

Orchard Hills Station Detailed Site Investigation

Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works

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Abbreviations

Abbreviation	Definition
AEC	Area of Environmental Concern
AHD	Australian height datum (0 AHD corresponds roughly to mean sea level)
AS	Australian Standard
AST	Aboveground Storage Tank
ATM	Airport Terminal Station
bgl	Below ground level
BTEXN	Benzene, toluene, ethyl-xylene, xylene, and naphthalene
BSF	Bringelly Service Facility
CLM	Contaminated Land Management
CMF	Claremont Meadows Service Facility
COPC	Chemicals of potential concern
CPG	CPB Contractors Ghella
DGV	Default Guideline Value
DEC	Department of Environment and Conservation
DSI	Detailed site investigation
EIS	Environmental Impact Statement
ENM	Excavated natural material
EPA	NSW Environment Protection Authority
GSW	General solid waste
GDE	Groundwater Dependent Ecosystem
GMP	Groundwater Management Plan
IBC	Intermediate Bulk Container
m	Metre
m bgs	m below ground surface
mg/L	Milligram per litre
NEPC	National Environment Protection Council
NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	Office of Environment and Heritage
OHS	Orchard Hills Station

Abbreviation	Definition
OPP	Organophosphorous Pesticides
PAH	Polycyclic aromatic hydrocarbon
PDS	Portal Dive Structure
PFAS	Per and polyfluoroalkyl substances
PSI	Preliminary Site Investigation
SAQP	Sampling Analysis Quality Plan
SBT	Station Boxes and Tunnelling Works
SBT North	Area including STM, CMF and OHE
SBT South	Area including PDS, ATM, BSF and AEC
TBM	Tunnel boring machine
TRH	Total Recoverable Hydrocarbons
TTMP	Tetra Tech Major Projects Pty Ltd
µg/L	Micro gram per litre
UST	Underground storage tank
VENM	Virgin excavated natural material
VWP	Vibrating wire piezometer
WSA	Western Sydney Airport
WSI	Western Sydney International (Airport)

1. Introduction

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

The SBT Works involves the construction and operation of a new 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: St Marys Station to Orchard Hills Station. St Marys Station is an existing heritage-listed suburban rail station. The Orchard Hills Station (OHS) (the 'site') is a new station for the Sydney Metro line and will include the portal dive structure. The boundary of the site is referred to as the 'OH Site Boundary shown on Figure 1 in Appendix 1.
- 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 the SBT South 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.

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

Previous investigations have been conducted at the site (refer to **Section 5**) and have been limited in scope. Based on the potential for contamination at the site from historical land use, further investigation was recommended to refine the understanding of potential contamination risks and to inform the design and construction of the OHS.

This document describes the Detailed Site Investigation (DSI) completed at the site. This DSI is specific to the shaft and surface construction activities at the site. Separate DSIs are being prepared for the tunnel, other station sites, and CMF. This DSI is specific to the construction phase on the site. Detailed consideration to the use of the site post construction (other than the use of the shaft and station for commercial/industrial purposes) is outside the scope of the SBT Works.



Figure 1.1 Overview of SBT Works

The purpose of this DSI was to:

- 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 OHS.

This DSI was carried out in conjunction with geotechnical and hydrogeological investigations. 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. 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 was completed:

- Review of existing information including the previous investigation reports.
- A site walkover to observe conditions within the site and surrounding land.
- Prepare 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); Orchard Hills Sampling Analysis and Quality Plan; Sydney Metro Western Sydney Airport Station Boxes and Tunnelling Works (Ref: SMWSASBT-CPG-SWD-SW001-GE-RPT-040504; dated 26 July 2022).
- Intrusive investigation which included:
 - 75 boreholes to depths between 1 and 29 m below ground surface (m bgs)
 - 16 test pits to 1 to 2 m bgs
 - 79 soil grab samples
- Convert six boreholes into groundwater monitoring wells.
- Groundwater sampling from new groundwater monitoring wells and a selection of existing groundwater monitoring wells.
- Analysis of soil and groundwater samples for contaminants of potential concern (COPC).
- Preparation of the following Technical Memorandum to consider whether Areas of Environmental Concern (AEC) (refer to Section 3.5) should continue to be considered Medium and/or High risk with regards to contamination and the Project, and for determining controls required to undertake Preparatory Works:
 - Technical Memorandum: Preliminary Soil Results Orchard Hills, SMWSASBT-CPG-SWD-SW000-GE-MEM-040554_RevA04, 24 August 2022 (TTMP, 2022b)
- Preparation of this report discussing the findings of the assessment. This report includes information reported in Technical Memorandum Rev A04.

3. Site Description

3.1. Site Setting and Features

The site is located on the corner of the eastern side of Kent Road and is bound to the north by the M4 Motorway and to south by properties located on the southern side of Lansdowne Road and is shown in the figures supplied in **Appendix 1**.

The site is currently comprised of rural-residential properties. Key attributes of the site are summarised in the following table.

Table 1: Site Information

Attribute	Description																																
Address	52-56 Kent Road, 58-62 Kent Road, 64 Kent Road, 70-74 Kent Road, 76-80 Kent Road, 82-86 Kent Road, 88-92 Kent Road, 94-98 Kent Road, 100-104 Kent Road, 106-112 Kent Road, 114-122 Kent Road, 17-25 Lansdowne Road, 22-26 Lansdowne Road, 28-32 Lansdowne Road, 34-38 Lansdowne Road. Portions of Kent Road and Lansdowne Road are also within the site.																																
Property Area	Approximately 25.6 Ha.																																
Title Identification Details	<p>The site comprises:</p> <table border="1"> <thead> <tr> <th>Lot/Section/Plan</th> <th>Extent of Lot within the Site</th> </tr> </thead> <tbody> <tr> <td>1//DP576160</td> <td>Full</td> </tr> <tr> <td>10//DP1195473</td> <td>Full</td> </tr> <tr> <td>104//DP128821</td> <td>Full</td> </tr> <tr> <td>43//DP29388</td> <td>Full</td> </tr> <tr> <td>44//DP29388</td> <td>Full</td> </tr> <tr> <td>45//DP29388</td> <td>Portion</td> </tr> <tr> <td>46//DP29388</td> <td>Portion</td> </tr> <tr> <td>47//DP29388</td> <td>Portion</td> </tr> <tr> <td>48//DP29388</td> <td>Portion</td> </tr> <tr> <td>49//DP29388</td> <td>Full</td> </tr> <tr> <td>50//DP29388</td> <td>Full</td> </tr> <tr> <td>81//DP29388</td> <td>Full</td> </tr> <tr> <td>82//DP29388</td> <td>Portion</td> </tr> <tr> <td>83//DP29388</td> <td>Portion</td> </tr> <tr> <td>97//DP29388</td> <td>Full</td> </tr> </tbody> </table> <p>Portions of Kent Road and Lansdowne Road within the site do not have a registered title.</p>	Lot/Section/Plan	Extent of Lot within the Site	1//DP576160	Full	10//DP1195473	Full	104//DP128821	Full	43//DP29388	Full	44//DP29388	Full	45//DP29388	Portion	46//DP29388	Portion	47//DP29388	Portion	48//DP29388	Portion	49//DP29388	Full	50//DP29388	Full	81//DP29388	Full	82//DP29388	Portion	83//DP29388	Portion	97//DP29388	Full
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97//DP29388	Full																																
Current Land Use	Mixture of residential and agricultural uses																																
Current Land Zoning	The site is currently zoned RU4 (Primary Production Small Lots) under the Penrith City Council Local Environmental Plan 2010																																
Adjoining Land Uses	<p>North: Western Motorway with residential dwellings of Claremont Meadows beyond</p> <p>South: Rural residential properties and an unnamed tributary of Blaxland Creek</p> <p>West: Rural residential properties and some market garden/small scale agricultural land uses.</p> <p>East: Rural residential properties with some open land/small scale agricultural land uses.</p>																																

3.2. Environmental Site Setting

The following table presents a summary of the environmental setting of the site.

Table 2: Environmental site setting

Aspect	Description
Topography	Topographic map of NSW available through SixMaps ¹ indicates the site is situated at elevations ranging between 46m and 34m Australian Height Datum (AHD) and generally slopes down to the south and east towards Blaxland Creek ² and South Creek.
Geology	<p>The Penrith 1:100 000 scale geology map³ 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. Bringelly shale is described as shale, carbonaceous claystone, laminite, lithic sandstone, with rare coal.</p> <p>A geotechnical cross-section of the site is included in Appendix 2.</p> <p>Based on previous investigations (refer to Section 4), the geology of the site is expected to be comprised of fill material (0.2 to 1 m thick) and underlain by residual soils comprised of Silty Sandy Clay to Silty Clay to approximately 7.5 mbgl and underlain by the Bringelly Shale.</p>
Hydrogeology	Groundwater at the site has been measured at depths ranging from 54 m to 32.4 m AHD within Siltstone and Sandstone Units (the Bringelly Shale, a confined lower aquifer system) and alluvium (an unconfined upper aquifer system). Groundwater is expected to follow topography, resulting in an easterly/south-easterly groundwater flow direction towards Blaxland and South Creeks. (TTMP, 2022) ⁴ .
Surface Water	<p>Dams are present on a number of the properties which comprised the site. The dams are assumed to support the various surrounding agricultural land uses. Reticulated potable water appears to be present for residential properties within/adjoining the site although these dams may also serve as a secondary source of water for domestic uses.</p> <p>Figure 1 shows the orientation of ephemeral tributaries of Blaxland Creek that passes through and slightly beyond the southern part of the site. The confluence of these tributaries and Blaxland Creek is approximately 400 m southeast of the site.</p>
Registered Groundwater Bores	There are no known registered groundwater bores onsite or within 250 m of the site. The nearest registered groundwater bore is located approximately 1.7 km east of the site. This groundwater bore was installed to 6 m bgl at a service station site and is for groundwater monitoring purposes only.
Salinity	The NSW Government Office of Environment and Heritage (OEH) have prepared a map which depicts the distribution and potential severity of dryland salinity within Western Sydney based on biophysical factors that are known to cause dryland salinity. A review of the map indicates that the majority of the site is mapped as having moderate salinity with a small portion of the southern part of the site mapped as having high salinity.

