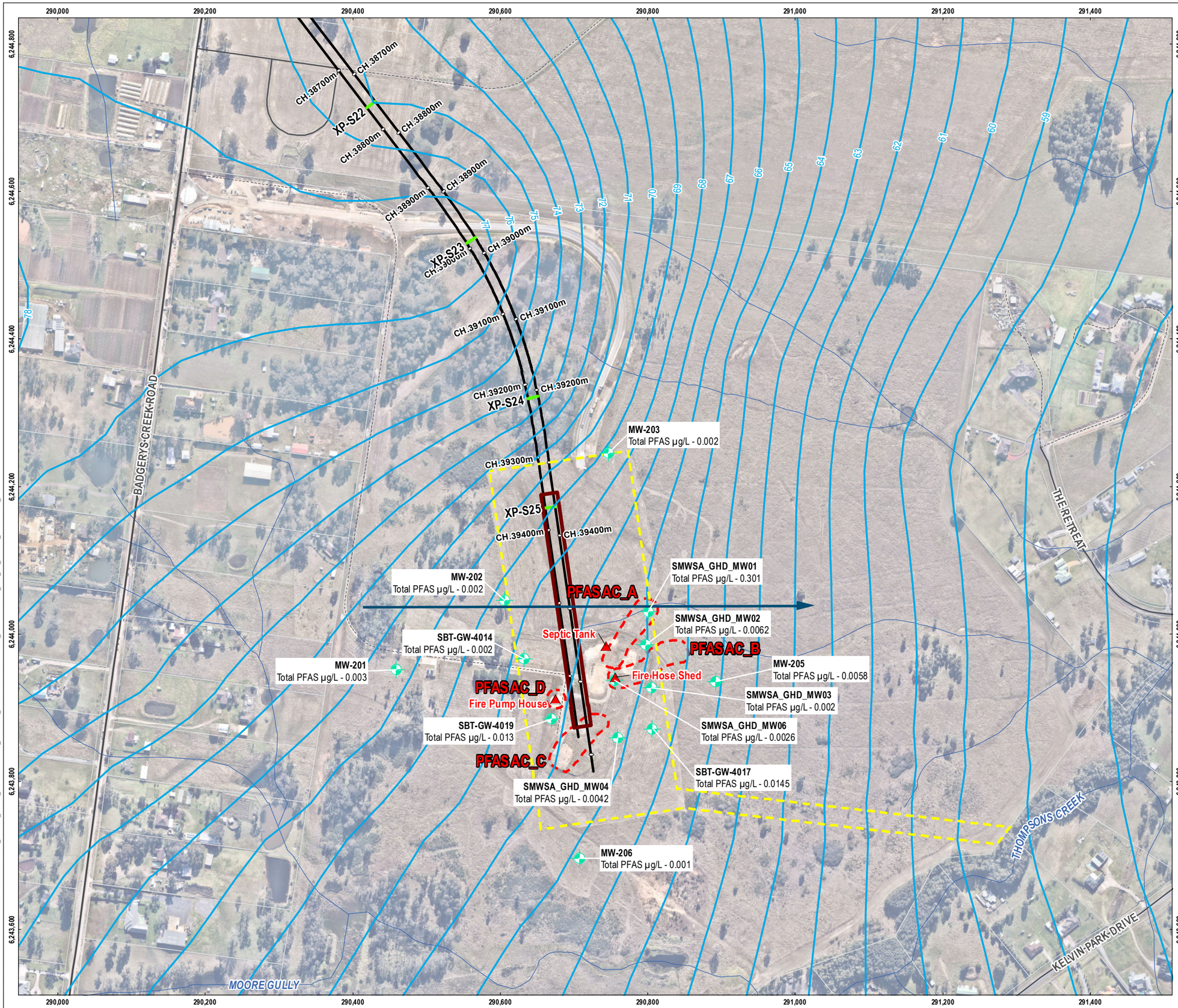
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 9D

Maximum Total PFAS Concentration Reported - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F009D_GIS**



LEGEND

- Historic Site Location
- Groundwater Monitoring Well
- Major Road
- Minor Road
- Track
- Non-perennial Watercourse
- Groundwater Elevation Contour (mAHD)
- Groundwater Flow Direction
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Tunnel Alignment
- Station Box / Shaft
- Cadastral Boundary
- Site Boundary
- PFAS Area Of Concern

SOURCE
Groundwater monitoring wells compiled by Tetra Tech Coffey.
Groundwater contours, groundwater flow direction, and alignment buffer from Tetra Tech Coffey.
Alignment supplied by CPBG.
Cadastre, roads, and watercourses from DFSI.
Aerial imagery from Nearmap (capture date 14-06-2022).

N

0 100 200 m

SCALE **1:5,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

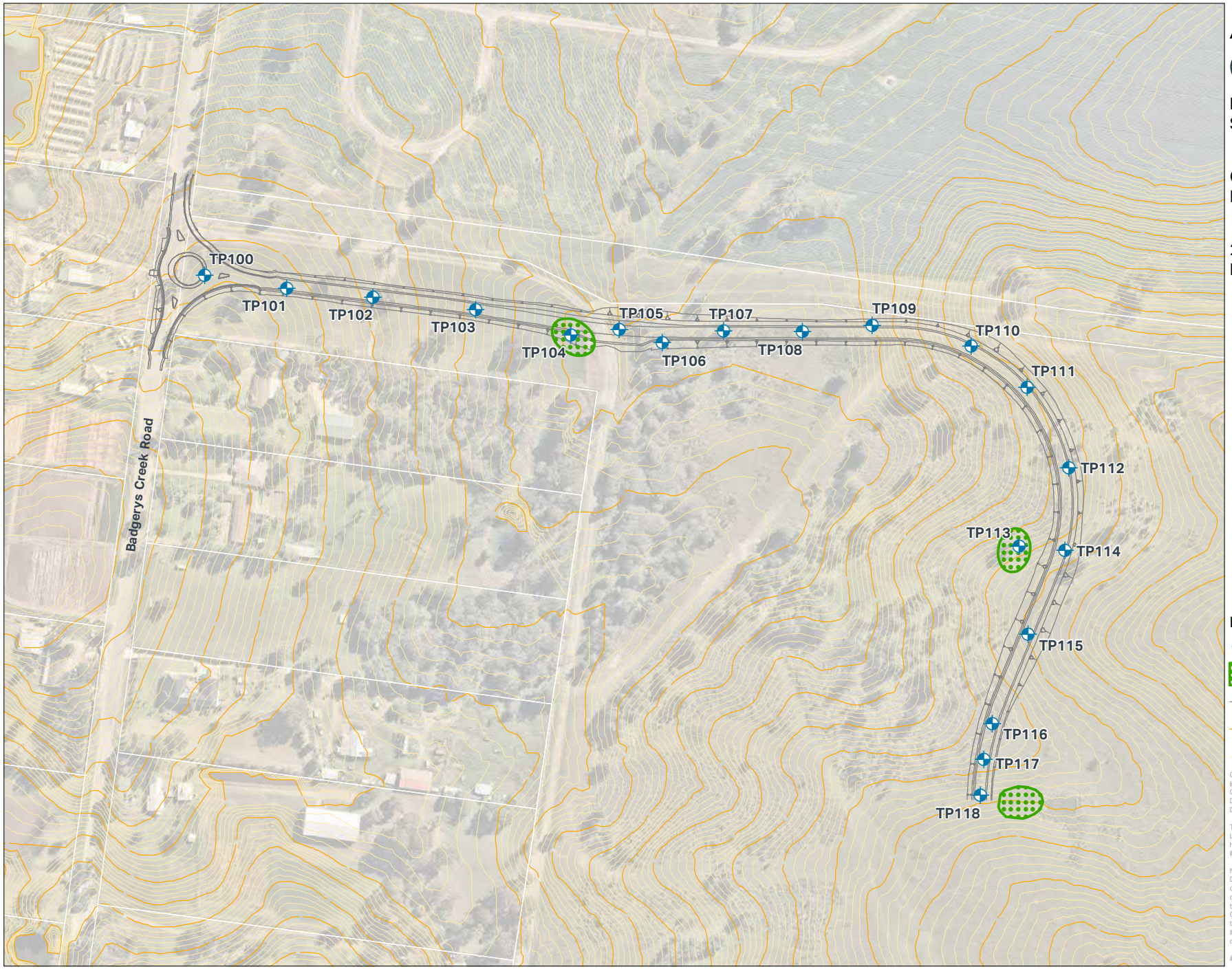
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 11

PFAS Concentrations in Groundwater

TETRA TECH COFFEY

DATE: **19.10.22** PROJECT: **754-SYDGE292575** FILE: **292575_DSI_AE_F011_GIS_REVA**



AECOM

N

0 50 100 m

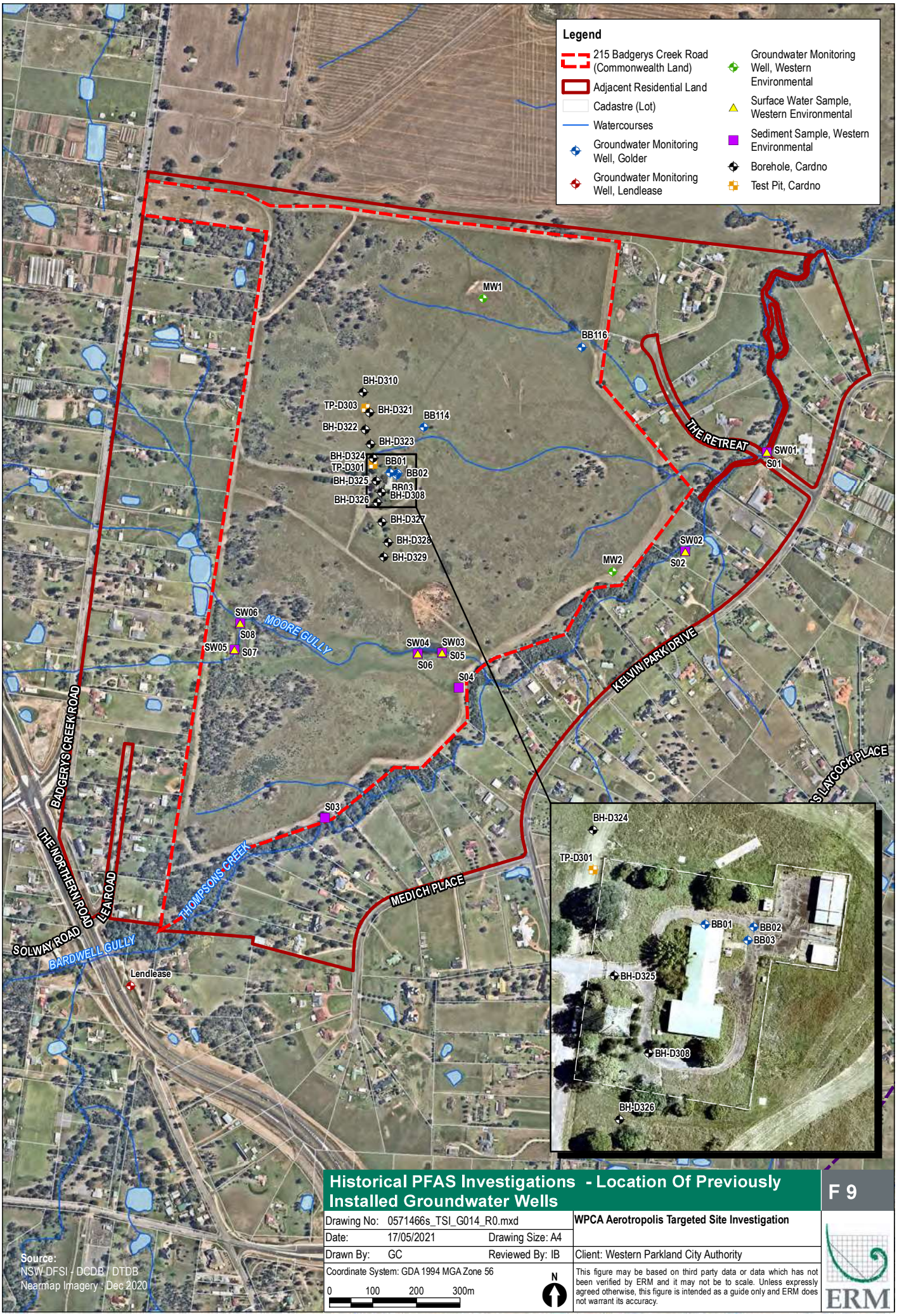
FIGURE 2:
SAMPLING LOCATIONS

CONTAMINATION INVESTIGATION

215 BADGERYS CREEK ROAD, BRINGELLY NSW 2555

Legend

- Sampling location
- Proposed sediment basin
- Design
- Major contour
- Minor contour



Historical PFAS Investigations - Location Of Previously Installed Groundwater Wells

F 9

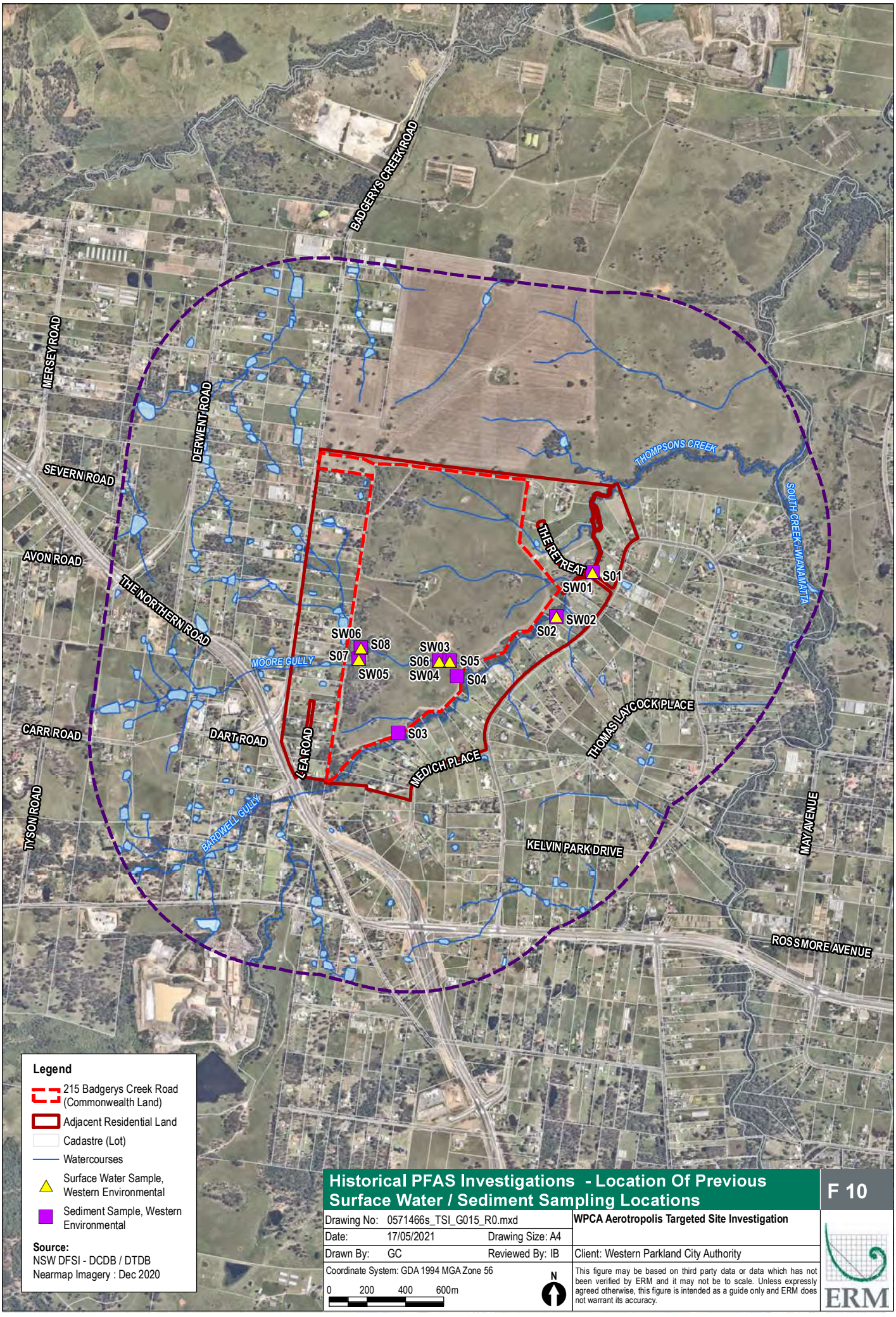
Drawing No:	0571466s_TSI_G014_R0.mxd	WPCA Aerotropolis Targeted Site Investigation
Date:	17/05/2021	Drawing Size: A4
Drawn By:	GC	Reviewed By: IB
Client: Western Parkland City Authority		