¹ <https://maps.six.nsw.gov.au/>

² Blaxland Creek is a tributary of South Creek

³ 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

⁴ Tetra Tech Major Projects (2022) *Hydrogeological Report (Project-wide)*, SMWSASBT-CPG-SWD-SW000-GE-RPT-040403, 5 July 2022.

Aspect	Description
Acid Sulfate Soils	The Atlas of Australian Acid Sulfate Soil (ASS) compiled by CSIRO ⁵ was reviewed to assess the probability of occurrence of ASS within the site. The ASS risk plan indicates that the 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 ⁶ (as of 8 March 2022) was carried out on 28 March 2022. The search did not identify the site, or surrounding properties.
NSW EPA Contaminated Land Public Record	A search of the NSW EPA Contaminated Land Public Record was carried out on 28 th March 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 site, or properties within 250 m of the site, were not present on the contaminated land public record.

3.3. Site History

The history of the 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.

The following information summarises relevant historical information included in the EIS Technical Paper which was supplemented by a review of historical aerial imagery that was undertaken as part of the SAQP.

Where historical titles were available for review (inclusive of 94-98 Kent Road, 100-104 Kent Road) the titles indicated that these properties comprising the site were privately owned dating back to 1949.

Review of available information indicates that the properties comprising the site are largely rural residential properties characterised by a residential dwelling with outbuildings such as workshops, and/or storage sheds. Some of these properties also contains dams.

Table 3: Supplementary Historical Aerial Photograph Review

Year	History
1947	The northern portion of the site is characterised by sparsely vegetated areas and agricultural/pastoral land. The southern half of the site was characterised largely by vegetated/forested areas. The surrounding properties were also characterised by agricultural land use and forested areas.
1955	The site and surrounding areas appeared largely unchanged although vegetation appeared to be increasingly sparse.
1965	Portions of the site appeared to have undergone some development with houses constructed on a number of the properties. The site continued to be used for agricultural purposes or was forested. A large dam was

⁵ <http://www.asris.csiro.au/>

⁶ <https://www.epa.nsw.gov.au/your-environment/contaminated-land/notification-policy/contaminated-sites-list>

Year	History
	present, immediately north-east of the site. Kent Road and Lansdowne Road could be seen and appeared to be unpaved.
1975	The site and surrounding areas appeared to be largely unchanged although a large shed could be seen in the central portion of the site (94 Kent Road) and a large dam was present in the north-eastern corner of the site (58 Kent Road). Construction of the M4 Motorway appeared to be underway.
1978	The site and surrounding areas appeared largely unchanged.
1984	The site and surrounding areas appeared largely unchanged.
1986	The site and surrounding areas appeared largely unchanged.
1991	The site and surrounding areas appeared largely unchanged.
1998	The site and surrounding areas appeared largely unchanged, although a large dam had been constructed in the south-west corner of the site.
2004	The site and surrounding areas appeared largely unchanged although a large shed/warehouse had been constructed in the central portion of the site, set back slightly from Kent Road (100-104 Kent Road).
2005	The site and surrounding areas appeared largely unchanged.
2009	The site and surrounding areas appeared largely unchanged.
2017	The site and surrounding areas appeared largely unchanged although anthropogenic materials can be seen to the west and south of the dam located 58-62 Kent Road, and a large bare area was present to the west of the dam at 52-56 Kent Road. Ground disturbance and debris can be seen on the surface in the eastern portion of 106-112 Kent Road. A small dam was observed in east of 114-122 Kent Road as well as evidence of debris noted in northeast of property
2022	The site and surrounding areas appeared largely unchanged.

The EIS identified a number of AEC which included the following:

- a cattle or sheep dip was suspected of being present at 94-98 Kent Street.
- Potential workshops and stored chemicals.
- Historical use of pesticides and herbicides.
- Presence of hazardous building materials.
- Unlicensed waste disposal to land.

3.4. Site Observations

The following observations apply generally to the site:

- The site comprised of a number of rural-residential properties.
- The site generally sloped slightly down to the south and east.
- Access within buildings and structures was generally restricted and the site walkover generally did not extend to areas where long grass was present for safety reasons, noting that the long grass restricted observations which could be made.
- Suspected asbestos-containing building materials largely in the form of fibre cement sheeting were suspected of being present within numerous structures (mainly houses) at the site.
- The majority of the properties appeared to have septic systems.

The following provides a summary of the observations made at each property. Key observations are also shown in **Figure 3, Appendix 1**.

Lot 10 DP1195473 (52-56 Kent Road)

- There was a small residential house constructed of brick and weatherboard present in the western portion of the property. A large shed, constructed largely of corrugated metal was present immediately north of the house. What appeared to be an ad-hoc apartment had been constructed within the shed, which was inaccessible at the time of the site walkover.
- East of the house and shed, the remainder of the site was comprised of grass.
- The EIS indicated an above ground storage tank (AST) may be present at the property, however no indication of an AST was identified during the walkover.
- A circular area comprised of compacted fill soil was present approximately 60m west of the dam situated in the eastern portion of the property.

Lot 1 DP576160 (58-62 Kent Road)

- Two, single level, residential houses were present on the western part of the property with the yards of each house separated by a 1m high chain-link fence.
 - The northern house appeared to be older and appeared to be constructed of weatherboard.
 - The southern house was constructed of brick.
- Lawn was present at the front (western) side of the property
- The eastern portion of the property was covered in grass/pasture.
- Minor quantities of anthropogenic materials were present to the west and south of the large dam situated in the eastern portion of the property. These materials largely included discarded metal and timber.

Lot 104 DP128821 (64 Kent Road)

- A large, two-storey house was situated in the western portion of the property and was surrounded by lawn/turf.
- A paved driveway accessing Kent Road was present in the south-western corner of the property and wrapped around to a large hard stand area on the south side of the house. Portions of the hardstand area were used for ad-hoc storage of tools and equipment.
- A 200L metal drum was situated on the lawn on the south side of the house and had been used as a fire pit for burning materials (partially burnt paper and metal could be seen within the drum).
- The remainder of the site appeared to be used for pasture.

Lot 43 DP29388 (70-74 Kent Road)

- Vacant, undeveloped plot.
- The majority of this property was covered by tall grass, and trees. No evidence of contamination was identified, although the walkover was restricted to making observations

from the grassed strip to the north that ran parallel to the property due to the dense vegetation.

Lot 44 DP29388 (76-80 Kent Road)

- A house, constructed of brick was situated on the western extent of the property.
- To the south-east, a large workshop, constructed of corrugated metal was present, which appeared to be used for storage and as a garage. Some minor staining was noted on the floor of the workshop however the hardstand appeared to be in good condition.
- What appeared to be a septic system was present between the house and workshop.
- A water cart, possibly for application of fertilizers or herbicides/pesticides was stored on the grass on the north side of the workshop. Several empty chemical containers of unknown contents were stored in the vicinity.
- The remainder of the site was characterised by grass/pasture.
- A dam was present in the eastern extent of the property. An intermediate bulk container (IBC), which appeared to be empty was situated on the western side of the dam.

Lot 45 DP29388 (82-86 Kent Road)

- A large house of brick construction was situated in the south-western corner of the property.
- A septic system was situated on the western side of the house.
- Further east and on the southern boundary of the site, two garden sheds and a workshop and carport were present.
- A long, narrow rectangular concrete pad was present along the northern boundary of the site.
- The eastern portion of the property was undeveloped and covered by grass and sparse, mature trees.

Lot 46 DP29388 (88-92 Kent Road)

- A house, constructed of brick was situated in the western portion of the property. A garage, with sealed hard stand situated beneath the house was used for storage.
- A septic system was situated on the eastern side of the house.
- The remainder of the western half of the property was undeveloped and characterised by grass, with some large bramble thickets present; due to the dense vegetation cover in these areas, it could not be discerned if fill mounds were present beneath the vegetative cover.
- The eastern half of the property was characterised by dense vegetation and tree cover.

Lot 47 DP29388 (94-98 Kent Road)

- A two-storey house of brick construction was situated on in the south-western portion of the property.
- A large shed (presumably for livestock) constructed with corrugated metal and no flooring was present in western central portion of the site.
 - A small concrete pad with a cut-off metal pipe was present on the south side of the shed, which could potentially be associated with fuel storage.

- Fibre cement debris with an approximate footprint of 1m² and suspected of containing asbestos was present in the central-eastern portion of the shed.
- Disused metal cans including old fuel drums were present on the bare ground.
- Discarded electronics equipment was present on the ground within the shed.
- The structure was considered unsafe to re-enter during DSI fieldworks, as such no additional sampling had been undertaken at the time this report was prepared.

The EIS has reported the shed to be a potential cattle dip site. No signs of a cattle dip were observed.

- Two well covers (presumably installed for groundwater and soil vapour monitoring) were observed on the eastern exterior side of the shed.
- A small shed constructed of corrugated metal was present along the southern boundary of the property.
- The remaining eastern half of the property was characterised by a dense stand of trees.

Lot 48 DP29388 (100-104 Kent Road)

- A single-storey weatherboard house was situated in the south-western corner of the property.
- A large workshop was situated immediately to the north with internal, sealed hardstand within and a large, paved area/driveway around the front of the building. The hard stand within the workshop appeared to be in good condition with only minor staining present.
- Pipework was observed on the exterior, eastern wall leading to a 200L metal drum. The pipework leading to the drum appeared to be connected to an air-conditioning unit within the workshop.
- No infrastructure indicative of the presence of fuel tanks or oil separators were observed.
- A groundwater monitoring well was present approximately 10m to the east of the workshop, with a second groundwater monitoring well (assumed to be groundwater) observed near the southern boundary (south-east of the workshop). This second well was situated next to a vertical PVC pipe extending out from the ground, approximately 50 mm in diameter that had been cut off approximately 30cm above ground level.
- Evidence of filling was present on the eastern side of the workshop, likely to create a level area.
- The central portion of the property was characterised by dense grass growth, with eastern third of the site characterised by vegetation/trees.
- A dam was present at the eastern extent of the site, several soil mounds were present along the southern and eastern sides of the dam. The soil mounds appeared to be part of a motocross track.
- Anthropogenic materials in the form of discarded metal, plastic and concrete roofing tiles were observed to the south of the dam.