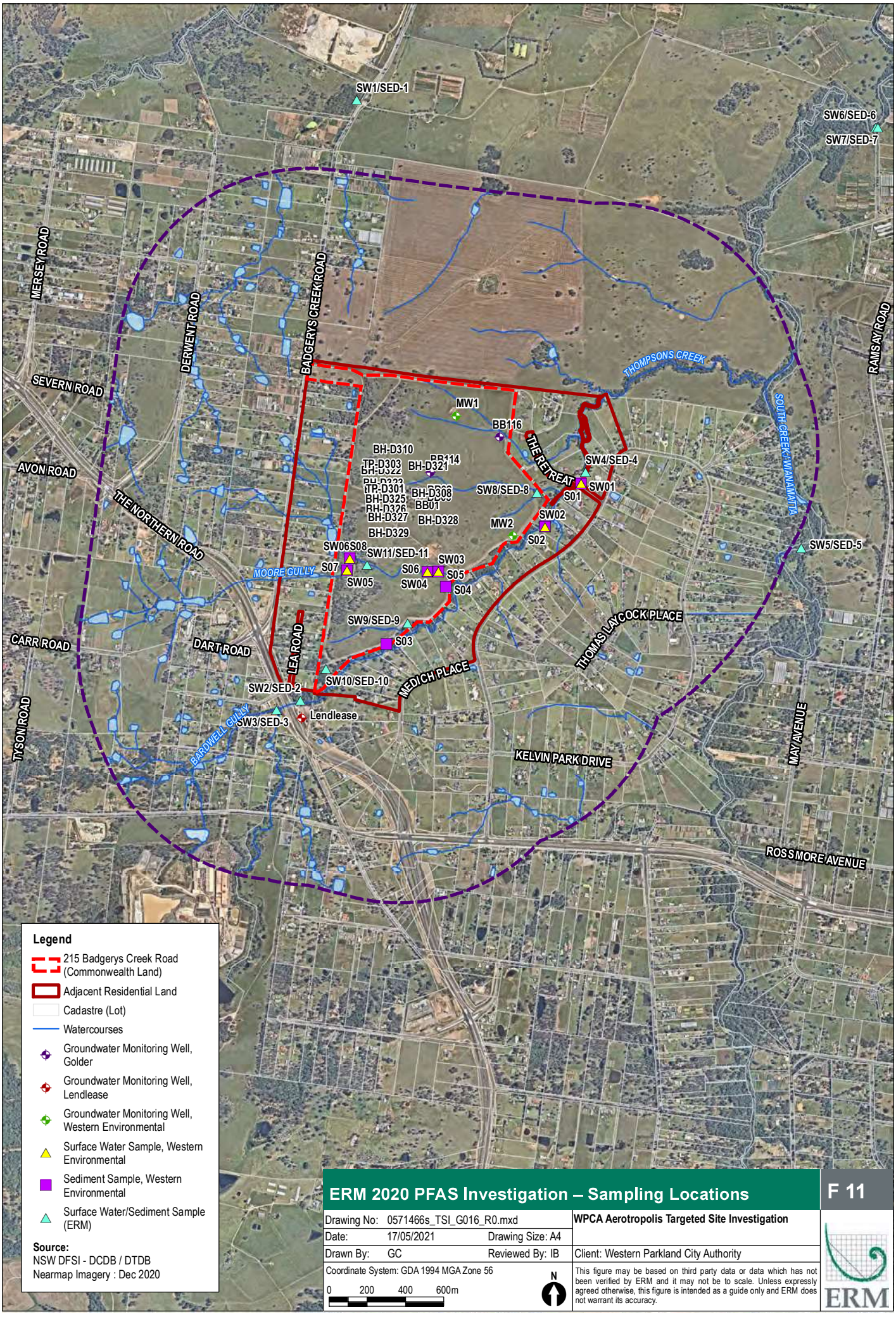
Coordinate System: GDA 1994 MGA Zone 56

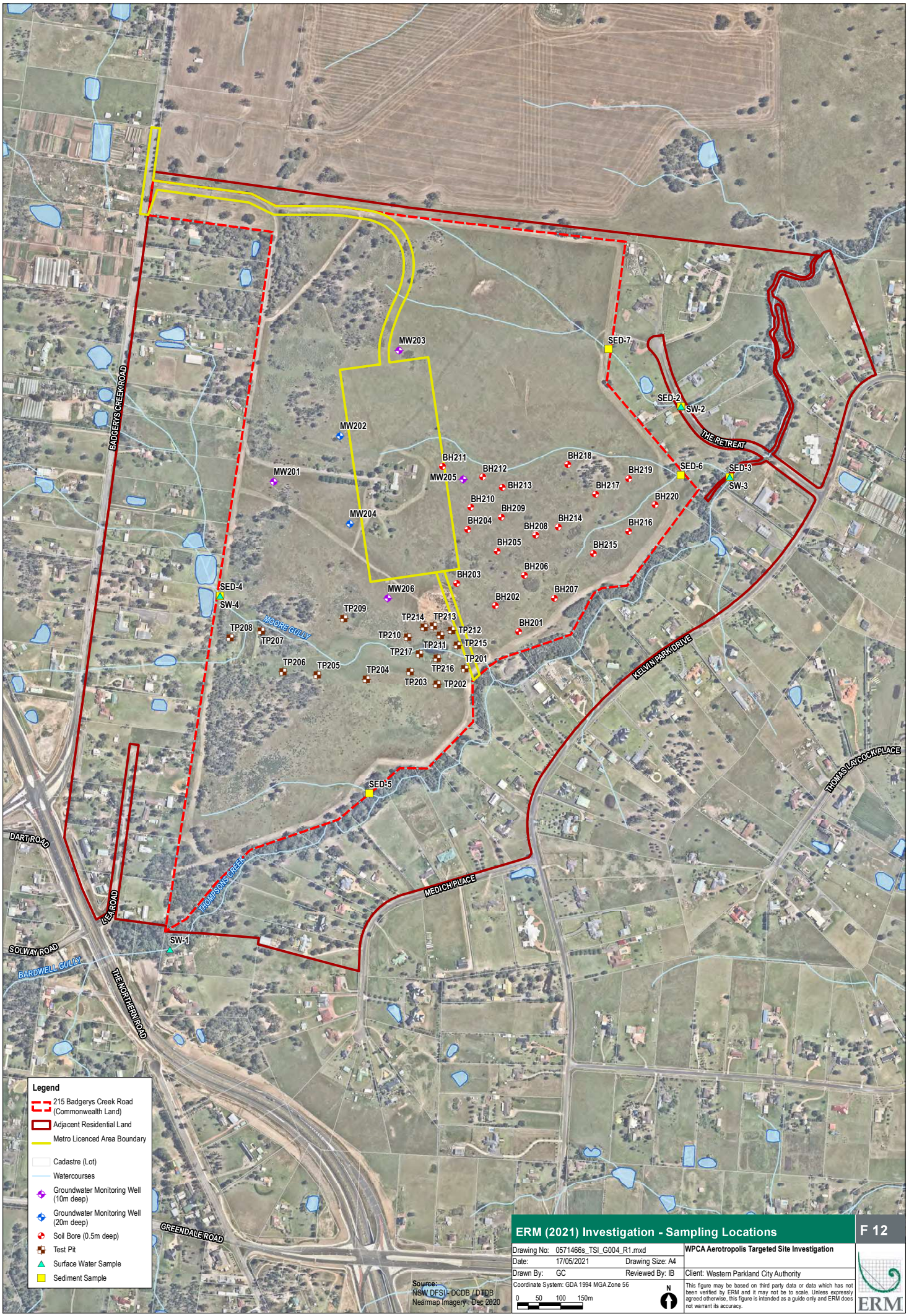
0 100 200 300m

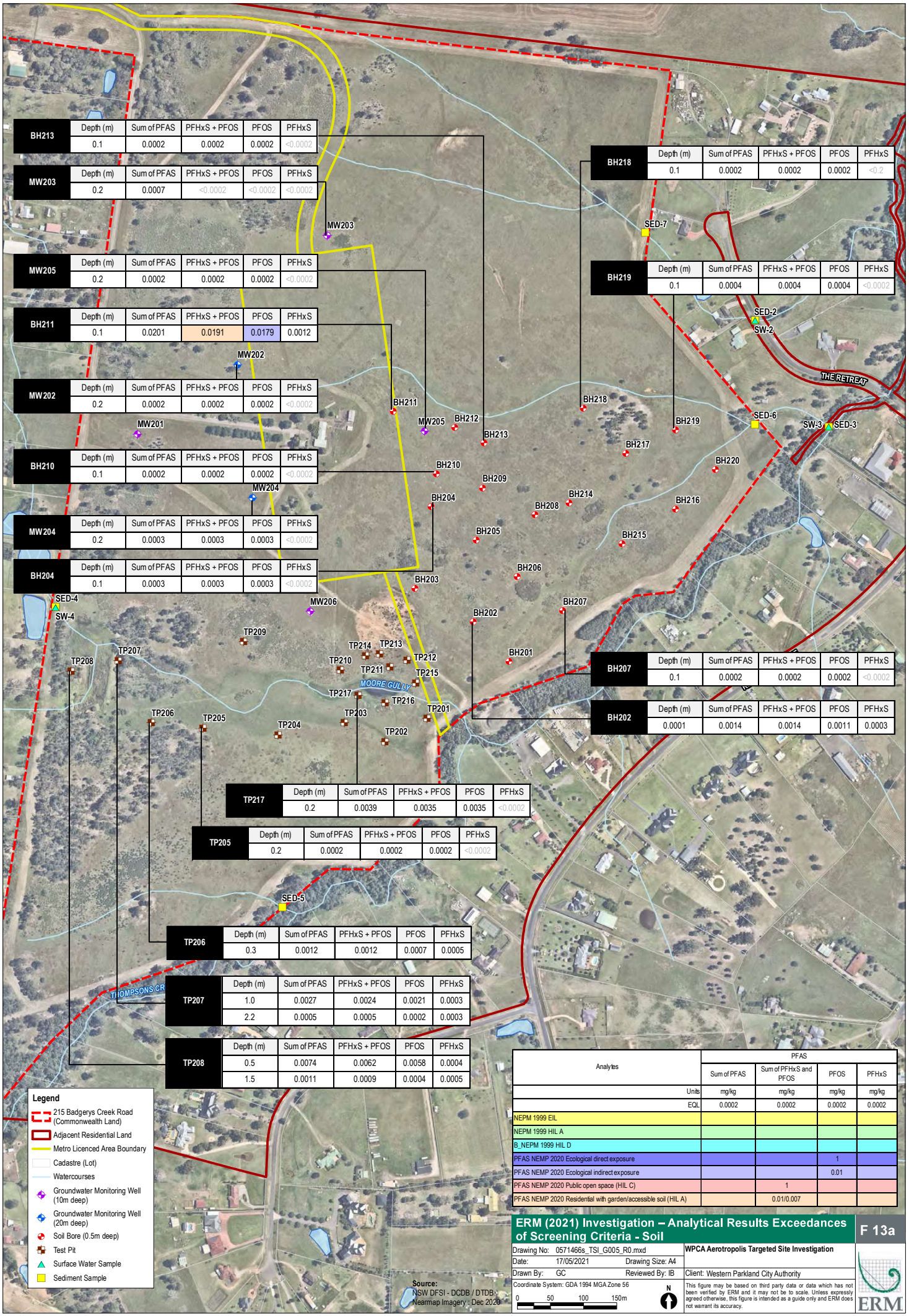
N

ERM


BADGERYS CREEK ROAD
MERSEY ROAD
DERWENT ROAD
SEVERN ROAD
AVON ROAD
THE NORTHERN ROAD
CARR ROAD
DART ROAD
LEA ROAD
TYSON ROAD
MEDICH PLACE
KELVIN PARK DRIVE
THOMAS LAYCOCK PLACE
MAY AVENUE
ROSSMORE AVENUE
THOMPSONS CREEK
SOUTH CREEK/WIANAMATTA
THE RETREAT
MOORE GULLY
BARDWELL GULLY
S01
SW01
SW02
S02
SW03
S03
S04
SW04
S05
S06
SW05
S07
S08
SW06
Legend
215 Badgerys Creek Road (Commonwealth Land)
Adjacent Residential Land
Cadastre (Lot)
Watercourses
Surface Water Sample, Western Environmental
Sediment Sample, Western Environmental
Source:
NSW DFSI - DCDB / DTDB
Nearmap Imagery : Dec 2020
Historical PFAS Investigations - Location Of Previous Surface Water / Sediment Sampling Locations
F 10
Drawing No: 0571466s_TSI_G015_R0.mxd
WPCA Aerotropolis Targeted Site Investigation
Date: 17/05/2021
Drawing Size: A4
Drawn By: GC
Reviewed By: IB
Client: Western Parkland City Authority
Coordinate System: GDA 1994 MGA Zone 56
0 200 400 600m
N
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.
ERM


SW1/SED-1
SW6/SED-6
SW7/SED-7
MERSEY ROAD
DERWENT ROAD
BADGERYS CREEK ROAD
RAMSAY ROAD
THOMPSONS CREEK
SEVERN ROAD
SOUTH CREEK/WANANAMATTA
MW1
BB116
THE RETREAT
SW4/SED-4
AVON ROAD
BH-D310
TP-D303
BH-D321
BB114
SW01
S01
SW8/SED-8
TP-D301
BH-D308
BH-D325
BB01
THE NORTHERN ROAD
SW02
BH-D327
BH-D328
MW2
BH-D329
S02
SW06
S08
SW11/SED-11
SW03
SW5/SED-5
S07
S06
S05
MOORE GULLY
SW05
SW04
S04
SW9/SED-9
CARR ROAD
DART ROAD
S03
THOMAS LAYCOCK PLACE
LEA ROAD
SW10/SED-10
MEDICH PLACE
SW2/SED-2
TYSON ROAD
SW3/SED-3
Lendlease
BARDWELL GULLY
MAY AVENUE
KELVIN PARK DRIVE
ROSSMORE AVENUE
Legend
215 Badgerys Creek Road (Commonwealth Land)
Adjacent Residential Land
Cadastre (Lot)
Watercourses
Groundwater Monitoring Well, Golder
Groundwater Monitoring Well, Lendlease
Groundwater Monitoring Well, Western Environmental
Surface Water Sample, Western Environmental
Sediment Sample, Western Environmental
Surface Water/Sediment Sample (ERM)
Source:
NSW DFSI - DCDB / DTDB
Nearmap Imagery : Dec 2020
ERM 2020 PFAS Investigation – Sampling Locations
F 11
Drawing No: 0571466s_TSI_G016_R0.mxd
WPCA Aerotropolis Targeted Site Investigation
Date: 17/05/2021
Drawing Size: A4
Drawn By: GC
Reviewed By: IB
Client: Western Parkland City Authority
Coordinate System: GDA 1994 MGA Zone 56
0 200 400 600m
N
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.
ERM


MW203
SED-7
SED-2
SW-2
THE RETREAT
MW202
BH211
BH212
BH218
BH219
SED-6
SED-3
SW-3
MW201
MW205
BH213
BH217
BH220
BH210
BH209
MW204
BH204
BH214
BH208
BH216
BH205
BH215
BH206
BH203
SED-4
MW206
BH207
SW-4
BH202
TP209
TP214
TP213
BH201
TP208
TP212
TP210
TP215
TP207
TP211
TP217
TP201
TP206
TP205
TP216
TP204
TP203
TP202
SED-5
SW-1
BARDWELL GULLY
THE NORTHERN ROAD
GREENDALE ROAD
Legend
215 Badgerys Creek Road (Commonwealth Land)
Adjacent Residential Land
Metro Licenced Area Boundary
Cadastre (Lot)
Watercourses
Groundwater Monitoring Well (10m deep)
Groundwater Monitoring Well (20m deep)
Soil Bore (0.5m deep)
Test Pit
Surface Water Sample
Sediment Sample
Source:
NSW DFSI - DCDB / DTDB
Nearmap Imagery - Dec 2020
ERM (2021) Investigation - Sampling Locations
F 12
Drawing No: 0571466s_TSI_G004_R1.mxd
WPCA Aerotropolis Targeted Site Investigation
Date: 17/05/2021
Drawing Size: A4
Drawn By: GC
Reviewed By: IB
Client: Western Parkland City Authority
Coordinate System: GDA 1994 MGA Zone 56
0 50 100 150m
N
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.
ERM



Analytes	PFAS			
	Sum of PFAS	Sum of PFHxS and PFOS	PFOS	PFHxS
Units	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.0002	0.0002	0.0002	0.0002
NEPM 1999 EIL				
NEPM 1999 HIL A				
B_NEPM 1999 HIL D				
PFAS NEMP 2020 Ecological direct exposure			1	
PFAS NEMP 2020 Ecological indirect exposure			0.01	
PFAS NEMP 2020 Public open space (HIL C)		1		
PFAS NEMP 2020 Residential with garden/accessible soil (HIL A)		0.01/0.007		

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

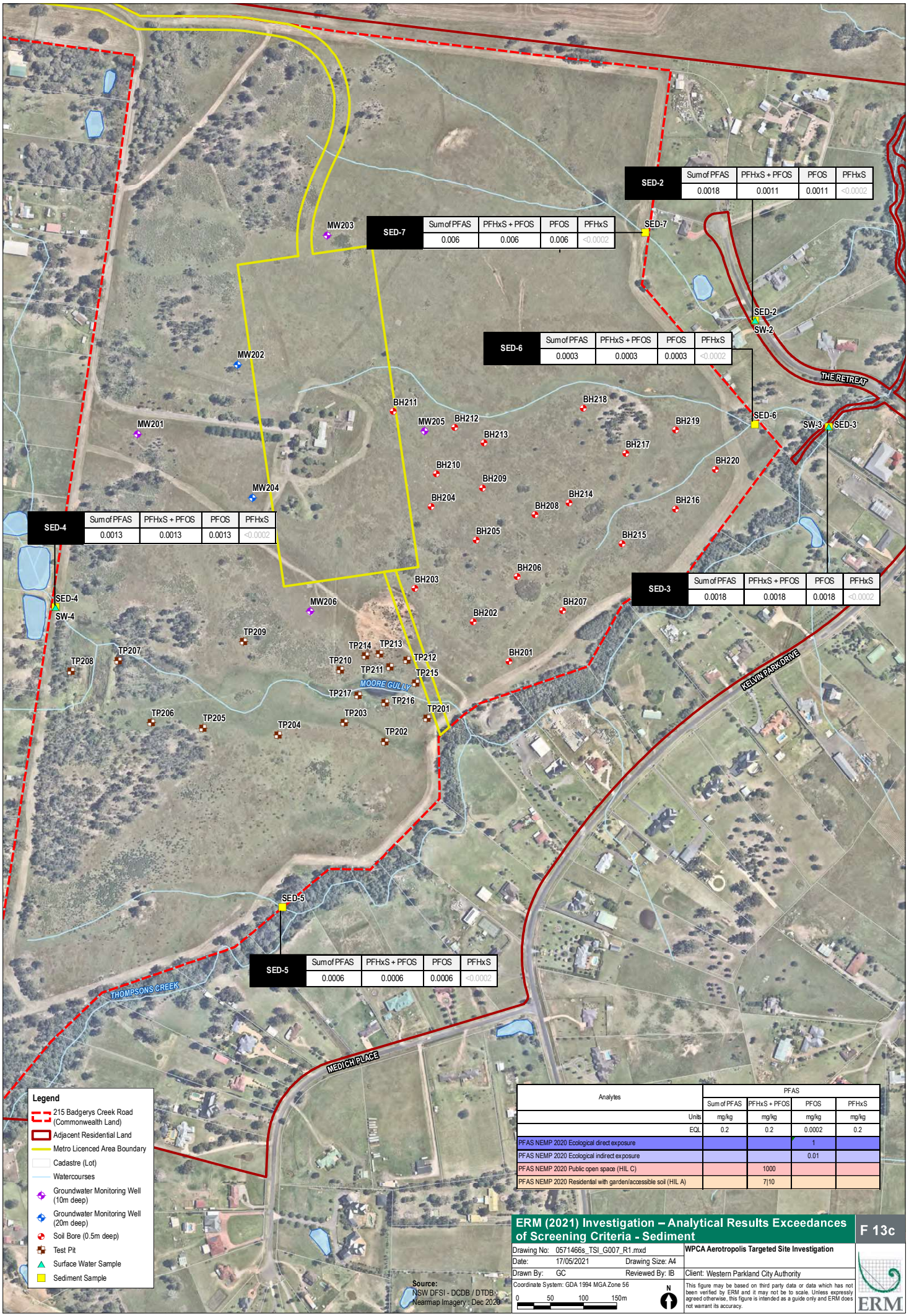
F 13a

Drawing No: 0571466s_TSI_G005_R0.mxd
Date: 17/05/2021 Drawing Size: A4
Drawn By: GC Reviewed By: IB
Coordinate System: GDA 1994 MGA Zone 56

WPCA Aerotropolis Targeted Site Investigation

Client: Western Parkland City Authority

ERM



Analytes	PFAS			
	Sum of PFAS	PFHxS + PFOS	PFOS	PFHxS
Units	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.2	0.2	0.0002	0.2
PFAS NEMP 2020 Ecological direct exposure			1	
PFAS NEMP 2020 Ecological indirect exposure			0.01	
PFAS NEMP 2020 Public open space (HIL C)		1000		
PFAS NEMP 2020 Residential with garden/accessible soil (HIL A)		7|10		

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

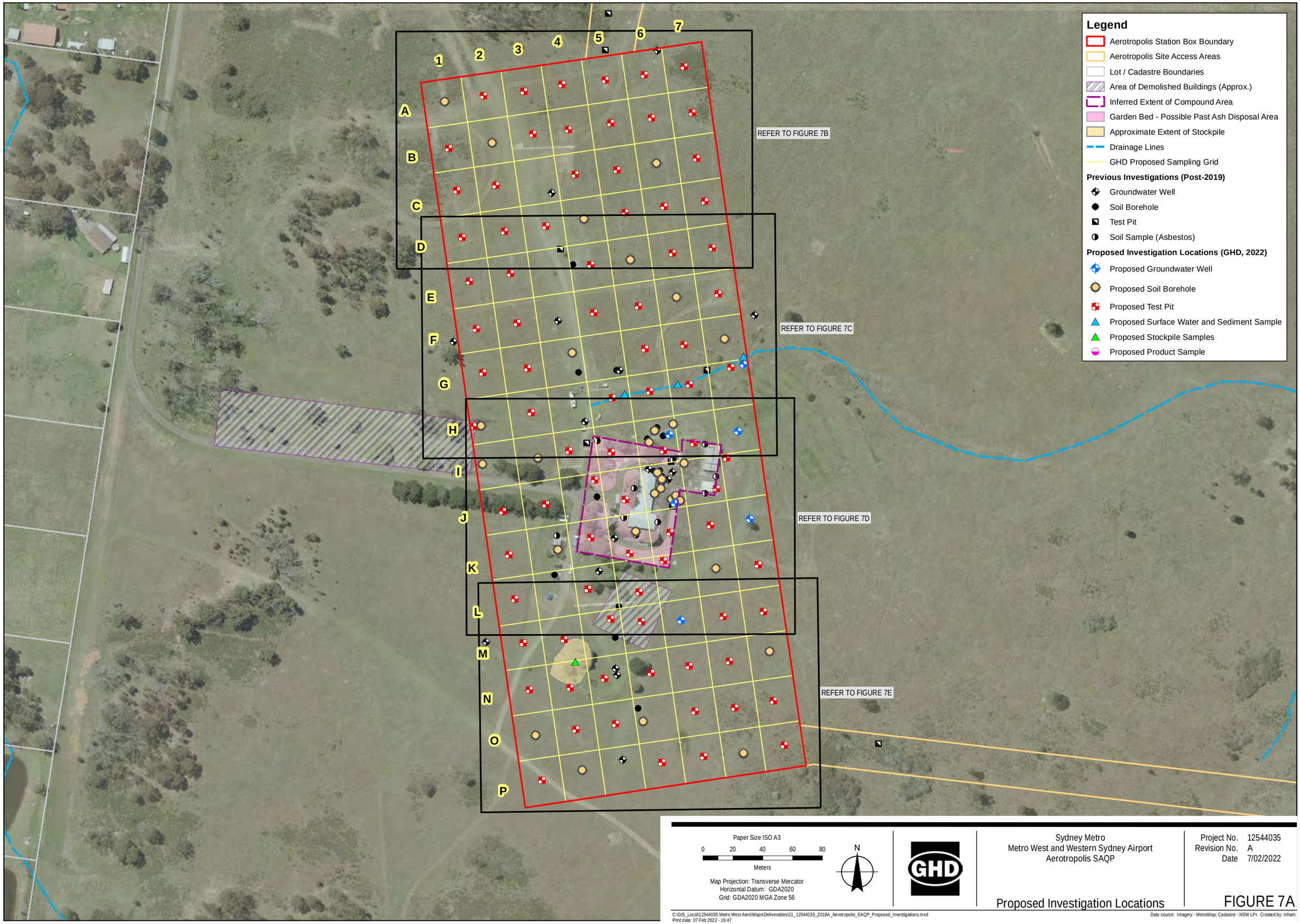
F 13c

Drawing No: 0571466s_TSI_G007_R1.mxd
Date: 17/05/2021 Drawing Size: A4
Drawn By: GC Reviewed By: IB
Coordinate System: GDA 1994 MGA Zone 56

WPCA Aerotropolis Targeted Site Investigation

Client: Western Parkland City Authority

ERM



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Meters

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

N

GHD

Sydney Metro
Metro West and Western Sydney Airport
Aerotropolis SAQP

Project No. 12544035
Revision No. A
Date 7/02/2022

Proposed Investigation Locations

FIGURE 7A

C:\GIS_Local\12544035 Metro West Aero\Maps\Deliverables\21_12544035_Z018A_Aerotropolis_SAQP_Proposed_Investigations.mxd
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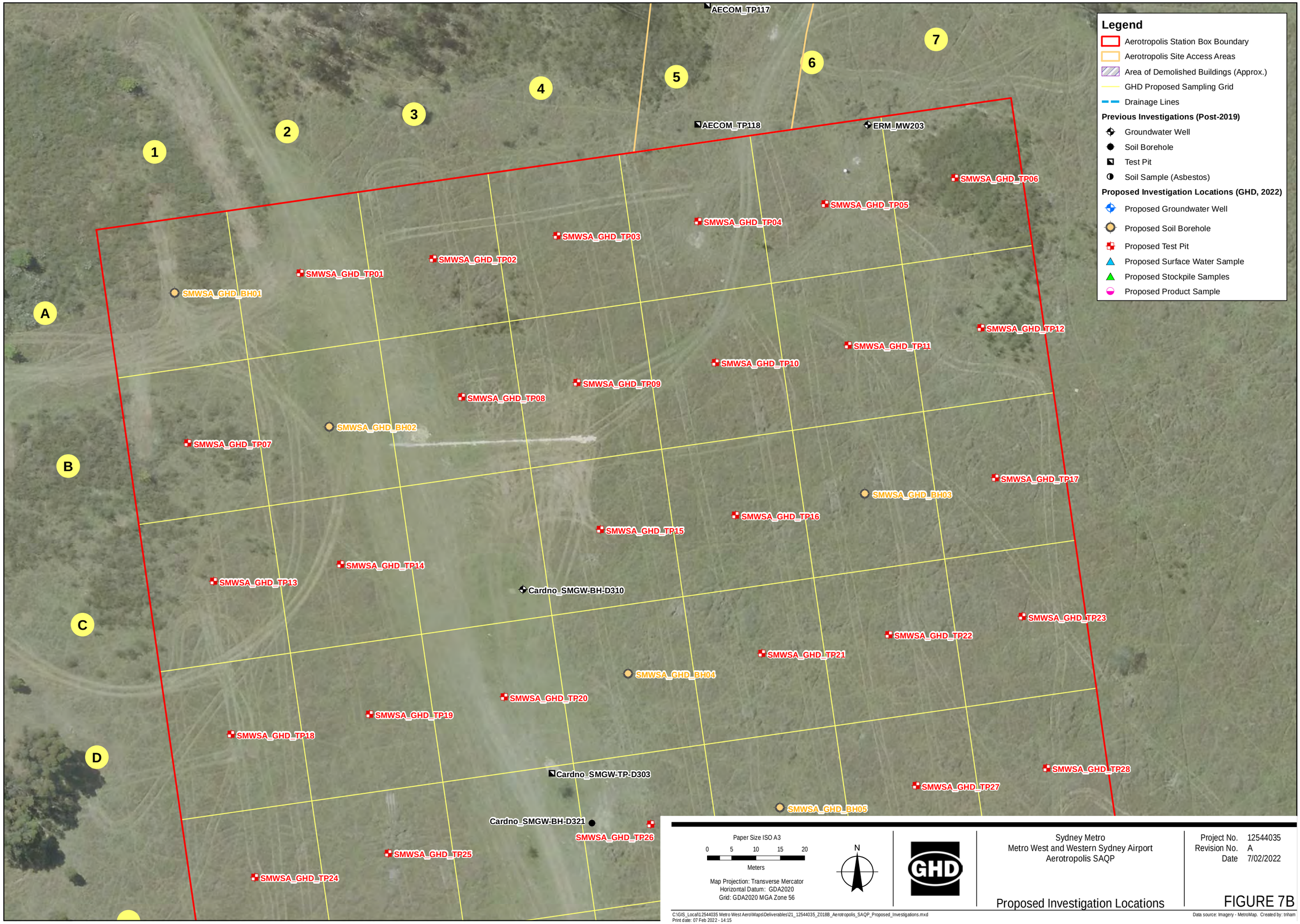

Paper Size ISO A3

0 5 10 15 20

Meters

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

N

GHD

Sydney Metro
Metro West and Western Sydney Airport
Aerotropolis SAQP

Project No. 12544035
Revision No. A
Date 7/02/2022

Proposed Investigation Locations

FIGURE 7B

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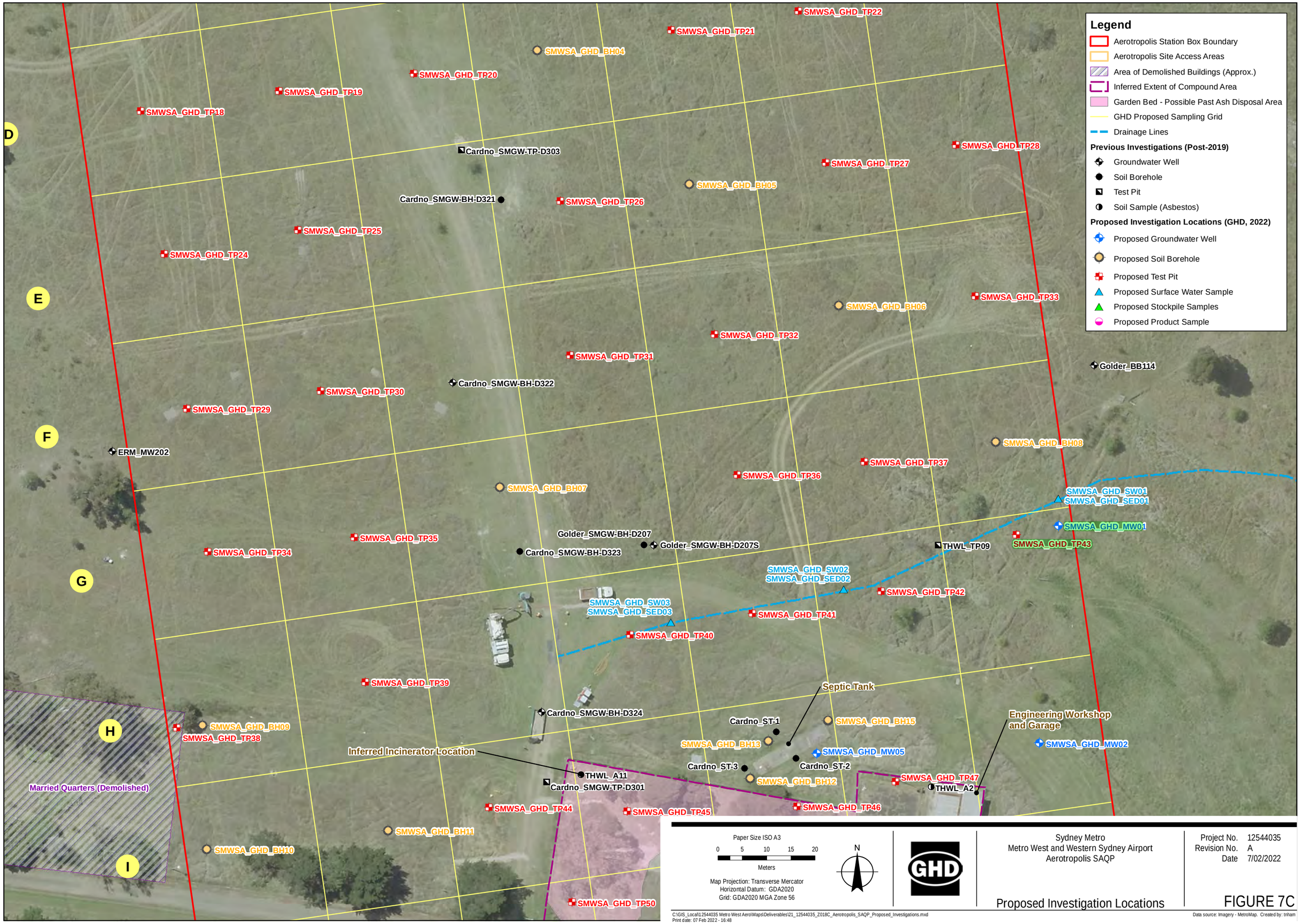
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SMWSA_GHD_TP27
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SMWSA_GHD_SW03
SMWSA_GHD_SED03
SMWSA_GHD_TP41
SMWSA_GHD_TP40
SMWSA_GHD_TP39
Septic Tank
Cardno_SMGW-BH-D324
Cardno_ST-1
SMWSA_GHD_BH15
Engineering Workshop and Garage
H
SMWSA_GHD_BH09
SMWSA_GHD_TP38
SMWSA_GHD_BH13
SMWSA_GHD_MW02
SMWSA_GHD_MW05
Inferred Incinerator Location
Cardno_ST-3
Cardno_ST-2
THWL_A11
SMWSA_GHD_BH12
SMWSA_GHD_TP47
Cardno_SMGW-TP-D301
THWL_A2
Married Quarters (Demolished)
SMWSA_GHD_TP44
SMWSA_GHD_TP45
SMWSA_GHD_TP46
SMWSA_GHD_BH11
SMWSA_GHD_BH10
I
SMWSA_GHD_TP50
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)
Proposed Investigation Locations (GHD, 2022)
Proposed Groundwater Well
Proposed Soil Borehole
Proposed Test Pit
Proposed Surface Water Sample
Proposed Stockpile Samples
Proposed Product Sample
Paper Size ISO A3
0 5 10 15 20
Meters
Map Projection: Transverse Mercator
Horizontal Datum: GDA2020
Grid: GDA2020 MGA Zone 56
N
GHD
Sydney Metro
Metro West and Western Sydney Airport
Aerotropolis SAQP
Project No. 12544035
Revision No. A
Date 7/02/2022
Proposed Investigation Locations
FIGURE 7C
C:\GIS_Local\12544035 Metro West Aero\Maps\Deliverables\21_12544035_Z018C_Aerotropolis_SAQP_Proposed_Investigations.mxd
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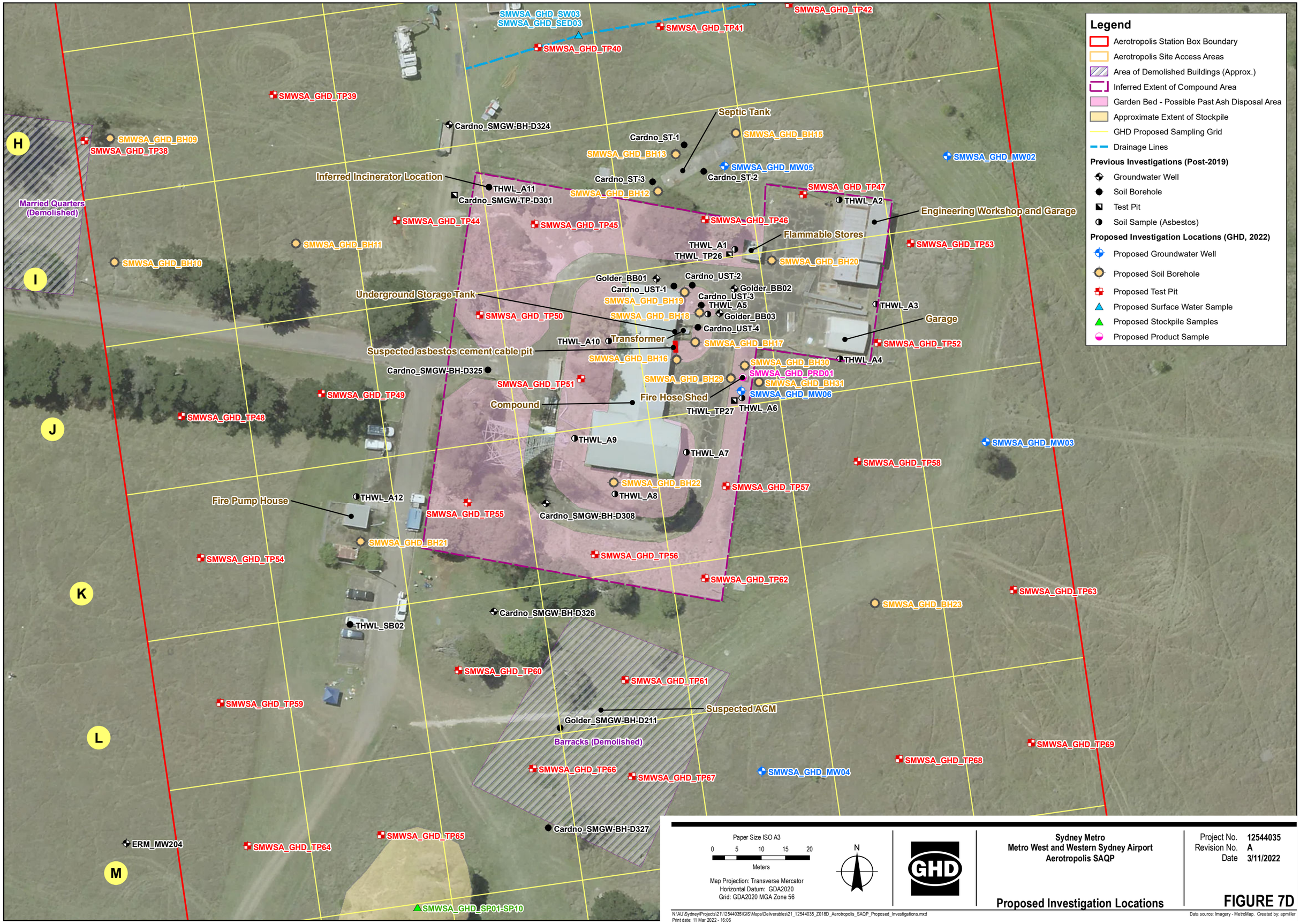