Lot 49 DP29388 (106-112 Kent Road)

- A single-storey brick house was present in the north-west corner of the property, accessed via a gated driveway off Kent Road near the north-west corner of the property and was constructed of interlocking brick.
- A detached, multi-car garage, constructed of corrugated metal was situated immediately north of the house, on the northern side of the driveway.
- To the east of the garage was a large workshop/shed, also constructed of corrugated metal.

- A second driveway, constructed of gravel, access the property from Kent Road at the northern extent of the property and extended to the centre of the property.
- The front and rear of the house was covered by lawn.
- The perimeter of the property was fenced.
- The eastern half of the property was characterised by grass/pasture and mature trees.
- Vegetation was noted to be present sporadically in the south-west and southern portion of the property.
- A large fill mound estimated to be approximately 25m x 2m x 1.5m was observed parallel to the northern property boundary.

Lot 50 DP29388 (114-122 Kent Road)

- A single-storey residential house constructed of weatherboard was present in the north-western portion of the property and was accessed from Kent Road via a gravel driveway.
- An 1m high fence appeared to surround the property.
- The western portion of the property was characterised by lawn, with taller grass / weeds present east of the house.
- A stockpile of anthropogenic material approximately 10m in size and consisting of plastic, metal, carpet and plasterboard was observed in the north-eastern section of the property. No suspected Asbestos Containing Material (ACM) was observed within the stockpile.
- The southern half of the property had a small house situated in the south-west corner, constructed of fibre cement sheeting suspected of containing asbestos.
- A groundwater monitoring well was present at the north-east corner of the intersection of Kent Road and Lansdowne Road.
- A small shed constructed of corrugated metal was situated north-east of the house.
- The remainder of the property was characterised by grass or pasture, with a large dam situated at the eastern extent.

Lot 97 DP29388 (17-25 Lansdowne Road)

- A single storey brick house was situated in the south-eastern portion of the property.
- A large dam was present in the south-west corner.
- Two large, metal sheds with bay doors were present along the eastern boundary.
- A small external office was situated in the central-southern portion of the property.
- Stored materials include suspected asbestos-containing fibre cement (stored within a small skip bin) were present along the eastern boundary near the north-east corner of the property.
- A small fill mound was present in the north-east corner – comprised of cement pavers and possibly site won material and appeared to form a ramp.
- The remainder of the site was characterised by grass/pasture.

Lot 83 DP29388 (22-26 Lansdowne Road)

Access to this property was not permitted for the DSI fieldworks until 28 July 2022; the following observations were made as part of the SAQP site walkover.

- A small house was present in the north-west corner of the property.
- A small AST was present on the grass (with no frame/cradle) between two small, corrugated metal sheds situated along the western boundary. The AST appeared to be empty.
- A large shed was present in the western-central portion of the site.

- The driveway and area just south and east of the large shed were characterised by a gravel surface.
- The area to the south of the shed was used for storage, with three, 40-foot shipping containers present with other equipment stored there.
- A small stockpile was present south-west of the large shed; the material comprising the stockpile appeared to be consistent with the driveway material.
- Two large metal drums were also present against the southern wall of the shed.
- A small soil stockpile overgrown with weeds was present in the south-western portion of the property.
- A disused caravan and some other stored materials (including wooden pallets) were present along the southern boundary of the property.
- The remainder of the property was characterised by grass/pasture.

Lot 82 DP29388 (28-32 Lansdowne Road)

- A house was present in the north-western corner of the property.
- The driveway led to the northern central portion of the property with a turnaround area. The turn-around area also appeared to be used of storage of ad-hoc materials including several disused metal 200L drums and building materials
- A groundwater monitoring well was present near the eastern property boundary in the central portion of the site.
- The remainder of the property was characterised by grass/pasture.

Lot 81 DP29388 (34-38 Lansdowne Road)

- A house was present in the north-western corner of the property.
- South of the house, a number of sheds were present.
- On the southern side of the shed, a number of intermediate bulk containers (IBC) were observed, with smaller drums and containers also identified (contents unknown).
- A large dam was present in the southern portion of the property.
- The remainder of the property was characterised by grass/pasture.
- Three large sheds were situated south of the dwelling, the concrete pads were inspected following removal of the walls and roof and were found to be in good, clean condition.

3.5. Areas of Environmental Concern and Site Observations

Table 4 outlines the AECs that were previously identified in the EIS Technical Paper, cross referenced with observations made by TTMP during the site walkover. The location and extent of the AEC is shown in **Figure 3, Appendix 1**.

Table 4: AEC Summary Table

AEC ID	EIS Risk Ranking	EIS Description	TTMP Site Observations
11	High	Potential workshops, AST, significant (>100m ²) unlicensed waste disposal to land or storage to land and use of hazardous building material. COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.	A large shed was observed and could potentially contain asbestos. A potential AST was noted in the EIS however upon inspection, it could not be located, as noted in the SAQP.
12	High	Dumped Waste Area COPC: heavy metals, TRH, PAH & asbestos.	In the 2018 aerial photograph, anthropogenic materials can be seen on the ground surface in the area, mainly in the southern portion of the AEC area, west of the dam. A large bare patch could also be seen within the central portion of the AEC area. Following slashing of vegetation on the property the AEC 12 area was visually inspected. Inspection of the area found that majority of anthropogenic material previously shown on the surface including what appeared to be some small sheds had been removed. Inspection of the large bare area shown in the aerial photograph indicated that the soil was well compacted and comprised of material that differed from the topsoil typically found at other sample locations within the area. The soil in this area appeared to largely be comprised of gravelly clay. Minor anthropogenic debris in the form of plastic was seen on the soil surface, however anthropogenic debris was not observed within surface soils.
13	Medium	Potential hazardous building materials. COPC: heavy metals (lead-based paint), & asbestos.	A small unoccupied residential house that may contain asbestos-containing building materials was recorded on site. The house was observed to be in good condition. No debris, suspected of containing asbestos was identified on the ground surface in the vicinity of the footprint of the house.
14	Medium	Potential hazardous building materials. COPC: heavy metals (lead-based paint), & asbestos.	Two one storey residential houses occupied this site, both houses have the potential to contain asbestos. Die-back of grass on the front lawn (western side) of the northern-most house was observed however this is suspected to be because of presence of parked cars for long periods and because hazardous building materials such as asbestos or lead paint are unlikely to cause die back of this scale in general and this area was also noted to be setback from the footprint of the house. Both houses were also noted to be in relatively good condition during the site walkovers.
15	Medium	Use of herbicides and pesticides on former cultivated land and use of hazardous building materials. COPC: heavy metals, pesticides/herbicides and asbestos.	A large two-storey house considered by the EIS to potentially containing hazardous building materials, was observed during both the SAQP and DSI site walkover. The house was observed to be of brick construction, was unpainted and appeared to be in good condition. No suspected ACM were identified on the ground surface.

AEC ID	EIS Risk Ranking	EIS Description	TTMP Site Observations
			A backyard firepit in an old 55-gallon drum and stored materials (timber, plastic containers) was also observed in close proximity to the house. The rest of the property was cleared and covered in grass. No die back was observed in the cleared area to the east of the house or in the nature strip to the south of AEC15.
16	Medium	Potential workshops, minor waste disposal, use or storage of hazardous building materials. COPC: heavy metals, TRH & asbestos.	Visual observations recorded no evidence of contamination, however due to the site containing dense vegetation accurate observations were restricted.
17	Medium	Potential workshop, minor waste disposal, use or storage of hazardous building materials. COPC: heavy metals, TRH, SVOCs, VOCs, OCP/OPP & asbestos.	The site walkovers observed the house to be of brick construction with a large, corrugated metal workshop located south-east of the house. Inspection of the workshop indicated that it was used for general storage and parking of the landowner's private vehicle. The floor of the warehouse was noted to be clean and free of major staining. A septic tank was observed in between the house and garage. It is suspected that herbicides and pesticides may have been applied using a water cart located on the north side of the workshop. The eastern two thirds of the site was characterised by grass/pasture.
18	Medium	Potential workshops, minor waste disposal, use or storage of hazardous building materials. COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.	Review of historical aerial photograph does not appear to indicate that a structure was previously situated in this AEC location. The site walkover undertaken as part of the SAQP identified a concrete pad, however there was no indication that a structure was situated overtop. There were no visual indications of potential contamination on this site.
19	Medium	Potential workshops, minor waste disposal, use or storage of hazardous building materials. COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.	Records of visual observation recorded two garden sheds and a carport (see photograph). Very minor quantities of chemicals were observed to be stored within the sheds. No staining of soil was observed. The sheds and carport were noted to be constructed of corrugated metal and timber.
20	High	Potential cattle or sheep dip, large shed with associated stressed vegetation and use of hazardous building materials. COPC: heavy metals, pesticides and asbestos.	Records state that within the shed on the south side, is a concrete pad with a cut-off metal pipe. Fibre cement debris suspected to contain asbestos was found within the central eastern portion of the shed (~1m ²). Found on the ground of the shed were disused metal cans, old fuel drums and discarded electronic equipment. The EIS reported the presence of a potential sheep or cattle dip, however visual inspection did not identify evidence of a cattle dip site nor was one identified outside of the shed. Two well gattic covers were noted on the eastern side of shed, presumably used for groundwater monitoring. The southern end of the property contained another smaller shed constructed of corrugated metal.
21	Medium	Potential hazardous building materials. COPC: heavy metals (lead-based paint) & asbestos.	Visual inspection identified a two-storey house constructed of brick, unpainted and observed to be in relatively good condition with evidence of contamination was not identified. No debris suspected of containing hazardous building materials were observed within the vicinity of the building footprint.