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Meters

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

N

GHD

Sydney Metro
Metro West and Western Sydney Airport
Aerotropolis SAQP

Project No. 12544035
Revision No. A
Date 3/11/2022

Proposed Investigation Locations

FIGURE 7D

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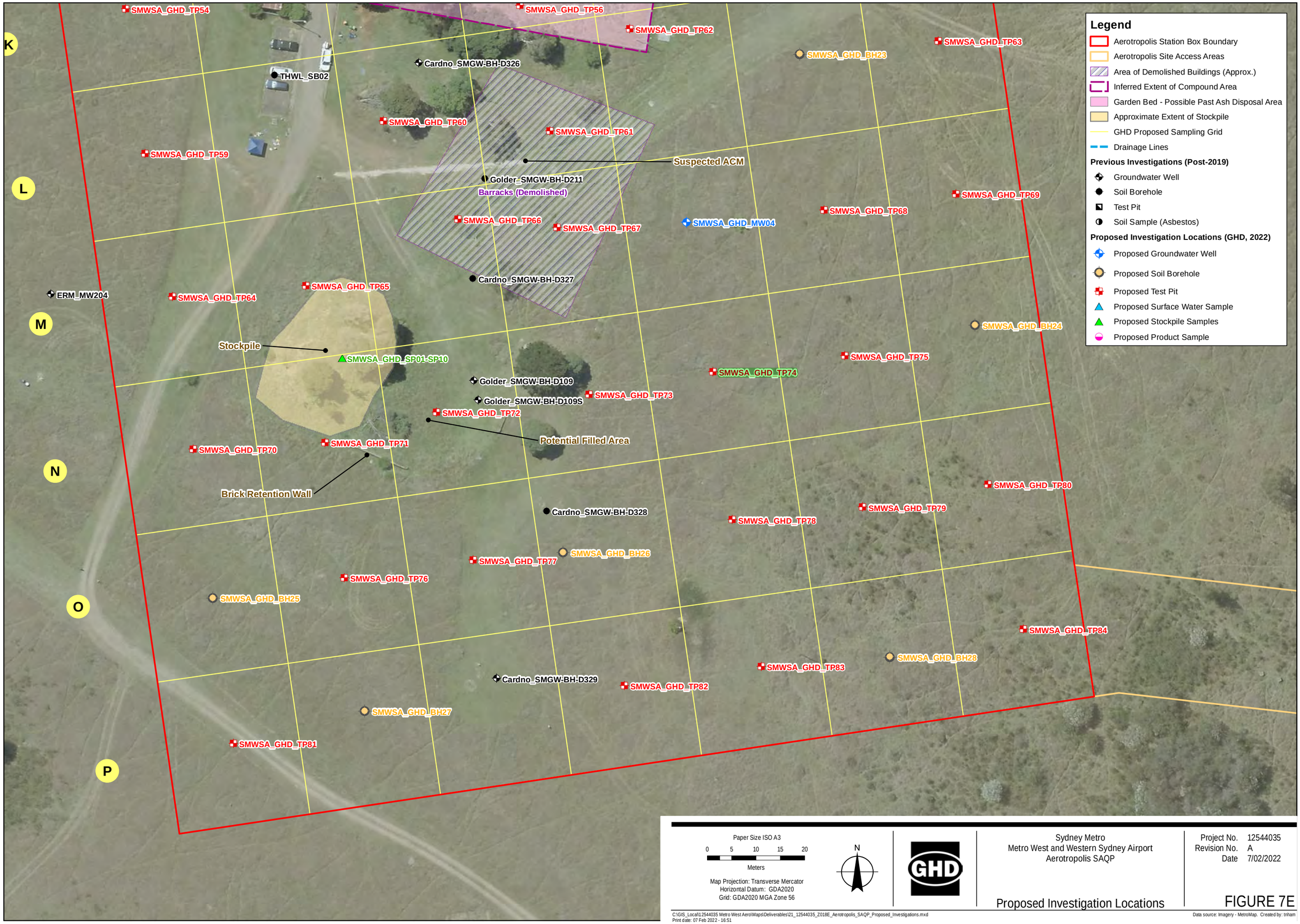

Paper Size ISO A3

0 5 10 15 20

Meters

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

N

GHD

Sydney Metro
Metro West and Western Sydney Airport
Aerotropolis SAQP

Project No. 12544035
Revision No. A
Date 7/02/2022

Proposed Investigation Locations

FIGURE 7E

C:\GIS_Local\12544035 Metro West Aero\Maps\Deliverables\21_12544035_Z018E_Aerotropolis_SAQP_Proposed_Investigations.mxd
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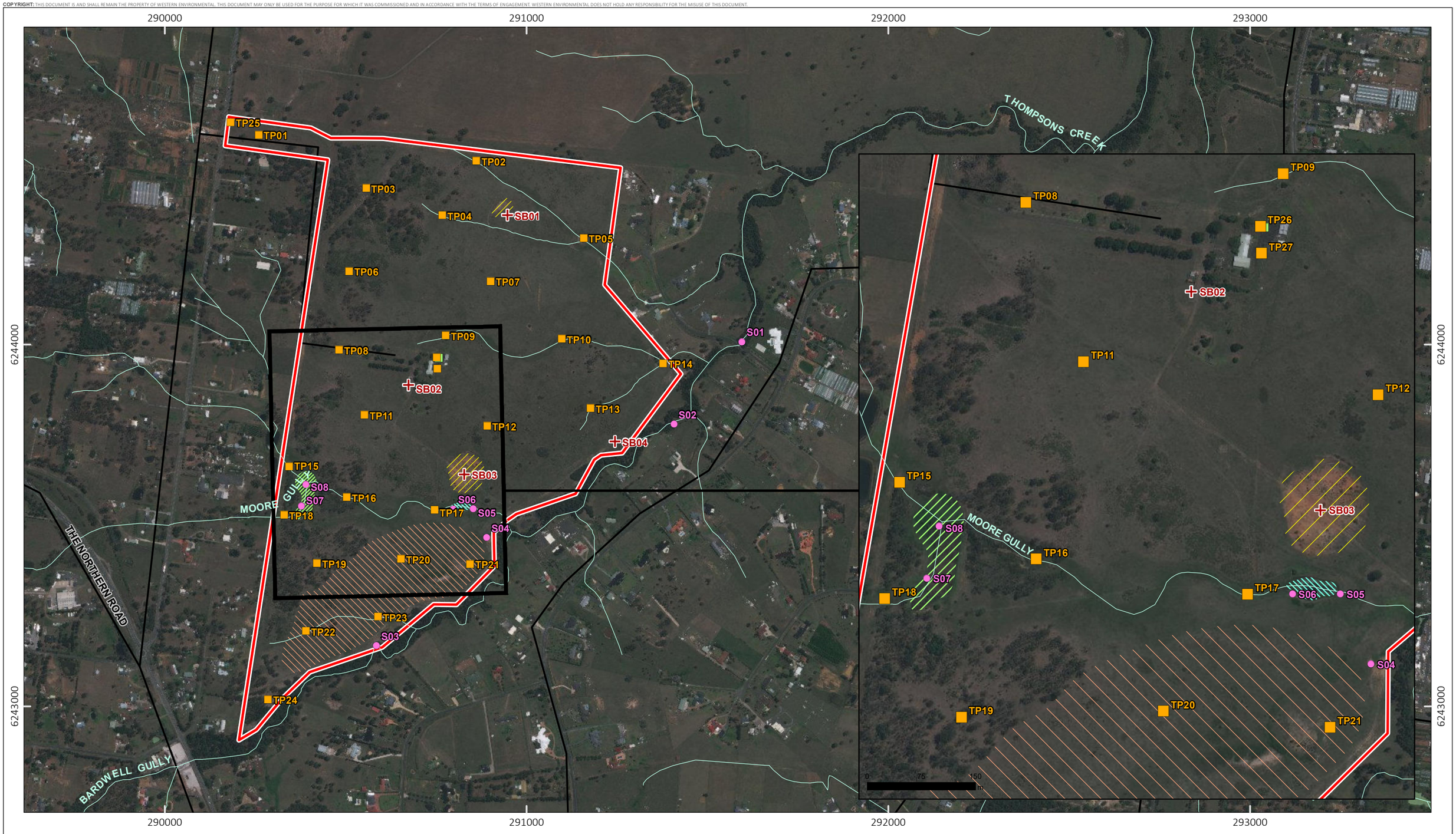

Figure 6: Soil Sample Locations

N 0 100 200 300 m	CLIENT: DITCRD	
	PROJECT: 215 BADGERYS CREEK ROAD, BRINGELLY	
SCALE: 1: 10,000	SHEET SIZE: A3	PROJECT NUMBER: 19.114
COORDINATE REFERENCE SYSTEM: GDA2020 MGA Zone 56	DRAWN BY: ENVIRONMAPS	DATE: 22/07/2019
DATA SOURCE: ORTHOPHOTO - OPEN SOURCE WORLD IMAGERY	REVIEWED BY: AV	DATE: 22/07/2019

Legend

- Site Boundary
- Watercourse
- Sediment Sample Location
- Soil Test Pit Location
- Soil Bore Location
- Dam
- Wetland
- Areas of Potential Contamination
- Area of Ground Disturbance
- Historically Burnt Area
- Potential Chemical Storage

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C:\GIS\Jobs\Western Environmental\19.114 - 215 Badgerys Creek Road, NSW\Figures\19-114_F06 Soil Sample Locations_190723.mxd

WESTERN ENVIRONMENTAL

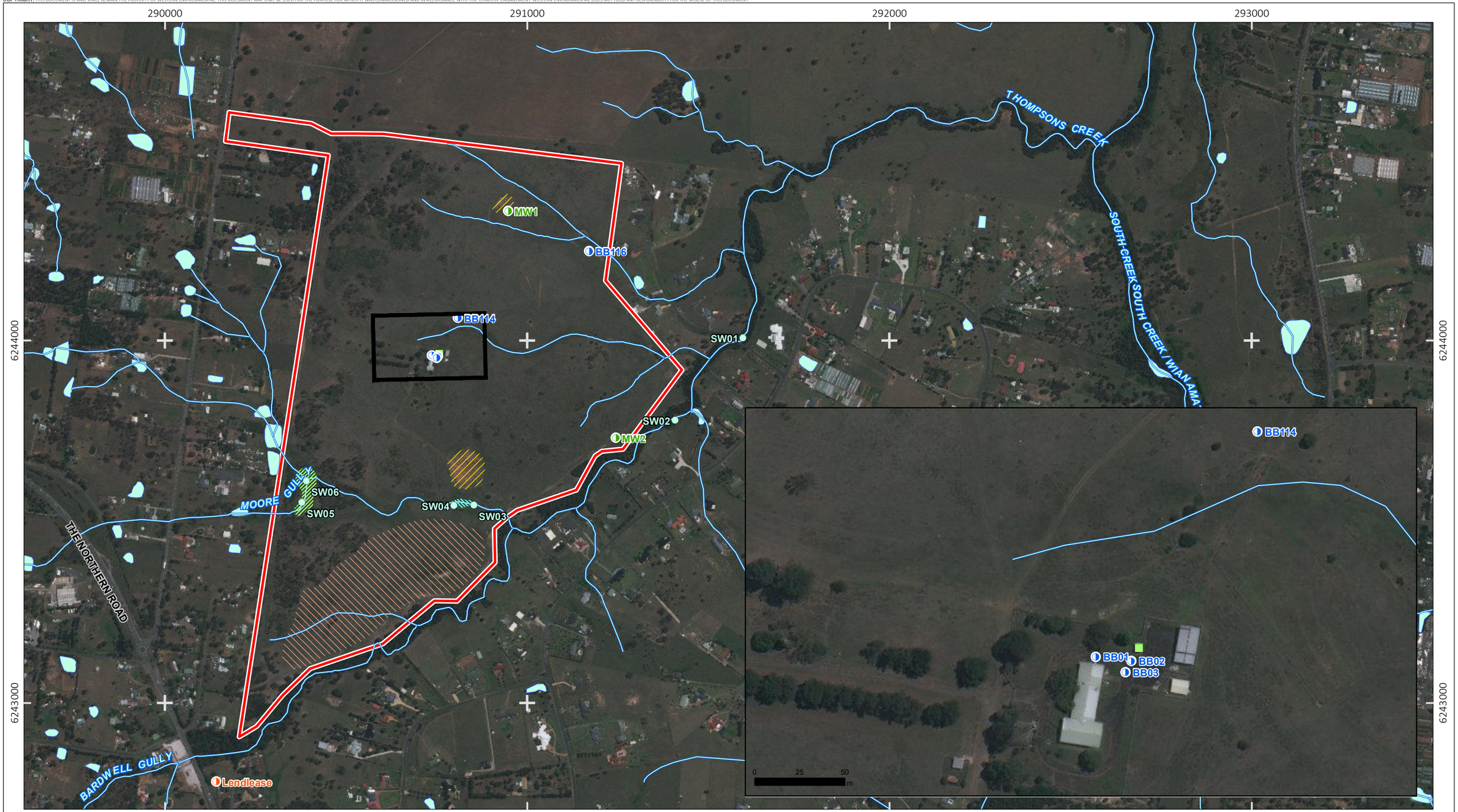

Figure 7: Water Sample Locations

0 100 200 300 m

SCALE: 1: 10,000	SHEET SIZE: A3	PROJECT NUMBER: 15.081
COORDINATE REFERENCE SYSTEM: GDA2020 MGA Zone 56	DRAWN BY: ENVIRONMAPS	DATE: 22/07/2019
DATA SOURCE: ORTHOPHOTO - OPEN SOURCE WORLD IMAGERY	REVIEWED BY: AV	DATE: 22/07/2019

CLIENT: DITCRD

PROJECT: 215 BADGERYS CREEK ROAD, BRINGELLY

Legend

- Site Boundary
- Dam
- Wetland
- Waterbody
- Watercourse
- Areas of Potential Contamination
- Area of Ground Disturbance
- Historically Burnt Area
- Potential Chemical Storage
- Surface Water Sample Location
- Lendlease Groundwater Monitoring Well Location
- WEPL Groundwater Monitoring Well Location
- Golder Groundwater Monitoring Well Location

WESTERN ENVIRONMENTAL

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C:\GIS\Jobs\Western Environmental\19.114 - 215 Badgerys Creek Road, NSW\Figures\19-114_F07 Water Sample Locations_190723.mxd

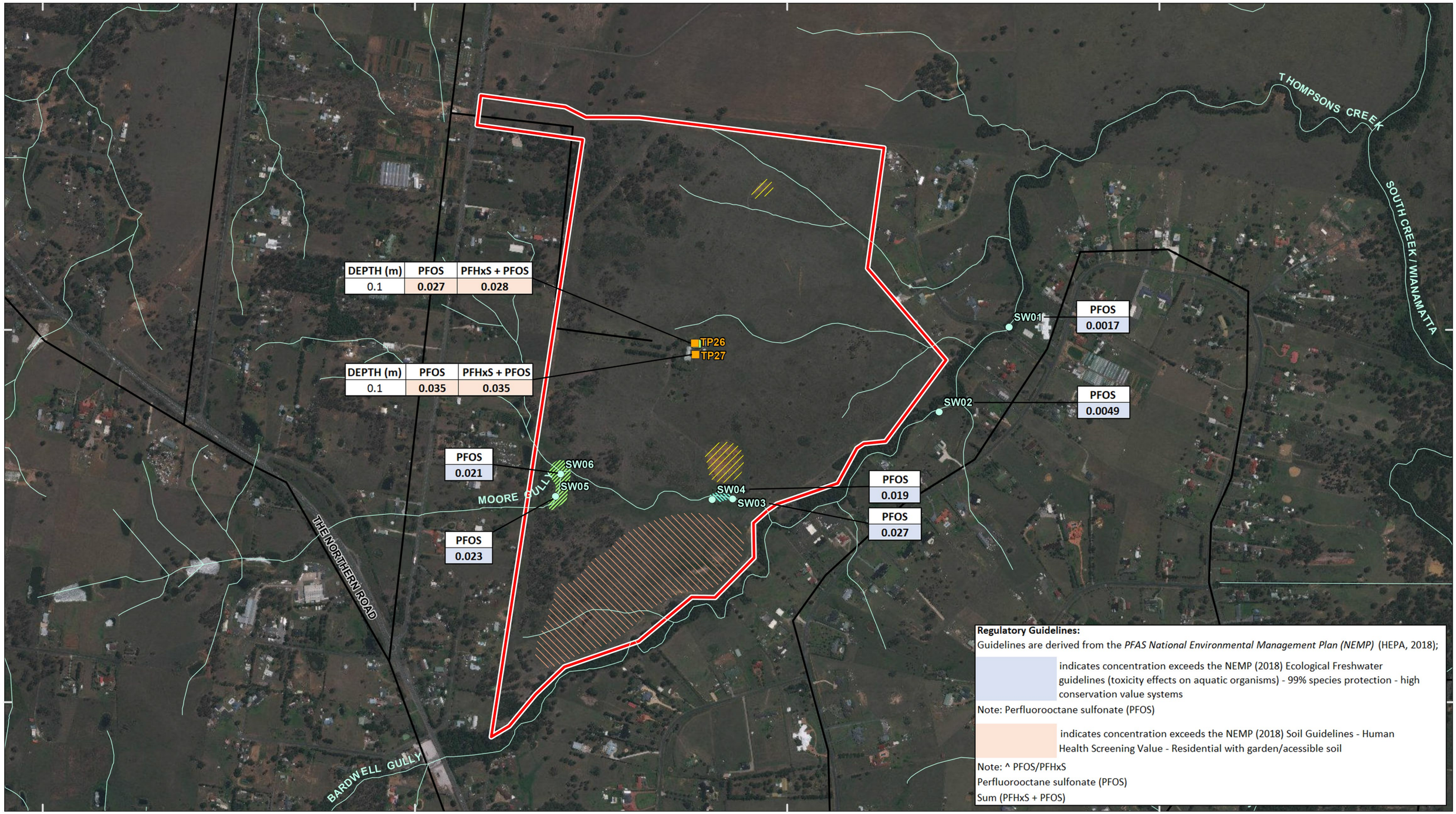

Figure 8: Guideline Exceedances

N

0 100 200 300 m

SCALE: 1: 10,000	SHEET SIZE: A3	
COORDINATE REFERENCE SYSTEM: GDA2020 MGA Zone 56	DRAWN BY: ENVIRONMAPS	DATE: 06/12/2019
DATA SOURCE: ORTHOPHOTO - OPEN SOURCE WORLD IMAGERY	REVIEWED BY: AV	DATE: 06/12/2019

CLIENT: DITCRD

PROJECT: 215 BADGERYS CREEK ROAD, BRINGELLY

PROJECT NUMBER: 19.114

Legend

- Site Boundary
- Watercourse
- Dam
- Wetland
- Surface Water Sample Location
- Test Pit Location

Areas of Potential Contamination

- Area of Ground Disturbance
- Historically Burnt Area
- Potential Chemical Storage

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C:\GIS\Jobs\Western Environmental\19.114 - 215 Badgerys Creek Road, NSW\Figures\19-114_F08 Exceedances_190717.mxd

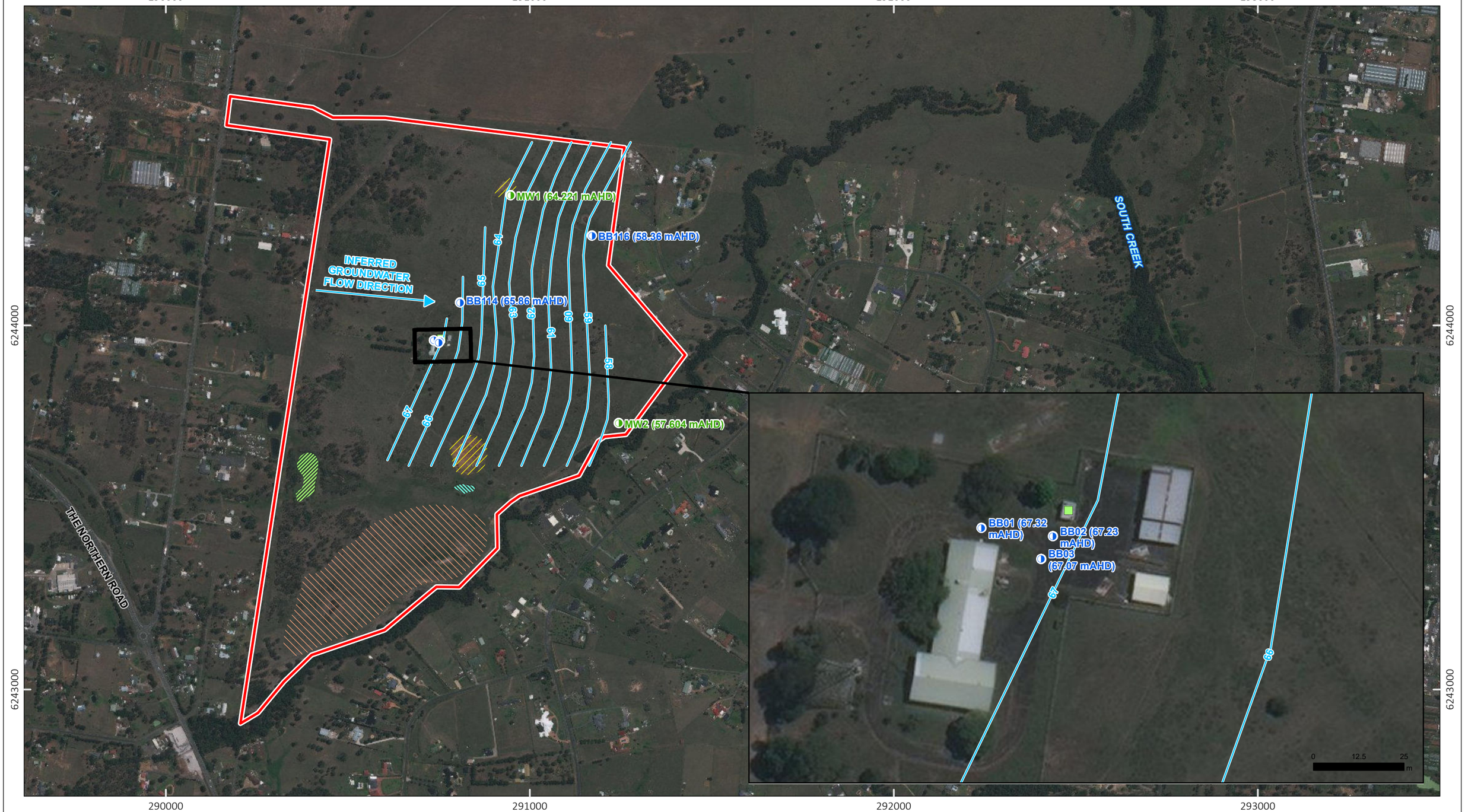

Figure 9: Groundwater Contours

0 100 200 300 m

N

SCALE: 1: 10,000	SHEET SIZE: A3	
COORDINATE REFERENCE SYSTEM: GDA2020 MGA Zone 56	DRAWN BY: ENVIRONMAPS	DATE: 22/07/2019
DATA SOURCE: ORTHOPHOTO - OPEN SOURCE WORLD IMAGERY	REVIEWED BY: AV	DATE: 22/07/2019

CLIENT: DITCRD

PROJECT: 215 BADGERYS CREEK ROAD, BRINGELLY

PROJECT NUMBER: 19.114

Legend

- Site Boundary
- Dam
- Wetland
- Groundwater Contour (mAHD)

Areas of Potential Contamination

- Area of Ground Disturbance
- Historically Burnt Area
- Potential Chemical Storage

- WEPL Groundwater Monitoring Well Location
- Golder Groundwater Monitoring Well Location
- (58.36 mAHD) Groundwater Level (mAHD)

WESTERN ENVIRONMENTAL

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C:\GIS\Jobs\Western Environmental\19.114 - 215 Badgerys Creek Road, NSW\Figures\19-114_F09 Groundwater Contours_190722.mxd

Appendix 3 Federal Material Import and Reuse procedure

Materials Reuse and Importation Procedure

SYDNEY GATEWAY
A Joint Venture Project
JOHN HOLLAND SEYMOUR WHYTE

Materials Reuse & Management

Further investigations to characterise soil
MCoA 9a

Conceptual Site Model & Tier 1 Risk Assessment
(included in Soil and Water Management Sub-Plan)
MCoA 10c and 10d

In-situ targeted excavation testing (to inform material classification)

Materials Management Plan
(in accordance with AEPR, NEPM and NEMP including Unexpected Find Procedure)
MCoA 10f, g, h, l, j and 11a, b, c

Reuse Decision Making Flowchart (contained within Materials Management Plan)
Nature of contaminants (i.e. volatile / non-volatile) and CSM exposure pathways associated with nominated re-use destinations (eg encapsulation in embankment)
(Site /Area Specific Reuse Report (broken down into areas eg Qantas/Airport Drive, Northern Lands Carpark) & Reuse Classification Map)

Not suitable for Reuse
(in accordance with AEPR, NEPM, NEMP)
(Stockpile Letter Assessment or Reuse Report)

Suitable for Reuse
(in accordance with AEPR, NEPM, NEMP)
(Stockpile Letter Assessment or Reuse Report)
If encapsulation proposed (for material > Tier 1): report needs to include risk assessment and potential for leachability and be provided to SYD and the AEO for Approval.

To qualify as suitable for reuse material must be either below Tier 1 criteria or encapsulated from ongoing environmental contact

Offsite disposal
(Waste Classification Report)

Waste Tracking
(per Waste & Resources Mgmt Plan)

Materials Tracking
(note: summary report / map of materials tracking will be provided to SYD and the AEO on completion of the works)

Unexpected Find.
Stop work and liaise with Site Auditor/Assessor to confirm testing and next steps

Ex-situ testing

Further reuse assessment (report to confirm unexpected find actions)

If suitable for Reuse

If not suitable for Reuse

AEPR Site Entry & Exit Reports
(Compound Areas only)
(to SYD and AEO under AWP)

- C1 Compound
- C2 Compound
- C4 Compound
- C5 Compound

Site Auditor / Assessor involved in scope of RAP as well as approval of RAP. Site Auditor/Assess role includes oversight of RAP implementation and validation review. Site Audit Statement to be issued on completion of works.

Remediation Action Plans (RAPs)
(followed by Validation Report (JHSW) and Site Audit Statement)

Northern Lands Carpark RAP
(modifying existing RAP requirements for JHSW Works)

Northern Lands Mound RAP
(ongoing environmental management)

(COM)

Materials Importation & Management

Refer to page 2 & 3 for detailed process

Part 1 Importation of Material **Quarried Product**

Part 2 Importation of Material **Recycled Products**

Part 3 Importation of Material **from 'Other Sources'**

Materials Handling and Source Control

Track via Materials Import Register

The importation of material into Commonwealth Land can be categorised into three areas:

1. **Part 1-** Importation of Quarried Products
2. **Part 2-** Importation of Recycled Products
3. **Part 3** – Importation of Materials from 'Other Sources'

This flowchart sets out the requirements for each of these material types listed above and details the process for testing and importation of materials for the Sydney Gateway Road Project.

The requirements of the AEPR and PFAS NEMP are considered to only be relevant for Part 3 of this Materials Importation & Management process on the basis that Part 1 and Part 2 relate to natural materials or materials subject to a Resource Recovery Order in accordance with the Protection of the Environment (Waste) Regulation 2014.

Updated Mitigation Measure (UMM) CS16 makes allowance for this importation under the EIS/MDP Approval.

KEY:

- Action complete
- Action ongoing (managed through commitments in Mgmt Plan)
- Action involves approval from Site Auditor/Assessor
- Action requires further documentation through AWP
- AEPR - Airport (Environment Protection) Regulation
- MCoA- Commonwealth Minister's Condition of Approval
- NEPM-National Environmental Protection Measure
- NEMP-National Environmental Management Plan (PFAS NEMP 2.0, 2020)

Refer to key on page 1

Materials Reuse and Importation Procedure

SYDNEY GATEWAY
A Joint Venture Project
JOHN HOLLAND SEYMOUR WHYTE

Materials Importation & Management

Part 1
Prior to importation of material - **Quarried Product**
(for example- aggregates (non recycled), natural materials

Materials Handling and Source Control
No testing required.
Evidence from Supplier confirming material is natural.
Visually verification to confirm material is consistent with supplier documentation.

Part 2
Prior to importation of material - **Recycled Products**

Materials Handling and Source Control
- Supplier to provide evidence of sampling and / or notification in accordance with the Resource Recovery Order (RRO).
- JHSW to ensure compliance with Resource Recovery Exemption (RRE) and approve material for import.
- Visually verification to confirm material is consistent with supplier documentation.

Part 3 Prior to importation of material - from 'Other Sources'
(for example tunnel spoil or similar from other road projects)

Compliance with UMM CS16
Any material imported and used within Sydney Airport land will be tested prior to use to ensure it does not exceed the acceptable limits in the PFAS National Environmental Management Plan (HEPA, 2018) and Schedule 3 of the Airports (Environment Protection) Regulations 1997.

The importation of material into Commonwealth Land from 'Other Sources' requires JHSW to demonstrate compliance with UMM CS16, being the PFAS NEMP and the AEPR.

Sampling frequency and analytes are detailed on Page 3
Updated Mitigation Measure (UMM) CS16 makes allowance for this importation under the EIS/MDP Approval.

Material analysis to confirm analytes below Tier 1 criteria (NEPM, NEMP and AEPR)
(Import Certificate / Analytical Report)

State Requirements

EPA agreement accepting material moving from State land to Federal Land
(EPA agreement)

Material classification prior to removal from State land.

Confirmation on 'State' requirement for lawful acceptance of material (JHSW to obtain from AEO)

If PFAS not detected in sampling (No Risk)
- Sampling Density per Page 3 of 4
- Risk assessment confirms low risk from origin of material
(documented risk assessment, available to be audited by SYD/AEO)

If PFAS detected > LOR and < 0.14mg/kg PFOS (Indirect Ecological Criteria [1]) (Low Risk)
- Sampling Density per Page 3 of 4
- Risk assessment confirms low risk from origin of material
- Leachability testing (ASLP- 0.07ug/L) on 10% of samples.
- Document where the material is going to be placed to confirm to confirm leaching potential.

If PFAS is detected > 0.14mg/kg PFOS and /or analytes are above AEPR criteria (High Risk)
- Import cannot proceed without risk assessment and Site Auditor Approval (HOLD POINT)
- Risk assessment to be done in accordance with Figure 5 of the PFAS NEMP to confirm decision making process.
- Site Auditor approval of risk assessment required.

Report to confirm Sampling Density and Waste Characterisation compliance with AEPR. Environment Team to provide approval to Import
(available to be audited by SYD/AEO. Auditor not required as below PFAS NEMP)

Importation to be tracked in Material Tracking Register
(available to be audited)

Records of Material Importation to be provided to SYD/AEO/ABC on Completion

Note: no testing required for concrete, bitumen, stabilised sand, and asphalt (commercially supplied new products)

KEY:
- Action complete
- Action ongoing (managed through commitments in Mgmt Plan)
- Action involves approval from Site Auditor/Assessor
- Action requires further documentation through AWP
- AEPR - Airport (Environment Protection) Regulation
- MCoA- Commonwealth Minister's Condition of Approval
- NEPM-National Environmental Protection Measure
- NEMP-National Environmental Management Plan (PFAS NEMP 2.0, 2020)

1. Reference Table 3 Ecological Criteria PFAS NEMP

(COM)

Refer to key on page 1

Materials Reuse and Importation Procedure

Materials Importation & Management

SYDNEY GATEWAY
A Joint Venture Project
JOHN HOLLAND SEYMOUR WHYTE

Analytes to be sampled to confirm compliance with AEPR Schedule 3 Criteria

Item no.	Substance	Accepted limit/trigger Level (mg/kg)
1	Aldrin (including aldrin and dieldrin in combination)	50
2	Arsenic (total)	500
3	Benzo (a) pyrene	5
4	Beryllium	100
5	Cadmium	100
6	Chlordane	250
7	Chromium (III)	600,000
8	Chromium (VI)	500
9	Copper	5,000
10	Cyanides (complexed)	2,500
11	Dieldrin (including dieldrin and aldrin in combination)	20
12	DDT	1,000
13	Heptachlor	50
14	Lead	1,500
15	Manganese	7,500
16	Methyl mercury	50
17	Mercury (inorganic)	75
18	Nickel	3,000
19	Polycyclic aromatic hydrocarbon	100
20	PCB (total)	50
21	Phenol	42,500
22	Zinc	35,000
23	Total petroleum hydrocarbon — fuel (C_6–C_9 fractions)	800
24	Total petroleum hydrocarbon — mineral oil (>C_9 fractions)	5,000
25	Benzene	1
26	Ethylbenzene	50
27	Toluene	130
28	Xylene	25

NEPM Screening Criteria

Health Investigation Levels in Soil – Commercial Industrial (HIL D)

Use NEPM criteria for all AEPR Analytes. Where no NEPM criteria exists for AEPR Analyte- use AEPR as criteria. Where there are criteria for the same analyte in both AEPR and NEPM, the most conservative criteria applies.