AEC ID	EIS Risk Ranking	EIS Description	TTMP Site Observations
22	Medium	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>A large workshop was observed on this site. A 200L metal drum, jerry cans and car batteries were identified on the concrete floor of the eastern side of the workshop. Two groundwater wells were observed on the eastern exterior of the building. One located east of the workshop and the second on the southern eastern boundary of the workshop, this one was observed next to a vertical PVC pipe protruding from the ground. Visual inspections multiple cars on site within the workshop during the SAQP inspection. Re-inspection of the workshop interior during the DSI fieldwork observed that the workshop floor was comprised of concrete hardstand that was noted to be in good condition, with only minor staining noted. No UPSS, oil separators and/or triple interceptor traps were identified.</p>
23	Medium	<p>Potential hazardous building materials.</p> <p>COPC: heavy metals & asbestos.</p>	<p>A single storey house and an outbuilding that was appeared to be previously used as a garage that had been converted into a secondary living room, with a chicken coup on the externally on the eastern extent. The outbuildings were constructed of corrugated metal. The house and outbuilding appeared to be in good condition with no suspected ACM identified near the footprint of the buildings.</p>
24	Medium	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>A single storey brick house observed to the northern west of the site with a 1m wooden fenced located at the front of the property. Due to prohibited access onto the property observations were made from the road.</p>
25	High	<p>Potential workshops, AST, significant (>100m²) unlicensed waste disposal to land or storage to land and use of hazardous building material.</p> <p>COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>This site was largely composed of vegetation with no observational evidence of contamination.</p>
26	Medium	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>Visual observations made from the street identified two small houses with the southernmost house constructed of constructed from fibre cement sheeting suspected of containing asbestos, the northern house was of newer construction consisting of weatherboard. A smaller shed constructed from corrugated metal was observed north-east of the house and a groundwater monitoring well south of the shed. Observations did not record any evidence of potential contamination from these structures and no workshop was present.</p>
27	Medium	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>This site was largely composed of grass or pasture with no recorded observations of any evidence of contamination.</p>

AEC ID	EIS Risk Ranking	EIS Description	TTMP Site Observations
28	Medium	<p>Use of herbicides and pesticides on former cultivated land and use of hazardous building materials.</p> <p>COPC: heavy metals, pesticides/herbicides and asbestos.</p>	<p>This site was characterised by grass/pasture with no observational notes of evidence of contamination. The structures shown within the AEC map were observed to be 20 ft shipping containers. South of the AEC area, a large garage/workshop was present, access was not permitted however the structures appeared to be in good condition and of recent construction. Anthropogenic materials including timber, plastic, metal, and bricks. The materials appeared to have been placed in an orderly fashion. Fibre cement sheeting suspected to contain asbestos was observed in an enclosed metal bin, inspection of the ground surface surrounding the bin did not identify debris or fragments of suspected ACM.</p> <p>West of the stockpiled materials, a soil mound was present. Closer inspection of the mound indicated that the mound had been shaped into a ramp, suspected to be used for loading/unloading livestock (no livestock was present at the time of inspection) with the steeper end reinforced with brickwork. The soil comprising the ramp/mound appeared to largely comprise clay and is suspected of being site-won material.</p>
29	Medium	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>COPC heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>A number of large sheds, constructed of corrugated metal and appearing to be of recent construction were located south of the house. On the southern exterior of the shed, three IBC, smaller drums and containers were observed, however the contents of these containers were unknown. No stained or malodorous soil was observed. Stored asbestos containing materials have been observed in this area.</p>
30	Medium	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>COPC: heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>A stockpile, approximately 5m³ in size consisting of what appeared to be a gravelly sand soil was observed. A septic tank was also observed, located south-west in the site with no visual records of evidence of contamination. While the EIS identified potential workshops within the AEC, although a camping trailer was observed to be parked in the area along with other anthropogenic materials that had been stacked/stored in the southern part of the AEC.</p>

4. Project Description

4.1. Construction

Construction of the site for the SBT Works includes the following:

- Demolition of existing buildings and associated infrastructure, and site clearance activities. This includes the removal of the AST noted at 22-26 Lansdowne Road, and the jerry cans observed at 100-104 Kent Road.
- Clearing and grubbing of vegetation and surface soils (refer to **Appendix 3**)
- Site levelling (refer to **Figure 5, 5A, 5B, 5C** in **Appendix 1**)
- Piling and excavation of portal, station box and dive structures using rippers and rock hammers.
- Construction of cast-in-situ permanent portal structure
- The station box and dive structure are approximately 300 m long, 20 m wide, and 10 m deep (to approximately 27 m AHD). Excavation of the structure will generate approximately 60,000 m³ of spoil (as in-situ volume) which requires off-site disposal.
- TBM assembly, launch and tunnelling support works
- Cross passage construction support.
- Construction of temporary construction work facilities including:
 - Sediment basin
 - Water treatment plant
 - Crane pad and associated hardstands around the station box and portal structure
 - Laydown areas
 - Workshop
 - Offices and car parks
 - Substation
 - Haul and access roads

Construction of the temporary works areas will require clearing and grubbing of vegetation and surface soils. Subject to the completion of the DSI, it is intended that soil materials stripped for the construction of the temporary works will be stockpiled within the site for subsequent reuse on-site post construction. Materials which cannot be reused on-site will be disposed of off-site as waste or reused within the larger Western Sydney Airport site (designated the 'FS01 site'; refer Section 4.3).

For the SBT Works the excavation of the station box and dive structure will be drained. The portal structure will be undrained (tanked), and the dive structure will be drained.

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

Construction activities will take place within the OH Site Boundary shown in the figures included in Appendix A.

4.2. Dewatering

The Orchard Hills Station excavation is anticipated to extend to 27 m AHD allowing some over-excavation for the preparation of the floor for the casting of the base slab. A ramp to the ground surface will be constructed to the south and will provide construction access and will form part of the metro rail system. On completion, the reference design nominates undrained conditions are to be achieved for the station though the ramp would remain drained.

Ephemeral watercourses are present to the north and also the southern extent of the station. This is considered as having little influence on groundwater levels. It is interpreted to act as a zone of groundwater discharge under pre-development conditions.

Based on the parameters outlined in the HIR (ibid) the sustained seepage to the station excavation and dive structure is assessed as 15 m³/d (0.17 L/s) and the extent of the impact is assessed to be within 350 m of the station. This zone of influence does not extend as far as South Creek to the east so no adverse impacts on South Creek are predicted. No existing groundwater bores have been identified within the assessed zone of influence.

4.3. Re use of Excavated Material within the WSA Site

A part of the larger Western Sydney Airport site (designated FS01 site) is proposed to be filled by up to 8 m. All excavated material which cannot be reused on site, shall be assessed to determine its suitability for use as fill at the FS01 site. Following development, the future use of the FS01 site is commercial / industrial as per the Western Sydney Airport Plan.

Material which cannot be re-used will be disposed off-site as waste to a licensed landfill.

5. Summary of Previous Investigations / Plans

The site has been subject to previous preliminary intrusive investigations of soil and groundwater. Data from these investigations is presented within the following reports:

- Cardno (Nov, 2021); *Contamination Assessment Report – Phase D/E, Sydney Metro Western Sydney Airport* (Ref: 80021888; RevB, dated 26th 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).
- Golder & Douglas Partners (March 2021); *Geotechnical Data Report –* (Ref: 19122621-002-R-Rev4; Rev4; dated 5th March 2021).

The following sections provide a summary of the previous investigations in regard to soil and groundwater.

5.1. Soil

Analytical data from previous investigations has been collated by TTMP and is provided in **Appendix 4**.

The scope of these previous assessments has been summarised in Table 5 and the results summarised in following sub-sections for fill and natural materials.

Table 5: Summary of previous soil assessments – boreholes and monitoring wells

Report	Scope of Previous Investigations
Factual Contamination Report (Golder & Douglas Partners, Feb 2021)	<ul style="list-style-type: none"> Two boreholes were drilled (SMGW-BH-A017 and SMGW-BH-A117) and sampled. Neither borehole locations were converted into groundwater monitoring wells.
Contamination Assessment Report (Cardno, May 2021)	<ul style="list-style-type: none"> Five boreholes (SMGW-BH-A306, SMGW-BH-A310⁷, SMGW-BH-A310S, SMGW-BH-A311, SMGW-BH-A315) were drilled and sampled. BH-A310, BH-A310S, BH-A311 and BH-A315 were all converted to groundwater wells.
Contamination Assessment Report – Phase D/E (Cardno, Nov 2021)	<ul style="list-style-type: none"> Seven boreholes (comprised of locations A370 – A375 and A372S which included three hand augered locations and four boreholes) were drilled and sampled. BH-A370, BH-A371, BH-A372 and BH-A372S were all converted to groundwater wells.
Geotechnical Data Report (Golder & Douglas Partners, March 2021)	<ul style="list-style-type: none"> Borehole A115, located at the eastern extent of 69-75 Kent Road (western side of Kent Road) was drilled to a depth of 45.35mbgl. Whilst a sample of fill material was collected from the borehole, it does not appear as though it was submitted for analysis of CoPC. The depth of fill was logged as extending to a depth of 1.5m and was underlain by Sandy CLAY.

Sampling and analysis were undertaken on both fill and natural soils. However existing sample locations for the Orchard Hills Project area are located within road reserve including Kent Road and Lansdowne Road. Those locations within the road reserve may not be representative of the area to be disturbed by the project, and not suitable to assess contamination conditions within the AEC identified in the EIS. There is also no relevant data on soil contamination status for the areas to be disturbed at Orchard Hills outside of the Station Box.

The following sections summarise existing available data for fill and natural materials.

5.1.1. Fill Materials

Based on the limited information collected to date, concentrations of COPC are lower than commercial/industrial land use criteria, with fill at this time likely being classified as GSW.

Review of soil descriptions provided in the logs from previous investigations indicates that fill extends to depths ranging from 0.2 to 2 mbgl. Due to the limited and sporadic distribution of sampling locations it is difficult to discern a trend in the thickness of the fill profile across the site.