Table 1A(1) Health investigation levels for soil contaminants

Chemical	Health-based investigation levels (mg/kg)			
	Residential[1] A	Residential[1] B	Recreational[1] C	Commercial/ industrial[1] D
Metals and Inorganics				
Arsenic[2]	100	500	300	3 000
Beryllium	60	90	90	500
Boron	4500	40 000	20 000	300 000
Cadmium	20	150	90	900
Chromium (VI)	100	500	300	3600
Cobalt	100	600	300	4000
Copper	6000	30 000	17 000	240 000
Lead[3]	300	1200	600	1 500
Manganese	3800	14 000	19 000	60 000
Mercury (inorganic)[5]	40	120	80	730
Methyl mercury[4]	10	30	13	180
Nickel	400	1200	1200	6 000
Selenium	200	1400	700	10 000
Zinc	7400	60 000	30 000	400 000
Cyanide (free)	250	300	240	1 500
Polycyclic Aromatic Hydrocarbons (PAHs)				
Carcinogenic PAHs (as BaP TEQ)[6]	3	4	3	40
Total PAHs[7]	300	400	300	4000
Phenols				
Phenol	3000	45 000	40 000	240 000
Pentachlorophenol	100	130	120	660
Cresols	400	4 700	4 000	25 000
Organochlorine Pesticides				
DDT+DDE+DDD	240	600	400	3600
Aldrin and dieldrin	6	10	10	45
Chlordane	50	90	70	530
Endosulfan	270	400	340	2000
Endrin	10	20	20	100
Heptachlor	6	10	10	50
HCB	10	15	10	80
Methoxychlor	300	500	400	2500
Mirex	10	20	20	100
Toxaphene	20	30	30	160
Other Organics				
PCBs[8]	1	1	1	7
PBDE Flame Retardants (Br1–Br9)	1	2	2	10

(9) To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.

(10) To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.

Table 1A(3) Soil HSLs for vapour intrusion (mg/kg)

CHEMICAL	HSL A & HSL B Low - high density residential				HSL C recreational / open space				HSL D Commercial				Soil saturation concentration (Csat)
	0 m to <1 m	1 m to <2 m	2 m to <4 m	4 m+	0 m to <1 m	1 m to <2 m	2 m to <4 m	4 m+	0 m to <1 m	1 m to <2 m	2 m to <4 m	4 m+	
SAND													
Toluene	160	220	310	540	NL	NL	NL	NL	NL	NL	NL	NL	560
Ethylbenzene	55	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	64
Xylenes	40	60	95	170	NL	NL	NL	NL	230	NL	NL	NL	300
Naphthalene	3	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	9
Benzene	0.5	0.5	0.5	0.5	NL	NL	NL	NL	3	3	3	3	360
F1[9]	45	70	110	200	NL	NL	NL	NL	260	370	630	NL	950
F2[10]	110	240	440	NL	NL	NL	NL	NL	NL	NL	NL	NL	560

ENM Sampling Density

Note- refer to RRO/RRE requirements for testing density for recycled products (as per Page 2 of 4 of this flowchart)

Stockpiled Material

Table 1

Sampling of Stockpiled Material		
Column 1	Column 2	Column 3
Quantity (tonnes)	Number of samples	Validation
<500	3	Required
500 – 1,000	4	
1,000 – 2,000	5	
2,000 – 3,000	7	
3,000 – 4,000	10	

In Situ Sampling of Material

Table 2

In Situ Sampling at surface				
Column 1	Column 2	Column 3	Column 4	Column 5
Size of *in situ* area (m^2)	Number of systematic sampling points recommended	Distance between two sampling points (m)	Diameter of the hot spot that can be detected with 95% confidence (m)	Validation
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

Table 2 has been taken from NSW EPA 1995, *Contaminated Sites Sampling Design Guidelines*, NSW Environment Protection Authority.

Asbestos: compliance with NEPM (2013) for HIL D criteria

- Bonded ACM - 0.05%
- Friable asbestos - 0.001%
- All forms of asbestos – no visible asbestos for surface soil

(COM)

Appendix 4 Soil Logs

Drillers Water Tanks

Water used by drillers was sources from potable reticulated water and generally stored in intermediate bulk containers (IBCs). Representative samples were collected during field investigations. Analytical results noted:

- non-detects for PFAS
- low concentrations of copper and zinc in the majority of samples, and non-detects arsenic, cadmium, chromium, lead, mercury and nickel in the majority of samples tested.
- minor detects for TRH hydrocarbons (noting these may also be non-petroleum based organic matter present in the tank)
- non-detects for PAH in the majority of samples with the exception of one sample which had minor concentrations of phenanthrene and naphthalene.
- detects of bromodichloromethane and chloroform in all samples which are bio-products from the chlorination of drinking water
- minor detect of di-n-butyl phthalate in one sample
- non-detects for BTEX, phenols and other organic compounds

Drillers Sump (from drilling at Aerotropolis)

Water used during drilling is stored in a sump adjacent to the rig. The water in the sump is re-circulated through the drill rig during drilling. The sump and rig is thoroughly flushed with potable water between each borehole. Representative samples were collected from the sump during drilling at Aetroropolis. Analytical results noted:

- non-detects for PFAS
- generally low concentrations of total metals. Higher concentrations of metals were reported in samples during drilling.
- non-detects for BTEX in the majority of samples with the exception of four samples which reported minor concentrations of toluene and xylene during drilling, and one sample with a minor detection of benzene.
- detectable concentrations of TRH hydrocarbons (noting these may also be non-petroleum based organic matter present in the tank) with higher concentrations reported in samples collected after drilling had commenced (showing a general increase in concentrations)
- non-detects for PAH in the majority of samples with the exception of three samples which had minor detects for phenanthrene, naphthalene and 2-methylnaphthalene during drilling, and non-detect at the start of drilling.
- detects of bromodichloromethane and chloroform in most samples which are bio-products from the chlorination of drinking water
- non-detects for and other organic compounds

Monitoring well construction materials

Representative samples were collected of materials used in the construction of monitoring wells. Analytical results noted the following.

PVC casing

- non-detects for PFAS, metals, BTEX, TRH, and other organics from the rinsate samples of PVC casings

Well construction material (sand, bentonite and cement/bentonite grout)

- non-detects for PFAS
- detectable concentrations of TRH hydrocarbon (noting these may also be non-petroleum based organic matter) in one sample of cement/bentonite grout and non-detects in all other samples. There was a non-detect for TRH in the bentonite sample used from this driller. Noting the additional material added to the grout was cement, the detection of TRH is likely to be attributed to a false positive from cross-contamination rather than TRH in the cement. TRHs were non-detect in all other samples tested.
- non-detects for BTEX, PAH, Phenols and all other organic compounds tested.

Summary

In summary the data shows that the materials and methods used during drilling and for the construction of monitoring wells are unlikely to have resulted in the occurrence of false positives in regard to PFAS. With consideration to the results of the investigation for soil and groundwater samples collected, other lines of evidence including visual/olfactory signs of contamination, drilling materials and drilling process are also considered unlikely to have resulted in cross-contamination of samples and false positives of other analytes such as metals and organics.

It is noted that detection of organics (BTEX, PAH and TRH) were reported in driller sump water samples during drilling. These results are discussed further in Section 10.6.6.

Appendix 11 Technical Memorandum

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4 August 2022

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

CPB Ghella Joint Venture
Level 8, Tower 1, 495 Victoria Avenue
Chatswood
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Attention: [redacted]

Dear [redacted]

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
AEC46	Site Summary • AEC46 includes project land at Aerotropolis which is part of or in the vicinity of AEC47. • Potential sources of contamination were considered to include hazardous building materials and unidentified items (activities) in this area.
AEC47	Site Summary • Former Defence Overseas Telecommunications Radio Station Complex (OTC) site. • 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)

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 22nd November 2021)
  - Cardno (May, 2021); *Contamination Assessment Report, Sydney Metro Western Sydney Airport* (Ref: 80021888; dated 5th May 2021)

  - Golder & Douglas Partners (Feb 2021); *Factual Contamination Report – Preliminary Site Investigation* (Ref: 19122621-003-R-Rev3; Rev3; dated 19th 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.

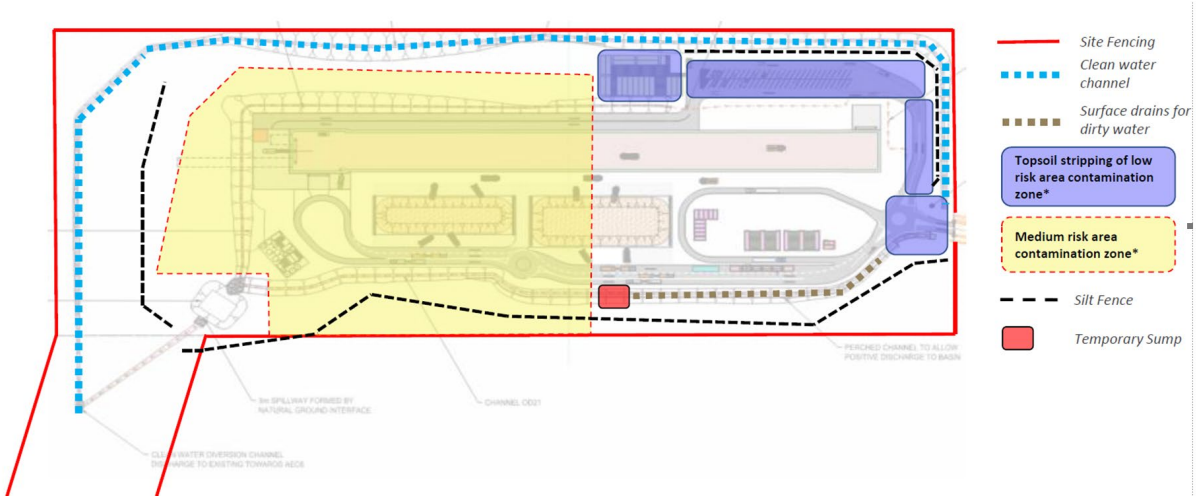


Figure 1 Conceptual Plan of Preliminary Works

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[1] at the OTC
- Removal of a 1,600 m^3 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 GOLDER & 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

[1] 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 is 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/OPPs, 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-4237
- SBT-BH-4238
- SBT-BH-4241
- SBT-BH-4242
- SBT-BH-4247
- SBT-BH-4248
- SBT-BH-4249
- SBT-BH-4251
- SBT-BH-4252
- SBT-BH-4253
- SBT-BH-4254
- SBT-BH-4255
- SBT-BH-4256
- SBT-BH-4257
- SBT-BH-4258
- SBT-BH-4260
- SBT-BH-4263
- SBT-BH-4264
- SBT-BH-4277
- SBT-BH-4280
- SBT-BH-4281
- SBT-BH-4282
- SBT-BH-4283
- SBT-BH-4287
- SBT-BH-4289
- SBT-BH-4292
- SBT-BH-4296
- SBT-BH-4304
- SBT TP 4276

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

Draft field logs from these investigation locations[2] 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[3] and PFAS NEMP[4] 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[6] 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:

[2] Note all boreholes planned for completion in this area have been completed.
[3] National Environment Protection Council, National Environment Protection (Assessment of Site Contamination) Measure, 1999 (April 2013)
[4] Heads of EPAs Australia and New Zealand (HEPA). PFAS National Environmental Management Plan. Version 2.0 – January 2020 (HEPA NEMP 2020)
[5] CRC Care Technical Report No. 10, Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater, 2011 (CRCCARE 2011)
[6] 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 assed 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,

[redacted]

Appendices

Appendix A: Figures

Appendix B: Diversion Drain

Appendix C: Clearance Certificate

Appendix D: Data Tables

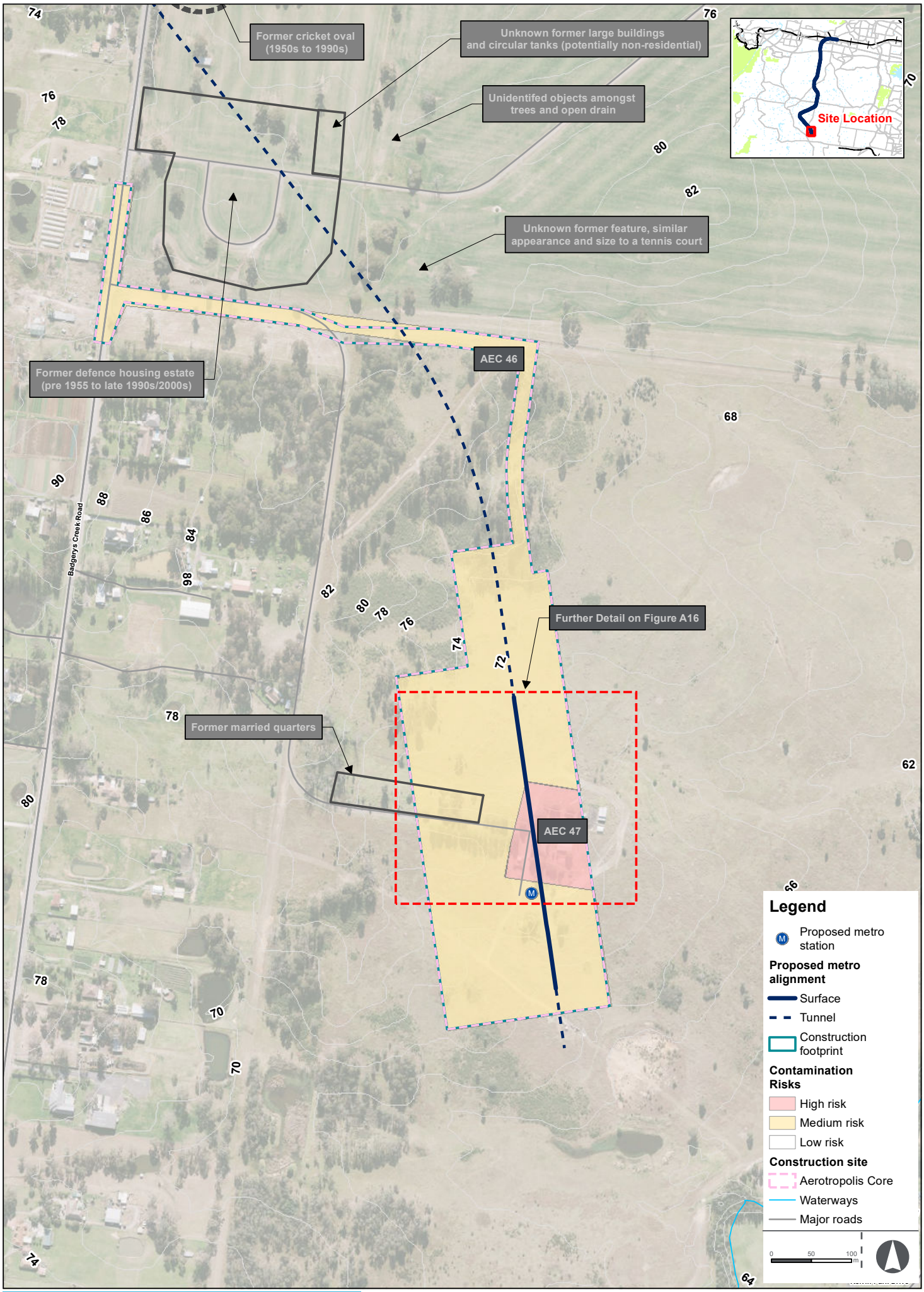
Appendix E: Field Logs

Appendix F: Laboratory Reports

Appendix G: GHD Data for Low Risk Areas

Appendix H: GHD Data for Diversion Drain

APPENDIX A: FIGURES



Sydney Metro – Western Sydney Airport

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

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

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).

N

0 50 100 m

SCALE **1:2,500**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

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WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 3

Historical Site Features
Aerotropolis Core Station

TETRA TECH COFFEY

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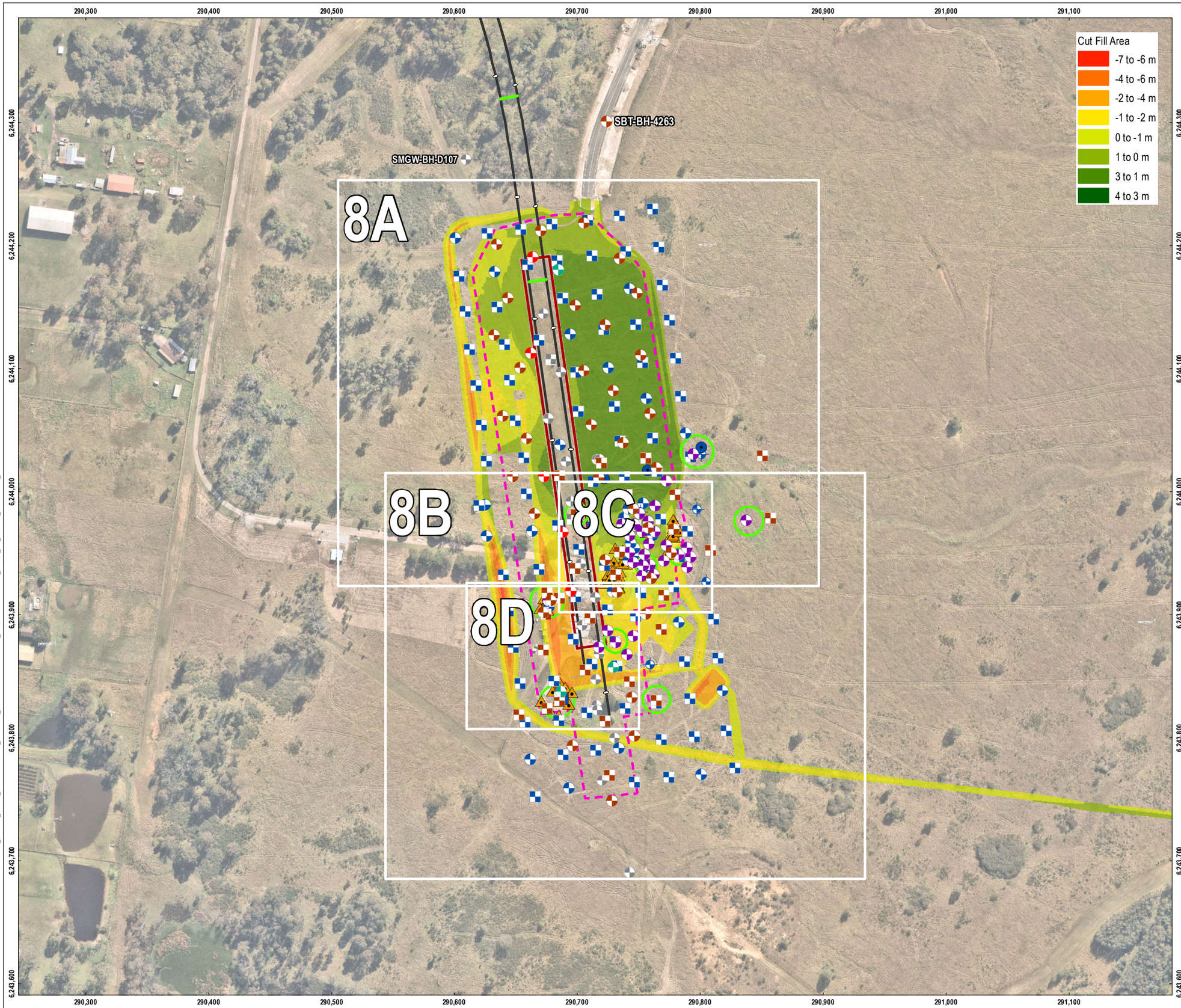

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

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).