Fill was largely described as dark brown sandy gravel or more commonly silty sand or silty clay, red/orange, grey or brown in colour with low plasticity. Visual/olfactory signs of contamination such as soil staining and hydrocarbon odours were not reported in the logs from previous investigations.

A summary of analytical results for fill materials screened against health-based guidelines is provided in Table 6.

⁷ Locations BH-A310, BH-A310S, and BH-A311 appear to be situated on the western border of the site, but off-site. Results have been considered due to proximity, shared/similar history with on-site sample locations and the lack of on-site data.

Table 6: Fill Materials Analytical Results

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	Commercial/ Industrial Health Guidelines (Note 1)	No. of Samples Exceeding Commercial/ Industrial Health Guidelines
Arsenic	28 / 26	<2	41	3000	Nil
Cadmium	28 / 0	<0.3	<1	900	Nil
Chromium (III+VI)	28 / 28	5.1	170	3600	Nil
Copper	28 / 28	4	70	240000	Nil
Lead	28 / 28	6.7	50	1500	Nil
Mercury	28 / 0	<0.05	<0.1	730	Nil
Nickel	28 / 19	<1.1	17	6000	Nil
Zinc	28 / 27	<4.7	790	400000	Nil
pH (aqueous extract)	13 / 13	4.4	8.2		-
TRH C6 - C10 Fraction F1	27 / 0	<10	<25	260	Nil
TRH C6 - C10 Fraction Less BTEX F1	27 / 0	<10	<25	260	Nil
TRH >C10 - C16 Fraction F2	27 / 0	<25	<250	20000	Nil
TRH >C10 - C16 Fraction Less Naphthalene (F2)	27 / 0	<25	<250	20000	Nil
TRH >C16 - C34 Fraction F3	27 / 1	<90	640	27000	Nil
TRH >C34 - C40 Fraction F4	27 / 1	<100	890	38000	Nil
TRH C10 - C40 Fraction	27 / 1	<50	1530		-
Benzene	27 / 0	<0.1	<0.2	3	Nil
Toluene	27 / 0	<0.1	<0.5	99000	Nil
Ethylbenzene	27 / 0	<0.1	<1	27000	Nil
Xylenes (m & p)	27 / 0	<0.2	<2		-
Xylene (o)	27 / 0	<0.1	<1		-
Xylenes (Total)	27 / 0	<0.3	<3	81000	Nil
Naphthalene	27 / 0	<0.1	<1	11000	Nil
PAHs (Sum of total)	25 / 1	<0.1	6.1	4000	Nil
Total Halogenated Phenol*	8 / 1	<1	1.3		-
Total Non-Halogenated Phenol*	8 / 0	<20	<20		-
Perfluorooctanesulfonic acid (PFOS)	21 / 13	<0.0001	0.0008	20	Nil
Perfluorohexanesulfonic acid (PFHxS)	21 / 0	<0.0001	<0.0001	20	Nil
Perfluorooctanoate (PFOA)	21 / 2	<0.0001	0.0002	50	Nil
Sum of PFHxS and PFOS (lab reported)	21 / 13	<0.0001	0.0008	20	Nil

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, and PFAS NEMP 2020 HIL-D for commercial/industrial land use.

In summary, the fill material reported COPC with low concentrations which were below the adopted commercial industrial health guidelines. Trace concentrations of perfluoroalkyl and polyfluoroalkyl substances (PFAS) were reported in fill materials at multiple locations at the site.

ACM were not observed in previous investigations. Seven samples of fill material were screened for asbestos. No positive detection of asbestos was reported.

Shallow soil samples collected via hand augers targeting the suspected cattle dip within the property located at 94-98 Kent Street reported concentrations of Organochlorine Pesticides (OCP) below the Limit of Reporting (LOR). Similarly, concentrations of arsenic were consistent with those recorded on other properties within the site, and hence considered indicative of background concentrations. These results indicate cattle dipping either did not occur or has not resulted in impact to shallow soil in this AEC.

5.1.2. Natural Materials

A summary of analytical results of the natural material is provided in Table 7.

Table 7: Natural Materials Analytical Results

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	Commercial/ Industrial Health Guidelines (Note 1)	No. of Samples Exceeding Commercial/ Industrial Health Guidelines
Arsenic	59 / 52	<2	38	3000	Nil
Cadmium	59 / 1	<0.3	1.2	900	Nil
Chromium (III+VI)	59 / 52	<5	83	3600	Nil
Copper	59 / 59	5.2	67	240000	Nil
Lead	59 / 58	<5	38	1500	Nil
Mercury	29 / 1	<0.05	0.2	730	Nil
Nickel	59 / 40	<2	110	6000	Nil
Zinc	59 / 57	<5	400	400000	Nil
pH (aqueous extract)	68 / 68	5	9.8		-
TRH C6 - C10 Fraction F1	37 / 0	<10	<25	260	Nil
TRH C6 - C10 Fraction Less BTEX F1	37 / 0	<10	<25	260	Nil
TRH >C10 - C16 Fraction F2	37 / 3	<25	80	20000	Nil
TRH >C10 - C16 Fraction Less Naphthalene (F2)	37 / 3	<25	80	20000	Nil
TRH >C16 - C34 Fraction F3	37 / 2	<90	170	27000	Nil
TRH >C34 - C40 Fraction F4	37 / 0	<100	<120	38000	Nil
TRH C10 - C40 Fraction	37 / 3	<50	236		-
Benzene	44 / 1	<0.1	0.2	3	Nil
Toluene	44 / 2	<0.1	2.4	99000	Nil
Ethylbenzene	44 / 2	<0.1	0.3	27000	Nil
Xylenes (m & p)	44 / 5	<0.2	2.5		-
Xylene (o)	44 / 3	<0.1	0.8		-
Xylenes (Total)	44 / 4	<0.3	3.3	81000	Nil
Naphthalene	46 / 4	<0.1	1.6	11000	Nil
PAHs (Sum of total)	36 / 2	<0.5	1.5	4000	Nil
Total Halogenated Phenol*	11 / 0	<1	<1		-
Total Non-Halogenated Phenol*	11 / 0	<20	<20		-
Perfluorooctanesulfonic acid (PFOS)	52 / 3	<0.0001	0.0003	20	Nil
Perfluorohexanesulfonic acid (PFHxS)	52 / 3	<0.0001	<0.0001	20	Nil
Perfluorooctanoate (PFOA)	52 / 0	<0.0001	<0.0001	50	Nil

Analyte (mg/kg unless shown)	No. Samples / No. Detects	Minimum Value	Maximum Value	Commercial/ Industrial Health Guidelines (Note 1)	No. of Samples Exceeding Commercial/ Industrial Health Guidelines
Sum of PFHxS and PFOS (lab reported)	52 / 3	<0.0001	0.0003	20	Nil

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, and PFAS NEMP 2020 HIL-D for commercial/industrial land use.

Analysis of samples of natural soil that were collected during previous investigations did not report concentrations of COPC above the health assessment criteria for a commercial/industrial land use setting.

5.2. Groundwater

Ten monitoring wells have been installed at the Site and the location of these are shown in Figure 4, **Appendix 1**. Well construction information for these wells is summarised in the following table.

Table 8: Groundwater Monitoring Wells

Location	Surface Level (m AHD)	Screen Level (m AHD)	Unit	Water Level range (m AHD)
SMGW-BH-A017S	43.62	Not listed	Not available	36.2 to 36.9 ^a
SMGW-BH-A017	43.62	18.62 to 30.62	Siltstone	37.8 to 38.3 ^b
SMGW-BH-A113	43.44	13.54 to 25.84	Siltstone	32.0 to 32.5 ^c
SMGW-BH-A115	40.4	33.4 VWP	Alluvium (Clay)	36.8 to 37.7
	40.4	22.4 VWP	Siltstone	36.2 to 36.9
	40.4	19.4 VWP	Siltstone	36.3 to 36.6
SMGW-BH-A117SL	38.9	22.0 to 28.9	Residual Soil	36.1 to 36.9 ^d
SMGW-BH-A117	38.9	34.9 to 31.0	Siltstone	34.8 to 35.9 ^d
SMGW-BH-A310S	39.94	33.94 to 36.94 (32.94 to 37.94)	Silty Clay / Clayey Sand	38.36 to 38.46
SMGW-BH-A310	39.93	25.93 to 32.93	Siltstone / Sandstone	Not available
SMGW-BH-A311	43.49	40.49 – 34.49	Sandy Clay with Sandstone	Not available
SMGW-BH-A315	42.28	33.28 to 39.28	Residual/Shale/ Sandstone	Not available

^a Levels before February 2020 not used due to testing disturbance

^b Lack of response to high rainfall event in February 2020.

^c Initial measurements before July 2020 not considered due to high level of disturbance due to testing

^d Short spikes in groundwater during rain interpreted as being due to surface water infiltration to piezometer

Available groundwater elevation data indicates groundwater is expected to flow in an easterly direction towards South Creek.

For preliminary screening purposes the analytical data was compared to Toxicant default guideline values (DGVs) present in the Australian and New Zealand Guidelines for Fresh and Marine Water

Quality (ANZG, 2018). Freshwater guidelines with 95% species protection were selected based on Blaxland Creek/South Creek being located in a modified ecosystem and have also referred to the 99% protection level for CoPC's that bioaccumulate. A summary of the laboratory analytical data is provided in **Table 9**.