N

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SCALE **1:3,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **23.06.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F008_GIS**

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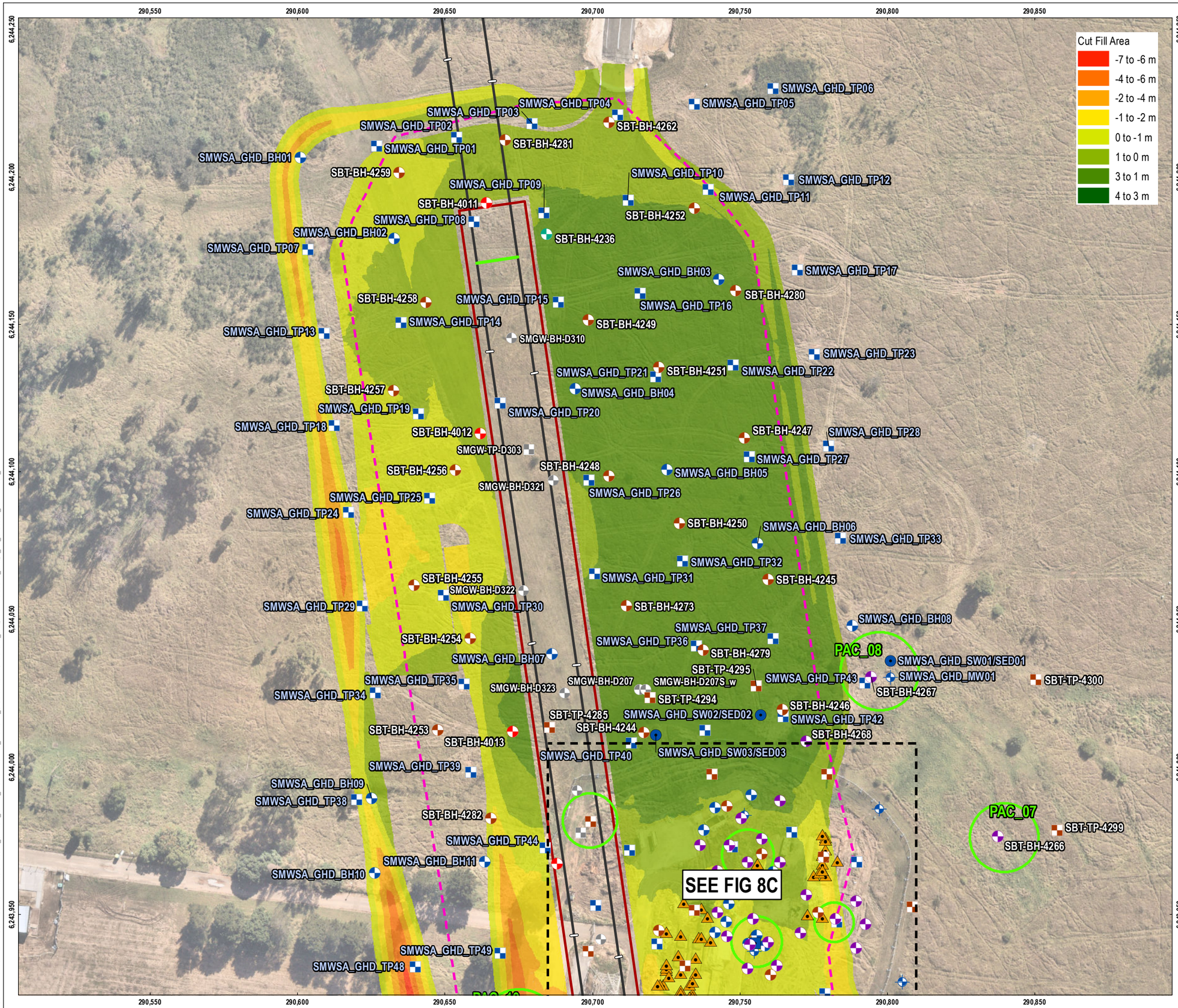

LEGEND

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).

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

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WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8A

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

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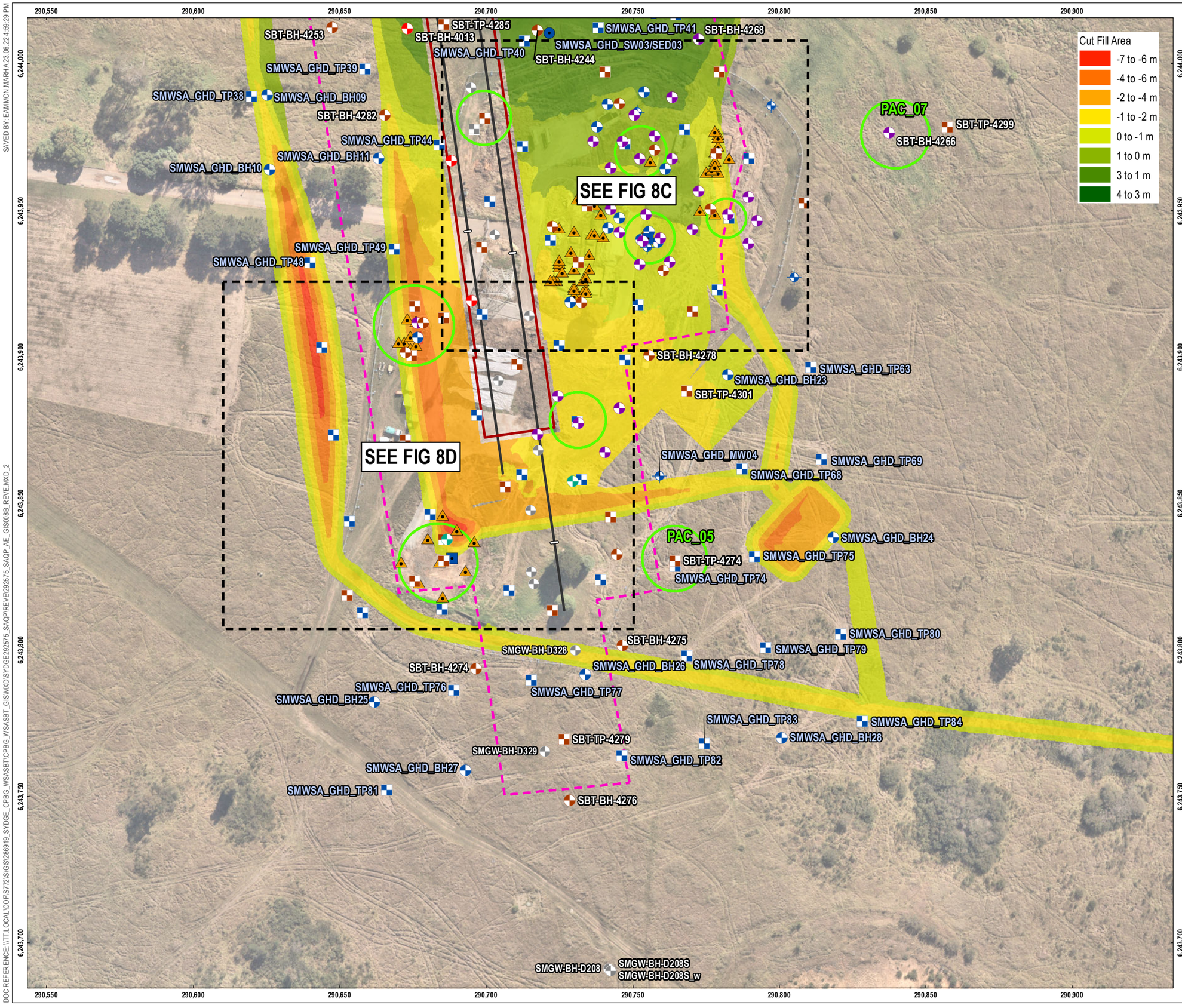

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

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).

N

0 25 50 m

SCALE **1:1,250**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8B

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

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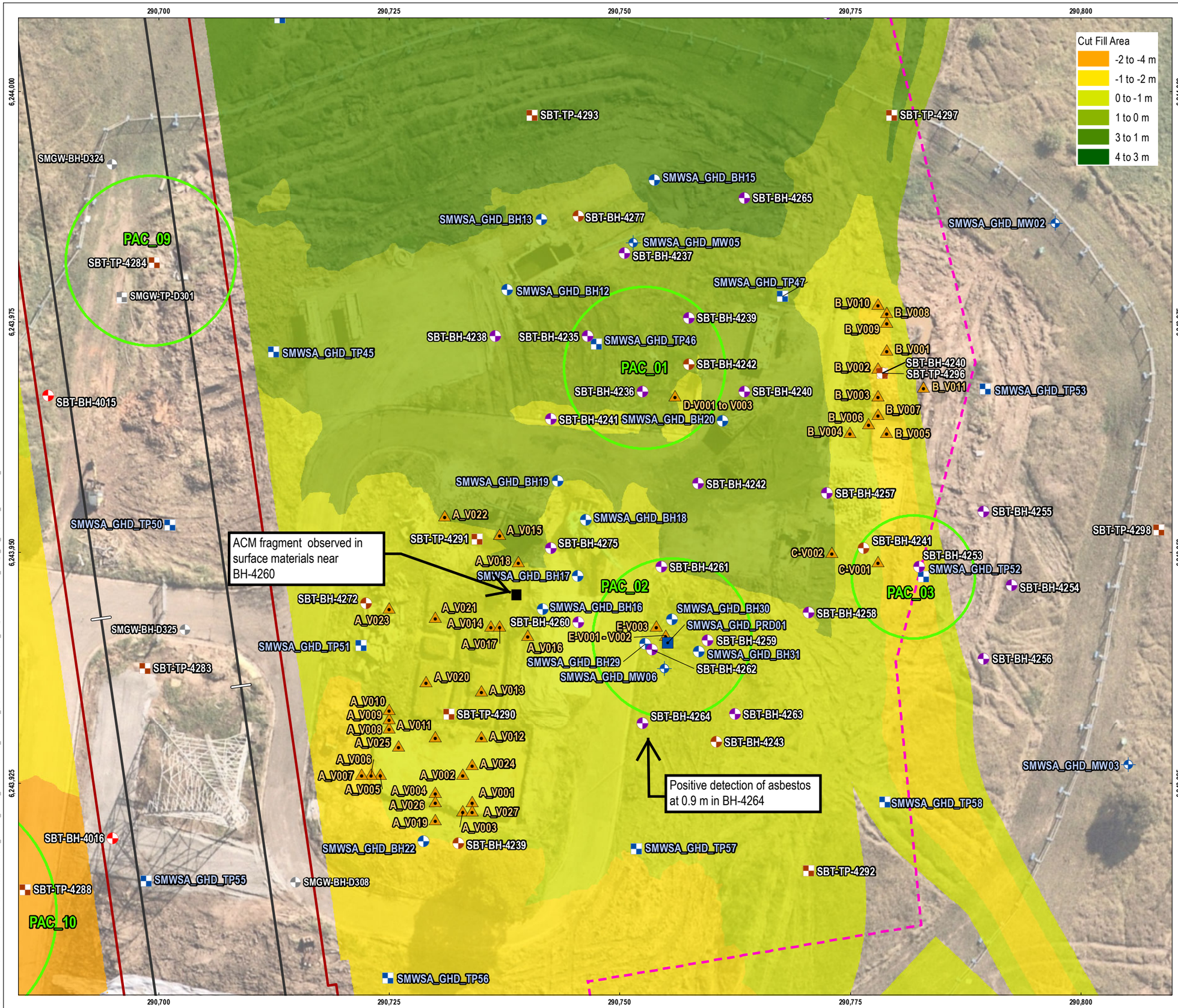

LEGEND

Additional Contaminated Land Location
- Borehole (1 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
- 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).

N

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SCALE **1:400**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

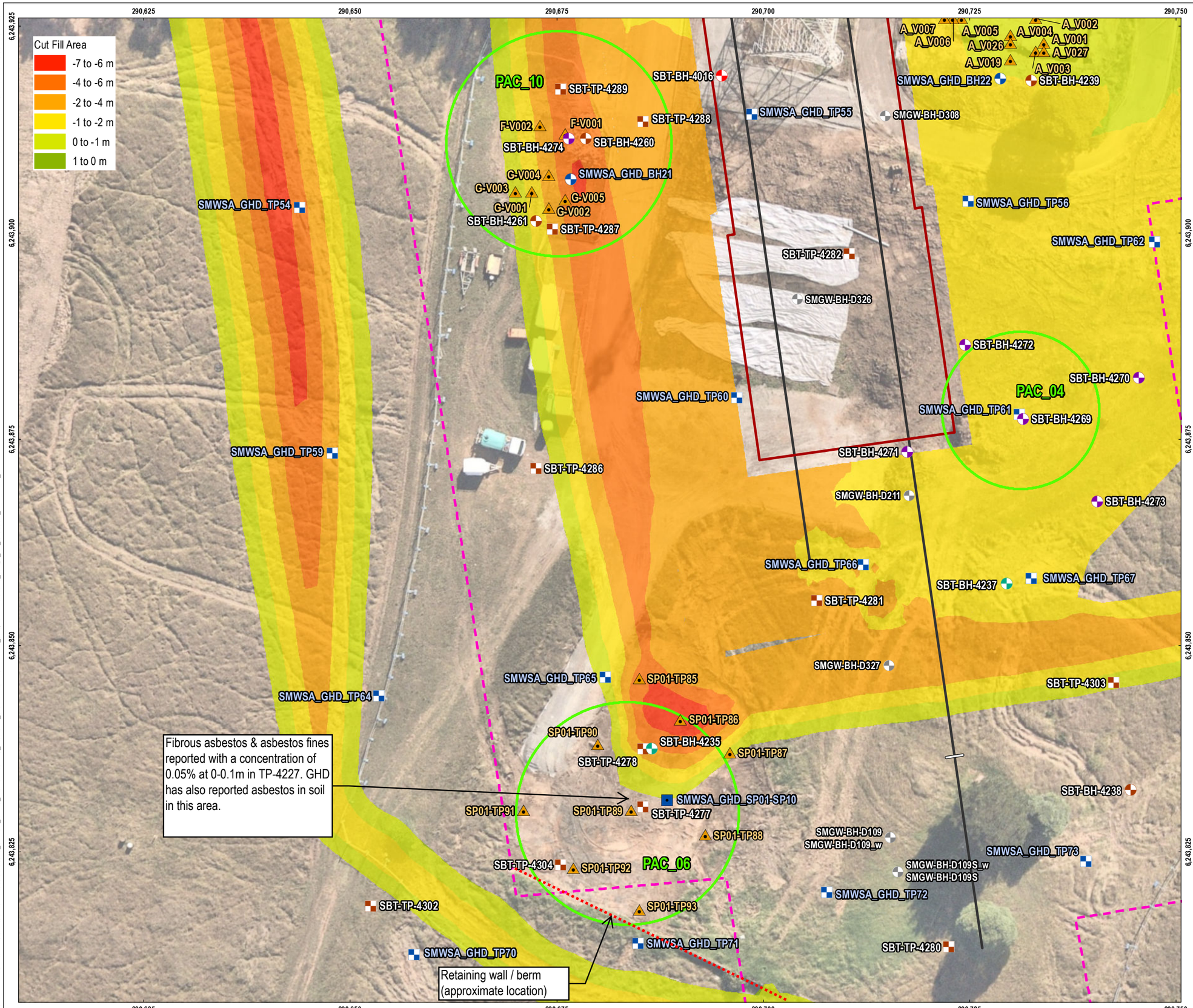
WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8C

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **23.06.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F008C_GIS**



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

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).

N

0 7.5 15 m

SCALE **1:450**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8D

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **23.06.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F008D_GIS**

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)

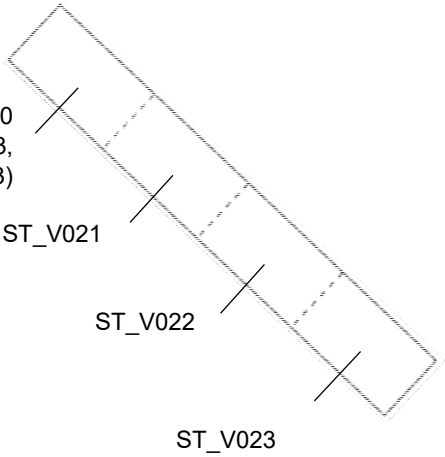
Photograph 3 – South Wall

(n/a – not analysed)

Photograph 4 – Associated pipework trench

SEPTIC TANK – excavation schematic with sample locations

	NORTH WALL	ST_V011		
		ST_V010		*EAST WALL*
ST_V013 (0-0.5 m)	ST_V012 (1.4-1.8 m)	ST_V003	ST_V008 (1.4-1.8 m)	ST_V009 (0.1-0.5 m) (FS01_22.04.30)
ST_V015 (0-0.5 m)	ST_V014 (1.3-1.8 m)	ST_V002	ST_V006 (1.1-1.6 m)	ST_V007 (0.2-0.6 m)
ST_V017 (0-0.4 m)	ST_V016 (1.2-1.5 m)	ST_V001	ST_V004 (1.2-1.7 m) (FD01 22.04.30)	ST_V005 (0-0.5 m)
WEST WALL		ST_V018 (1.3-1.7 m)		
Base samples 2.4m		ST_V019 (0.2-0.6 m)	*SOUTH WALL*	



North

Sample scheduled for analysis

Not to scale

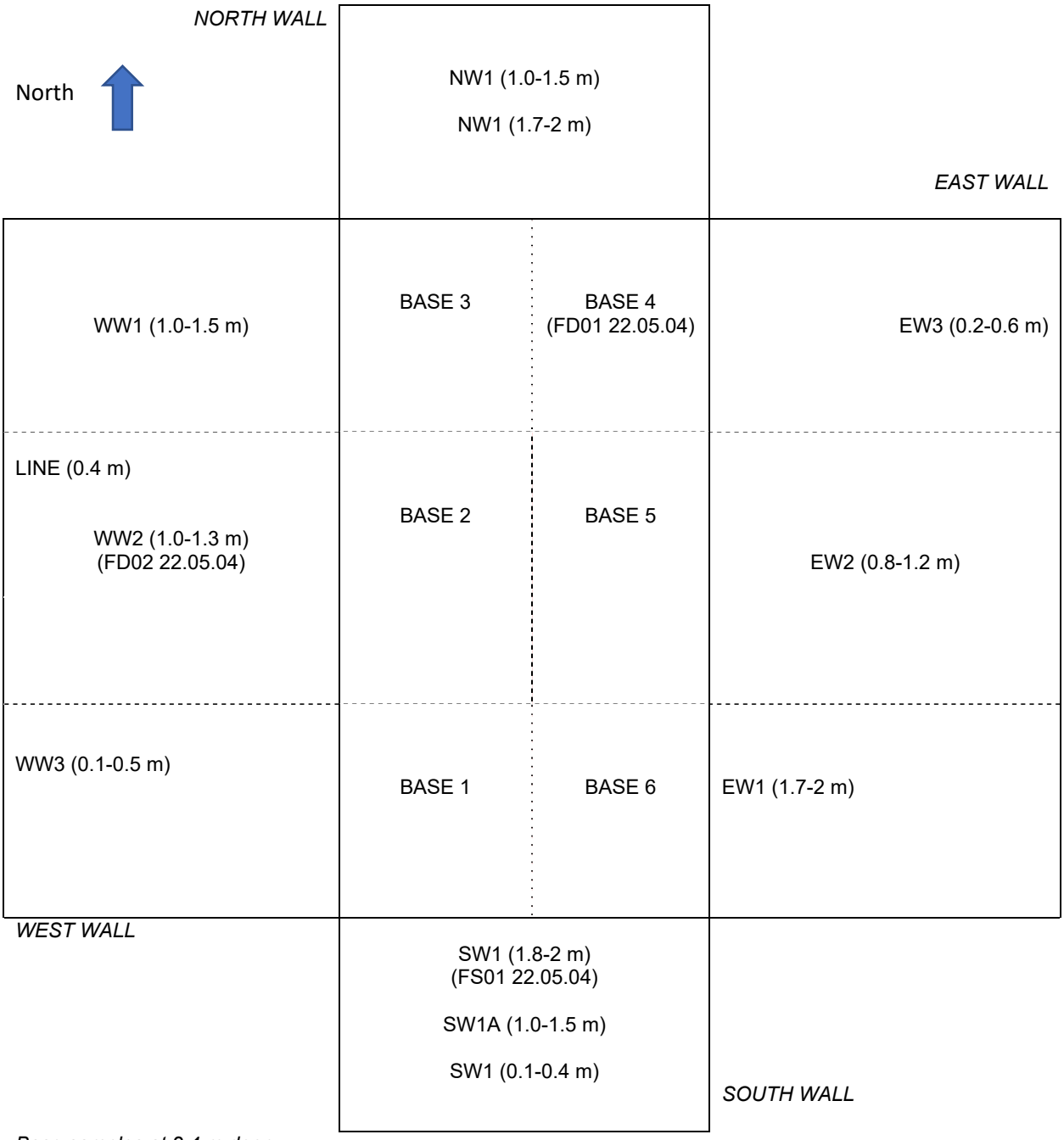
Appendix F – UPSS tank pit sample locations

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



Base samples at 2.4 m deep

Not to scale

	Exceedance of 0.001% FA & AF HSL
	Exceedance of 0.02% HIL C criterion
	Exceedane of all forms of asbetos at surface criterion (no visible asbestos)
*	Laboratory ID, below the 0.1 g/kg limit of reporting

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
- Approximate Extent of Stockpile
- GHD Proposed Sampling Grid
- Suspected asbestos cable pit location
- Drainage Lines

Investigation Locations (GHD, 2022)

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

Septic Tank

Inferred Incinerator Location

Married Quarters (Demolished)

Engineering Workshop and Garage

Flammable Stores

Fire Hose Shed

Underground Storage Tank

Transformer

Garage

Compound

Fire Pump House

Suspected ACM

Location	Depth (m)	Nature
SMWSA-GHD-BH30	0.4-0.5	Bonded asbestos*

Location	Depth (m)	Nature
SWSA-GHD-BH16	0-0.2	0.012% FA&AF & bonded asbestos

Location	Depth (m)	Nature
SMWSA-GHD-TP57	0-0.1	<0.001 FA&AF & bonded asbestos

Location	Depth (m)	Nature
SMWSA-GHD-TP61	0-0.1	0.007% FA&AF & bonded asbestos*

Location	Depth (m)	Nature
SMWSA-GHD-TP66 (PACM)	0-0.1	<0.001 FA&AF & bonded asbestos Visible ACM at surface

Location	Depth (m)	Nature
SMWSA_GHD_SP01_TP85 PACM	0-0.1	Bonded asbestos Visible ACM at surface

Location	Depth (m)	Nature
SMWSA_GHD_TP67 (PACM)	0-0.1	<0.001 FA&AF & bonded asbestos Visible ACM at surface

Location	Depth (m)	Nature
SMWSA_GHD_SP01_TP88 (PACM)	0-0.1	Bonded asbestos Visible ACM at surface

Location	Depth (m)	Nature
SMWSA_GHD_SP01_TP87	0-0.2	Bonded asbestos Visible ACM at surface

Location	Depth (m)	Nature
SMWSA_GHD_SP01-TP93 & SMWSA_GHD_SP01_TP93 0.4-0.6 PACM	0.4-0.6	0.13 % FA&AF & bonded asbestos
	0.9-1.1	0.23 % FA&AF & bonded asbestos

Location	Depth (m)	Nature
SMWSA_GHD_SP01_TP92 (PACM)	0.6-0.9	Bonded asbestos

Paper Size ISO A3

0 5 10 15

Meters

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

N

GHD

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

Asbestos detects and exceedances (soil)

Project No. 12544035
Revision No. A
Date 5/19/2022

FIGURE 10

\\ghdnet\ghd\AU\Sydney\Projects\21\12544035\GIS\Maps\Deliverables\21_12544035_Z034_Aerotropolis_SAQP_AsbestosExceedances.mxd
Print date: 19 May 2022 - 15:36

Data source: Imagery - MetroMap. Created by: apmiller

Preliminary Works in the Low Risk Area includes the following activities:

1. Perimeter Fencing
2. Topsoil Stripping
3. Site Leveling
4. Erosion and Sediment Control Development:
   - Swale drains
   - Sediment Basin
   - Drain Diversion
5. Pavements
6. Establishment Site Facilities
7. Concrete slab and site amenities

290,300 290,400 290,500 290,600 290,700 290,800 290,900 291,000 291,100

6,244,300 6,244,200 6,244,100 6,244,000 6,243,900 6,243,800 6,243,700 6,243,600

SBT-BH-4263

SMGW-BH-D107

8A 8B 8C 8D

Section A

Section B

Section C

Section D

Section E

Diversion Drain

Retaining Wall

Low Risk Area (former northern portion of a AEC46)

Low Risk Area (former western portion of a AEC46)

Low Risk Area (former sourthern portion of a AEC46)

AEC 46: Medium Risk Area (central portion of AEC46)

Sediment Basin

Cut Fill Area
- -7 to -6 m
- -4 to -6 m
- -2 to -4 m
- -1 to -2 m
- 0 to -1 m
- 1 to 0 m
- 3 to 1 m
- 4 to 3 m

CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

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).

N

0 50 100 m

SCALE **1:3,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

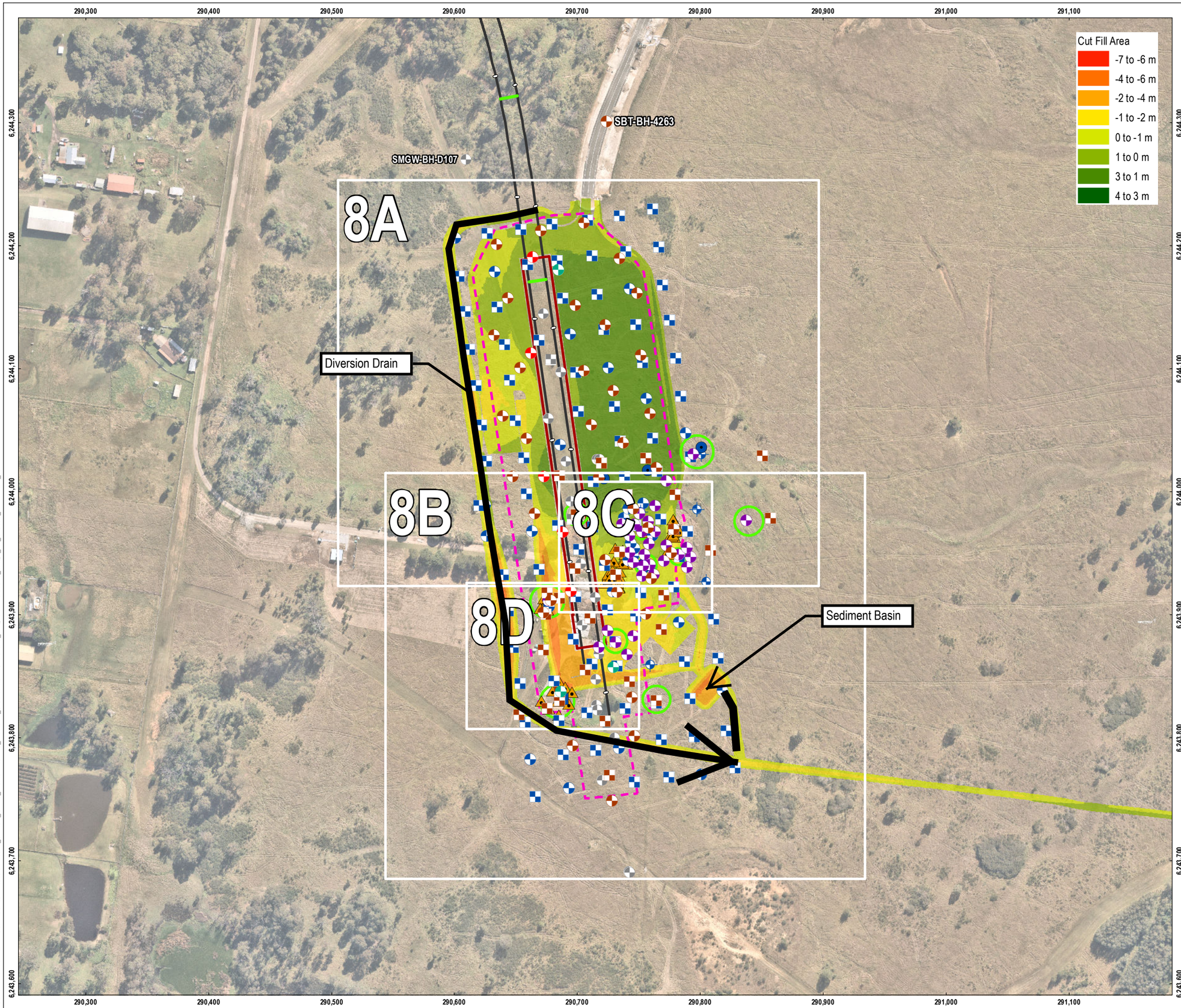
FIGURE 9

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **23.06.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F008_GIS**

APPENDIX B: DIVERSION DRAIN



CPB CONTRACTORS

Ghella 1894 5 Generations of Tunnelers

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
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- Surface Water Sample
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SOURCE
Site boundaries and investigations from Tetra Tech Coffey.
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Aerial imagery from Nearmap (capture date 22-03-2022).

N

0 50 100 m

SCALE **1:3,000**
PAGE SIZE: **A3**
PROJECTION: **GDA2020 MGA Zone 56**

CPB - GHELLA

WESTERN SYDNEY AIRPORT
STATION BOXES AND TUNNELLING WORKS

FIGURE 8

Site Establishment Earthworks and Investigation Locations - Aerotropolis Core Station

TETRA TECH COFFEY

DATE: **23.06.22** PROJECT: **754-SYDGE292575** FILE: **292575_SAQP_AE_F008_GIS**

APPENDIX C: CLEARANCE CERTIFICATE

Level 1, 488 Botany Road, Beaconsfield NSW 2015
1300 888 338 | info@airsafe.net.au | airsafe.net.au
ABN 17 649 181 297

CLEARANCE CERTIFICATE

May 13, 2022

EnviroPacific Services Pty Ltd
PO Box 295
WICKHAM NSW 2293

Project: 215 Badgerys Creek Road, Bringelly
Job Number: 62159

Attention: [redacted]

Dear [redacted],

In accordance with your instructions, Airsafe carried out a clearance inspection of an asbestos work area prior to the resumption of normal work in the area by unprotected personnel to confirm that the asbestos removal work has been completed.

The clearance inspection was carried out in accordance with Section 3.10 of the Code of Practice: How to Safely Remove Asbestos [Safe Work Australia, 2020] under Section 474 of the Work Health and Safety Regulation 2017.

The details of the clearance inspection are contained in the following pages of this report.

Should you have any queries regarding this report please contact the undersigned.

Regards
AIRSAFE LABORATORIES PTY LTD

[redacted]

[redacted]
Licensed Asbestos Assessor
[SafeWork NSW Licence No LAA 001380]

CLIENT DETAILS	
Project No:	62159
Client:	EnviroPacific Services Pty Ltd
Contact Details:	[redacted] PO Box 295 WICKHAM NSW 2293 [redacted]
REMOVAL WORK DETAILS	
Date of Removal Work:	11/05/22 – 12/05/22
Site Address:	215 Badgerys Creek Road, Bringelly NSW 2556
Location:	Soil surface inspection of the building footprints, septic tank location, and surrounding areas within the subject area (Refer to site map at the end of this report for locations).
Asbestos Removed:	Visual inspection of the soil surface following an emu pick of surface ACM over the subject area.
Licensed Asbestos Removalist:	EnviroPacific Services Pty Ltd Class A Asbestos Removal Licence [SafeWork NSW Licence No AD203785]
INSPECTION DETAILS	
Inspection Date:	12/05/2022
Inspection Time:	14:00
The Transit Route and Waste Routes are Free From any Visible Asbestos:	YES ☐ NO ☐ N/A X
Visual Inspection Satisfactory:	YES X NO ☐ N/A ☐
ASBESTOS REMOVAL DOCUMENTS	
Did you receive a copy of the asbestos removal control plan (ARCP)?	YES X NO ☐ N/A ☐
Did you receive a copy of the regulatory notification from? (SafeWork NSW)	YES X NO ☐ N/A ☐
Is the asbestos removal work consistent with the ARCP and notification form?	YES X NO ☐ N/A ☐
ATTACHMENTS	
Photographs:	YES X NO ☐ N/A ☐
Certificates of Analysis:	YES ☐ NO ☐ N/A X
Site Map:	YES X NO ☐ N/A ☐

CLEARANCE DECLARATION

A clearance inspection of the above area revealed the asbestos material specified has been removed in accordance with the Code of Practice: How to Safely Remove Asbestos [Safe Work Australia, 2020] and that the asbestos removal area, and the area immediately surrounding it, are free from visible asbestos contamination.

The results of the clearance inspection indicate the asbestos removal area does not pose a risk to health and safety from exposure to asbestos and can be re-occupied.

LIMITATIONS

Note:	Heavy vegetation is present in sections of the subject area which are located adjacent to areas where asbestos cement sheet fragments have been identified. The scope of this clearance is to cover the visible soil surface areas only. ACM may be present and bound to the root matrix of the grass and unable to be identified. These materials are outside the scope of works and are not covered by this clearance certificate. Airsafe recommends an inspection of the soil surface once vegetation is removed prior to re-occupancy. ACM has been identified embedded in surface clays over an area within the subject area. This area is outside the scope of works and not covered by this clearance certificate (please refer to the attached site map for approximate location).
Scope:	This clearance certificate covers the asbestos material specified in the area stated above. Airsafe takes no responsibility for any asbestos or other contamination found within demolition debris, the soil, inaccessible areas, the sub-surface, or other areas of the property not stated above. Although the surface has been found to be free of visible asbestos debris, there is potential to encounter sub-surface pieces or unidentified 'pockets' of foreign material and asbestos during further excavation works. Should asbestos materials be encountered during future works, appropriate action should be taken in accordance with SafeWork NSW regulations This report describes the observed conditions within the areas inspected at the time of inspection. Site conditions may change with future site activities, and therefore this report must not be considered accurate beyond the time of inspection. This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only and has been based on information provided by the client. The advice herein relates only to this project and all results, conclusions and recommendations made should be reviewed by a competent and experienced person with experience in occupational hygiene, before being used for any other purpose, Airsafe accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced or amended in any away without prior approval by the client or Airsafe and should not be relied upon by any other party, who should make their own independent enquiries. This report does not provide a complete assessment of the status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, Airsafe reserves the right to review the report in the context of the additional information.

PHOTOGRAPHS

Photo 1

Soil surface of building footprint following the removal of ACM from surface.

Photo 2

Soil surface of building footprint following the removal of ACM from surface.

Photo 3

Soil surface of subject area following the removal of ACM from surface.

Photo 4

Soil surface of subject area following the removal of ACM from surface removal works.

Photo 5

Soil surface of subject area following the removal of ACM from surface.

Photo 6

Soil surface of subject area following the removal of ACM from surface.

SITE MAP – CLEARANCE SECTIONS