Table 9: Groundwater Summary Table

Analyte	Units	No. Samples / No. Detects	Minimum Value	Maximum Value	ANZG (2018) Freshwater 95% toxicant DGVs / PFAS NEMP 99% ecological water quality guideline values	No. of Samples Exceeding ANZG (2018) Freshwater 95% toxicant DGVs / PFAS NEMP 99% ecological water quality guideline values
Magnesium (Filtered)	mg/L	17 / 17	83	1500		-
Aluminium (Filtered)	mg/L	21 / 12	<0.01	2.36	0.055	10
Arsenic (Filtered)	mg/L	26 / 22	<0.001	0.005		-
Beryllium (Filtered)	mg/L	25 / 13	<0.001	0.015		-
Boron (Filtered)	mg/L	25 / 9	<0.02	0.13	0.37	Nil
Cadmium (Filtered)	mg/L	21 / 6	<0.0001	0.0004	0.0002	5
Chromium (III+VI) (Filtered)	mg/L	25 / 6	<0.001	0.005		-
Cobalt (Filtered)	mg/L	25 / 21	<0.001	0.87		-
Copper (Filtered)	mg/L	20 / 10	<0.001	0.024	0.0014	9
Iron (Filtered)	mg/L	20 / 20	0.29	115		-
Lead (Filtered)	mg/L	21 / 6	<0.001	0.021	0.0034	4
Manganese (Filtered)	mg/L	25 / 25	0.109	43	1.9	5
Mercury (Filtered)	mg/L	24 / 0	<0.00005	<0.0001	0.0006	Nil
Molybdenum (Filtered)	mg/L	24 / 6	<0.001	0.003		-
Nickel (Filtered)	mg/L	25 / 24	<0.001	0.278	0.011	19
Selenium (Filtered)	mg/L	22 / 6	<0.001	0.03	0.011	3
Strontium (Filtered)	mg/L	24 / 24	0.339	29.1		-
Tin (Filtered)	mg/L	/				
Vanadium (Filtered)	mg/L	24 / 2	<0.001	0.01		-
Zinc (Filtered)	mg/L	24 / 19	<0.005	0.606	0.008	18
Electrical Conductivity @ 25C (lab)	µS/cm	21 / 21	1760	32700		-
pH (lab)	pH_unit	22 / 22	4.92	8		-
Alkalinity (total as CaCO3)	mg/L	26 / 24	<3	816		-
Bicarbonate Alkalinity as CaCO3	mg/L	20 / 20	3	816		-
Carbonate Alkalinity as CaCO3	mg/L	24 / 0	<1	<10		-
Hardness as CaCO3	mg/L	22 / 22	464	5510		-
Ammonia as N	mg/L	26 / 26	0.07	5.11	0.9	10
Nitrite + Nitrate as N	mg/L	21 / 12	<0.01	0.15		-
Nitrate (as NO3-N)	mg/L	26 / 11	<0.005	0.14		-
Nitrite (as NO2-N)	mg/L	25 / 3	<0.005	0.02		-
Nitrogen (Total)	mg/L	12 / 10	<0.5	4.9		-
Total Dissolved Solids @180oC	mg/L	16 / 16	1060	23900		-
Perfluorohexane sulfonic acid (PFHxS)	µg/L	7 / 1	<0.0007	0.0007		-
Perfluorooctanesulfonic acid (PFOS)	µg/L	7 / 4	<0.0001	0.002	0.00023	4
6:2 Fluorotelomer Sulfonate (6:2 FTS)	µg/L	7 / 4	<0.005	0.021		-
Perfluoroheptanoic acid (PFHpA)	µg/L	7 / 1	<0.006	0.006		-
Perfluorooctanoic acid (PFOA)	µg/L	7 / 1	<0.0006	0.0006	19	Nil
Sum (PFHxS + PFOS)	µg/L	7 / 1	<0.001	0.0022		-
Sum of PFASs (n=28)	µg/L	7 / 4	<0.005	0.034		-
Benzene	µg/L	8 / 0	<1	<1	950	Nil
Toluene	µg/L	8 / 8	2	56		-

Analyte	Units	No. Samples / No. Detects	Minimum Value	Maximum Value	ANZG (2018) Freshwater 95% toxicant DGVs / PFAS NEMP 99% ecological water quality guideline values	No. of Samples Exceeding ANZG (2018) Freshwater 95% toxicant DGVs / PFAS NEMP 99% ecological water quality guideline values
Ethylbenzene	µg/L	8 / 0	<1	<2		-
Xylene (o)	µg/L	8 / 0	<1	<2	350	Nil
Xylene (m & p)	µg/L	8 / 1	<2	3		-
Xylene Total	µg/L	7 / 1	<2	3		-
F1 (C6 - C10)	µg/L	7 / 4	<20	100		-
F1 (C6 - C10) less BTEX	µg/L	8 / 4	<20	50		-
F2 (C10 - C16)	µg/L	7 / 2	<50	280		-
F2 C10 - C16 (minus Naphthalene)	µg/L	7 / 2	<50	280		-
F3 (C16 - C34)	µg/L	7 / 2	<100	200		-
F4 (C34 - C40)	µg/L	7 / 0	<100	<100		-
C10 - C40 (Sum of total)	µg/L	7 / 4	<77	280		-
PAHs (Sum of total)	µg/L	6 / 0	<0.5	<1		-
Chloroform	µg/L	7 / 2	<1	55		-
Dichloromethane	µg/L	5 / 1	<1	3.7		-
OCPs and Herbicides [^]	µg/L	Up to 8 / 0	<0.01	<200	0.004 to 3,700	Nil

[^]Trifluralin, chlordane, DDT, Endrin, g-BHC (Lindane), Heptachlor, Toxaphene, Azinophos methyl, Chlorpyrifos, Diazinon, Dimethoate, Fenitrothion, Malathion, Parathion, Diethylphthalate, Dimethyl phthalate, and Di-n-butyl phthalate

Groundwater samples were collected from SMGW-BH-A315, SMGW-BH-A017, SMGW-BH-A117, SMGW-BH-A117S and SMGW-BH-A310 / SMGW-BH-A311 for chemical analysis.

Based on preliminary screening of the laboratory analytical data available and information reviewed, the following properties were identified as properties where groundwater quality is potentially an issue:

- 34-38 Lansdowne Road, Orchard Hills (potential groundwater impact from use of herbicides and pesticides). TTMP notes that the groundwater analytical results from SMGW-BH-A315 do not indicate that groundwater in the vicinity of this property is impacted with pesticides or herbicides.
- 106-112 Kent Road, Orchard Hills (potential impact to groundwater due to unlicensed disposal to land).
- 94-98 Kent Road, Orchard Hills (chlorinated hydrocarbons, TRH and heavy metals were detected in groundwater).
- Kent Road (SMGW-BH-A315 and SMGW-BH-A310) reported concentrations of PFOS greater than the PFAS NEMP 99% ecological water quality guideline value. Samples from wells SMGW-BH-A017, SMGW-BH-A310S and SMGW-BH-A113 had elevated LORs above the adopted assessment criteria.

Concentrations of PFOS were also detected in four groundwater samples from SMGW-BH-A315 (three samples) and SMGW-BH-A310 (one sample).

6. Preliminary Conceptual Site Model

Based on the findings of previous investigations completed, the Preliminary Conceptual Site Model (CSM) presented in the SAQP (TTMP Ref: SMWSASBT-CPG-SWD-SW001-GE-RPT-040504) summarises the following for the site.

Potential **primary sources** of contamination which have been identified within the site include uncontrolled fill material, contamination associated with general agricultural activities including storage and application of herbicides and pesticides, stockpiled soil, weathering of building materials suspected to contain asbestos, leaks associated with the presence of an AST, a potential sheep/cattle dip and infrastructure related to a workshop.

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 OHS Box and Portal Drive Structure, contamination in groundwater has the potential to be drawn into the Station Box and Portal Drive Structure which requires management during construction. The Station Box and Portal Drive Structure is proposed to be undrained (tanked) which will mitigate groundwater, gas and soil vapour ingress during operation.

Receptors could potentially be exposed to contaminants derived from the disturbance of contaminants present in within soil and groundwater (such as incidental dermal contact/ ingestion of impacted soil/groundwater), through disturbance of hazardous building materials, and through inhalation of gasses/vapours. Ecological receptors may be exposed via direct contact, biota uptake mechanisms, surface water runoff, and infiltration/lateral groundwater migration.

Potential receptors considered applicable during construction works at the OH site include:

- workers involved with the site work.
- persons involved with the cleaning clothing, vehicles and equipment used in redevelopment.
- general public including persons who could be subject to contaminated media generated during redevelopment (e.g. dust).
- ecological receptors including terrestrial and aquatic flora and fauna.
- groundwater and surface water receptors.

Post-completion of the Project, the site will be used as a rail station. Potential receptors which may be exposed to contaminants post-redevelopment include:

- future site users.
- persons involved with maintenance of the rail infrastructure.
- ecological receptors including terrestrial and aquatic flora and fauna (including native and domestic terrestrial fauna).
- groundwater and surface water receptors

7. Data Gaps Identified

Based on the observations made during the site walkover and the information reviewed, the data gaps and uncertainties were considered to comprise:

- Sampling and analysis have been undertaken on both fill and natural soils. However many existing boreholes/test pits for the Orchard Hills Project area are located within road reserve and/or outside of the site boundary. These locations were unlikely to be representative of the areas to be disturbed for the project.
- Concentrations of arsenic (41mg/kg) and chromium (total) (140mg/kg) were detected at concentrations marginally above the CT1 threshold values (40mg/kg and 100mg/kg respectively) from fill samples collected from a borehole (BH-A371) within the property of 88 – 92 Kent Street, adjacent to the Station Box and Portal Drive Structure. Cadmium was detected in a soil sample from one borehole (BH-A370) within the Station Box and Portal Drive Structure footprint at the same property however the concentration (1.2mg/kg) was less than the CT1 threshold value (2mg/kg). These reported concentrations are likely attributable to fill rather than associated with cattle/sheep dips, however it is considered further assessment is warranted to establish whether these concentrations are indicative of a larger issue, or if they are relatively isolated.
- Fibre cement debris suspected to contain asbestos was identified on bare soil within the shed at 94-98 Kent Street. Discarded IT equipment and empty metal 200L drums and other containers were also situated on the soil surface. Further investigation was needed to characterise contamination (if present) at this property.
- A concrete pad with a severed metal pipe protruding from it was noted on the southern side of the large shed at 94-98 Kent Road that could potentially be associated with bulk fuel storage and warrants further investigation.
- Fill material has been observed on the site. The potential exists for uncontrolled fill materials to have been historically placed in portions of the site. Fill material requires further investigation to establish whether contamination in soil is present.
- Several soil stockpiles were observed on the site. An investigation is required to establish the quality of the material in the stockpile and management requirements.
- Stockpiled building materials including fibre cement sheeting suspected of containing asbestos (stored in a small skip bin) were situated against the eastern fence line in the northern portion of the property located at 17-25 Lansdowne Road.
- An AST was identified at 22 - 26 Lansdowne Road. While the AST appeared to be in good condition, it was situated on the grass and was not mounted in a frame, or within bunding. The AST was located in close proximity to sheds and farming equipment however it was not clear whether the AST had been historically located in this area. Further investigation is warranted to assess whether contamination may have resulted from the AST.
- Inspection of the interiors of the majority of the site sheds was not permitted as part of the site walkovers, additional investigation is recommended during sampling to identify whether additional AEC's may be present at the site.
- Observations within two properties (106-112 Kent Road and 114-112 Kent Road) were limited. Long grass or dense vegetation limited site observations at 70-74 Kent Road, 88-92 Kent Road and 100-104 Kent Road. Limited site observations present a potential data gap for consideration in the DSI.
- Further investigation of groundwater is required to establish the quality and flow of groundwater at the site and in the surrounding area to inform groundwater management requirements during construction dewatering.

8. Data Quality Objectives

As stated in Section 18 Appendix B of Schedule B2 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 ('ASC NEPM') (NEPC, 2013), the DQO process is a seven-step iterative planning approach used to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site.

The seven-step DQO process adopted for assessment of soil and groundwater are provided in **Appendix 7**.

9. Adopted Assessment Criteria

9.1. General

To assess the significance of contaminant concentrations, 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:

- Construction workers during site development;
- Future site workers / maintenance workers;
- Site users;
- Neighbouring land users; and
- Ecological receptors.

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

9.2. Soil

9.2.1. Health Based Criteria

The following commercial/industrial guidelines were adopted for the DSI report based on the proposed commercial/industrial end landuse which will be predominately covered in hardstand and have limited soft landscaping:

- NEPM 2013 Health investigations levels (HIL) D
- NEPM 2013 Health screening levels (HSL) Vapour Intrusion 0 to <1m SAND⁸
- NEPM 2013 Management Limits COARSE
- PFAS NEMP 2.0 direct contact.

⁸ Note the HSL for 0 to <1m SAND is the most conservative HSL in the NEPM and was used a Tier 1 screening criteria.

Where positive detection of an analyte has been reported that does not have published health-based assessment criteria from the above documents, alternative guidelines from other, authoritative sources were referred to including but not limited to the US EPA Regional Screening Levels.

9.2.2. 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.

9.2.3. 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).

9.2.4. 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 processes 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.

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).

9.2.5. Waste Classification

Concentrations of COPC were compared to the NSW Environmental Protection Authority (EPA) Waste Classification Guidelines 2014 for the purposes of providing a preliminary waste classification of soil. Waste acceptance criteria specific to landfill facilities for resource recovery was also be considered.

9.2.6. Off-Site Material Reuse

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

9.3. 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 AEPR and those for a future commercial / industrial land use, as shown in Table 3 in Appendix 5.

The client (Sydney Metro) provided information regarding the requirements for material imported to the FS01 site.

According to the Federal material import and reuse procedure provided (Appendix 3), if material to be imported is not already classified as either a “quarried product” or “recycled product”, then it is referred to as an “other source” import material. “Other source import material requires compliance with UMM CS16 which involves the material being tested prior to use to ensure it does not exceed the acceptable limits in:

- NEPM for commercial / industrial land use;
- PFAS National Environmental Management Plan (HEPA, 20018) (NEMP); and
- Schedule 3 of the Airports (Environment Protection) Regulations 1997 (AEPR).

In addition, the following is also specified:

- If PFAS is not detected, the material is determined to pose no risk;
- If PFAS is detected >LOR and <0.14 mg/kg PFOS (indirect ecological criteria), the material is determined to be low risk, though leachability testing (ASLP 0.07 µg/L) is required on 10% of samples; and
- If PFAS is detected at >0.14mg/kg PFOS and or analyte above the AEPR criteria, the material id deemed high risk and cannot be imported without risk assessment and auditor approval.

9.4. Groundwater

The groundwater quality data was compared to appropriate guidelines including, not limited to:

- ANZG (2018) Freshwater Ecosystems guideline for 95% species protection level default guidelines values;
- ANZECC/ ARMCANZ (2000) guideline values for physical and chemical stressors;
- HEPA (2020) PFAS National Environmental Management Plan, Version 2.0; and
- NHMRC (2022) Australian Drinking Water Guidelines 6 2011, Version 3.7⁹.
- NEPM 2013 Health screening levels (HSL) Vapour Intrusion 2 to <4m clay¹⁰

10. Sampling Methodology

10.1. Overview

The sampling locations (i.e. boreholes, hand sample locations and groundwater monitoring wells) at the site are shown in Figures 4A – 4C, **Appendix 1**.

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 5) and data gaps / uncertainties identified (Section 6).

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

- Geotechnical/Hydrogeological intrusive investigation locations being undertaken by TTMP for CPG (Geotechnical Program);
- Contaminated land intrusive locations being undertaken by TTMP for CPG (Contaminated Land Program); and
- This section summarises the sampling undertaken by TTMP to support the preparation of this DSI by TTMP at the site and the construction footprint.

10.2. Soil

In summary the intrusive investigation completed included:

- 72 boreholes to depths ranging between 1 and 29 m bgs
- 16 test pits to 1 to 2 m bgs
- 79 soil grab samples 0 to 0.1 m bgs
- Convert six boreholes into groundwater monitoring wells.

The soil sampling locations are shown in **Figures 4, Figure 4A to 4C, Appendix 1**, and are summarised in Table 10 and Table 11. Borehole logs are presented in **Appendix 6**¹¹.

⁹ Groundwater is not being used for potable water supply at Orchard Hills. The ADWG has been adopted as a conservative screening criteria to infer whether there is a potential risk via the vapour inhalation pathway in the station box where the NEPM HSL would not apply.

¹⁰ The HSLs have been adopted at Tier 1 criteria for assessing potential risks to construction workers in buildings at the site.

¹¹ Soil logs provided in Appendix 6 are presented in draft format.

Table 10: Borehole and Test Pit Investigation Locations

Location	Method	Depth (m bgs)	Location	Completion Date
SBT-BH-1346	Geotechnical Rig	1	52-56 Kent Rd	10/05/2022
SBT-BH-1039	Geotechnical Rig	27	88-92 Kent Rd	8/06/2022
SBT-BH-1038	Geotechnical Rig	26	88-92 Kent Rd	10/06/2022
SBT-BH-1288	Geotechnical Rig	2	94-98 Kent Rd	10/06/2022
SBT-BH-1040	Geotechnical Rig	29	88-92 Kent Rd	15/06/2022
SBT-BH-1287	Geotechnical Rig	2	88-92 Kent Rd	16/06/2022
SBT-BH-1289	Geotechnical Rig	2	88-92 Kent Rd	16/06/2022
SBT-BH-1286	Geotechnical Rig	2	94-98 Kent Rd	16/06/2022
SBT-GW-1042	Geotechnical Rig	9	94-98 Kent Rd	17/06/2022
SBT-BH-1284	Geotechnical Rig	2	94-98 Kent Rd	17/06/2022
SBT-BH-1045	Geotechnical Rig	28	106-112 Kent Rd	21/06/2022
SBT-BH-1046	Geotechnical Rig	28.73	106-112 Kent Rd	22/06/2022
SBT-BH-1036	Geotechnical Rig	28	64-68 Kent Rd	28/06/2022
SBT-BH-1062	Geotechnical Rig	20	28-32 Lansdowne Rd	1/07/2022
SBT-BH-1059	Geotechnical Rig	27	28-32 Lansdowne Rd	6/07/2022
SBT-BH-1060	Geotechnical Rig	20	34-38 Lansdowne Rd	6/07/2022
SBT-BH-1061	Geotechnical Rig	20	28-32 Lansdowne Rd	11/07/2022
SBT-GW-1021	Geotechnical Rig	9	28-32 Lansdowne Rd	14/07/2022
SBT-BH-1054	Geotechnical Rig	29.5	28-32 Lansdowne Rd	18/07/2022
SBT-BH-1056	Geotechnical Rig	29	28-32 Lansdowne Rd	20/07/2022
SBT-BH-1055	Geotechnical Rig	30	28-32 Lansdowne Rd	21/07/2022
SBT-BH-1051	Geotechnical Rig	29	114-122 Kent Rd	26/07/2022
SBT-BH-1035	Geotechnical Rig	29.25	52-56 Kent Rd	2/08/2022
SBT-GW-1037	Geotechnical Rig	25	77-81 Kent Road	4/08/2022
SBT-GW-1043	Geotechnical Rig	21	94-98 Kent Rd	8/08/2022
SBT-BH-1050	Geotechnical Rig	26	114-122 Kent Rd	12/08/2022
SBT-GW-1048	Geotechnical Rig	9	106-112 Kent Rd	15/08/2022
SBT-BH-1281	Excavator	1	106-112 Kent Rd	21/07/2022
SBT-BH-1282	Excavator	0.9	106-112 Kent Rd	21/07/2022
SBT-BH-1304	Excavator	0.8	106-112 Kent Rd	21/07/2022
SBT-BH-1308	Excavator	1	106-112 Kent Rd	21/07/2022
SBT-BH-1277	Excavator	2	114-122 Kent Rd	21/07/2022
SBT-BH-1294	Excavator	1	114-122 Kent Rd	21/07/2022
SBT-BH-1295	Excavator	1	114-122 Kent Rd	21/07/2022
SBT-BH-1296	Excavator	1	114-122 Kent Rd	21/07/2022
SBT-BH-1297	Excavator	1	114-122 Kent Rd	21/07/2022
SBT-BH-1298	Excavator	1	114-122 Kent Rd	21/07/2022
SBT-BH-1339	Excavator	1	114-122 Kent Rd	21/07/2022
SBT-BH-1301	Excavator	1	22-26 Lansdowne Rd	21/07/2022

Location	Method	Depth (m bgs)	Location	Completion Date
SBT-BH-1338	Excavator	1	22-26 Lansdowne Rd	21/07/2022
SBT-BH-1311	Excavator	1	76-80 Kent Rd	1/08/2022
SBT-BH-1302	Hand dug (shovel)	0.3	106-112 Kent Rd	1/08/2022
SBT-BH-1303	Hand dug (shovel)	0.3	106-112 Kent Rd	1/08/2022
SBT-BH-1321	Geoprobe	1	52-56 Kent Rd	9/05/2022
SBT-BH-1322	Geoprobe	1	52-56 Kent Rd	9/05/2022
SBT-BH-1323	Geoprobe	1	52-56 Kent Rd	9/05/2022
SBT-BH-1324	Geoprobe	1	52-56 Kent Rd	9/05/2022
SBT-BH-1325	Geoprobe	1	52-56 Kent Rd	9/05/2022
SBT-BH-1326	Geoprobe	1	52-56 Kent Rd	9/05/2022
SBT-BH-1314	Geoprobe	1	58-62 Kent Rd	9/05/2022
SBT-BH-1317	Geoprobe	1	58-62 Kent Rd	9/05/2022
SBT-BH-1318	Geoprobe	1	58-62 Kent Rd	9/05/2022
SBT-BH-1320	Geoprobe	1	58-62 Kent Rd	9/05/2022
SBT-BH-1328	Geoprobe	1	58-62 Kent Rd	10/05/2022
SBT-BH-1329	Geoprobe	1	58-62 Kent Rd	10/05/2022
SBT-BH-1332	Geoprobe	1	58-62 Kent Rd	9/05/2022
SBT-BH-1333	Geoprobe	1	58-62 Kent Rd	10/05/2022
SBT-BH-1315	Geoprobe	1	64-68 Kent Rd	9/05/2022
SBT-BH-1316	Geoprobe	1	64-68 Kent Rd	10/05/2022
SBT-BH-1319	Geoprobe	1	64-68 Kent Rd	9/05/2022
SBT-BH-1331	Geoprobe	1	64-68 Kent Rd	10/05/2022
SBT-BH-1334	Geoprobe	1	64-68 Kent Rd	10/05/2022
SBT-BH-1313	Geoprobe	1	70-74 Kent Rd	9/05/2022
SBT-BH-1327	Geoprobe	1	70-74 Kent Rd	10/05/2022
SBT-BH-1340	Geoprobe	1	70-74 Kent Rd	9/05/2022
SBT-BH-1292	Geoprobe	1	76-80 Kent Rd	13/05/2022
SBT-BH-1293	Geoprobe	1	76-80 Kent Rd	13/05/2022
SBT-BH-1312	Geoprobe	1	76-80 Kent Rd	13/05/2022
SBT-BH-1330	Geoprobe	1	76-80 Kent Rd	13/05/2022
SBT-BH-1341	Geoprobe	1	76-80 Kent Rd	16/05/2022
SBT-BH-1290	Geoprobe	2	82-86 Kent Rd	16/05/2022
SBT-BH-1291	Geoprobe	1	82-86 Kent Rd	16/05/2022
SBT-BH-1285	Geoprobe	2	94-98 Kent Rd	17/05/2022
SBT-BH-1309	Geoprobe	1	94-98 Kent Rd	18/05/2022
SBT-BH-1283	Geoprobe	2	100-104 Kent Rd	18/05/2022
SBT-BH-1305	Geoprobe	1	100-104 Kent Rd	18/05/2022
SBT-BH-1310	Geoprobe	1	100-104 Kent Rd	18/05/2022
SBT-BH-1306	Geoprobe	1	17-25 Lansdowne Rd	19/05/2022
SBT-BH-1307	Geoprobe	1	17-25 Lansdowne Rd	19/05/2022

Location	Method	Depth (m bgs)	Location	Completion Date
SBT-BH-1276	Geoprobe	2	28-32 Lansdowne Rd	19/05/2022
SBT-BH-1278	Geoprobe	2	28-32 Lansdowne Rd	19/05/2022
SBT-BH-1279	Geoprobe	2	28-32 Lansdowne Rd	19/05/2022
SBT-BH-1280	Geoprobe	2	28-32 Lansdowne Rd	19/05/2022
SBT-BH-1299	Geoprobe	1	34-38 Lansdowne Rd	20/05/2022
SBT-BH-1300	Geoprobe	1	34-38 Lansdowne Rd	20/05/2022
SBT-BH-1335	Geoprobe	1	34-38 Lansdowne Rd	20/05/2022
SBT-BH-1336	Geoprobe	1	34-38 Lansdowne Rd	20/05/2022
SBT-BH-1337	Geoprobe	1	34-38 Lansdowne Rd	20/05/2022

Table 11: Grab Sample Investigation Locations

Location ID			
SBT-BH-1336	SBT-BH-6233	SBT-OHE-3004	SBT-OHE-328
SBT-BH-3012	SBT-BH-6234	SBT-OHE-3005	SBT-OHE-329
SBT-BH-6201	SBT-BH-6235	SBT-OHE-3006	SBT-OHE-330
SBT-BH-6202	SBT-BH-6236	SBT-OHE-3007	SBT-OHE-331
SBT-BH-6203	SBT-BH-6237	SBT-OHE-3008	SBT-OHE-332
SBT-BH-6204	SBT-BH-6238	SBT-OHE-3009	SBT-OHE-334
SBT-BH-6218	SBT-BH-6239	SBT-OHE-3010	SBT-OHE-415
SBT-BH-6219	SBT-BH-OHE-6240	SBT-OHE-3011	SBT-OHE-6200
SBT-BH-6220	SBT-BH-OHE-6241	SBT-OHE-306	SBT-OHE-6216
SBT-BH-6221	SBT-BH-OHE-6243	SBT-OHE-307	SBT-OHE-6252
SBT-BH-6223	SBT-BH-OHE-6244	SBT-OHE-308	SBT-OHE-6253
SBT-BH-6224	SBT-BH-OHE-6245	SBT-OHE-309	SBT-OHE-6254
SBT-BH-6225	SBT-BH-OHE-6247	SBT-OHE-320	SBT-OHE-6255
SBT-BH-6226	SBT-BH-OHE-6248	SBT-OHE-321	SBT-OHE-6256
SBT-BH-6227	SBT-BH-OHE-6249	SBT-OHE-322	SBT-OHE-6257
SBT-BH-6228	SBT-BH-OHE-6250	SBT-OHE-323	SBT-OHE-6258
SBT-BH-6229	SBT-BH-OHE-6251	SBT-OHE-324	SBT-OHE-6259
SBT-BH-6230	SBT-OHE-3001	SBT-OHE-325	SBT-OHE-6260
SBT-BH-6231	SBT-OHE-3002	SBT-OHE-326	SBT-OHE-6261.
SBT-BH-6232	SBT-OHE-3003	SBT-OHE-327	-

The SAQP included the requirement for the completion of 1 to 2 m deep intrusive locations via test pits or boreholes. TTMP's preference was to complete these locations via test pits, however the use of test pits was not permitted at the site by Sydney Metro. Recent identification of protected plants requiring management imposed a further constraint on the use of test pits.

The majority of 1 to 2 m locations were completed prior to the 17 June 2022 through the use of boreholes. For the 1 to 2 m boreholes near surface materials were excavated using hand excavation with a shovel adjacent/over the borehole location to expose fill materials and collect samples for asbestos analysis via AS 4964 (2004) Method for the qualitative identification of asbestos in bulk samples at laboratories who hold methods accredited by the National Association of Testing Authorities (NATA). Close observation was made of the ground surface in the vicinity of each investigation location for the presence of visible potential ACM where practicable (i.e., where not obscured by vegetation).

The remaining shallow sampling locations (1 to 2 m depth) completed after 21 July 2022 were completed with an excavator.

TTMP notes that the contamination borehole locations as shown in the figures supplied within the SAQP correlated with the locations (and numbers) that were drilled as part of the DSI. The location of hand sample locations also broadly correlates with those shown in the SAQP figures, although TTMP notes that additional hand samples were collected, thereby increasing the sample numbers that were originally presented in the SAQP. Due to safety concerns, the hand samples located within the shed at 94-98 Kent Road have not been collected at the time of issuing this report.

Two sample locations were also shown within the workshop located at 100 – 104 Kent Road, following access to the workshop as part of the DSI investigation it was considered that these locations were not required due to the condition of the concrete slab across the workshop floor (i.e. observed to be in a reasonable condition with no cracks/voids apparent, no significant staining and slab thickness exceeding 300 mm based on observations from the external edges).

10.3. Sampling Density

Project Clearance Area

The site construction footprint is shown in **Appendix 3** and has an area of approximately 20 hectares (ha). For a site of this size (in excess of 5 ha) the NSW Sampling Guidelines does not prescribe a recommended minimum 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 characterise soils at the site and to target AEC's that had previously been identified or suspected in the EIS and SAQP. TTMP consider this approach to be consistent with the intent of the Sampling Design Guidelines (NSW EPA, 1995).

Station Box and Dive Structure

The area of the Orchard Hills Station Box was estimated to be approximately 11,000 m² in size, assuming an average thickness of fill¹² or topsoil of 200 mm equates to 2,200 m³. To date 33¹³ samples have been collected from shallow materials within and/or in close proximity to the station box area which equates to an equivalent sampling density of 1 sample per 70 m³ of this material within the station box.

Overall, TTMP considers that the number of test locations completed satisfies the SAQP requirements.

¹² Where present, fill material is typically comprised of reworked natural ground.

¹³ This is inclusive of samples collected by TTMP and Cardno.

10.4. Sampling Methodology

The sampling methodology undertaken is presented in Table 11.

Table 12: Soil Sampling Methodology

Activity	Detail / Comments
Below Ground Service Clearance and ground penetrating radar (GPR)	Dial-Before-You-Dig (DBYD) service plans and information provided by CPG for the site and surrounding area was reviewed prior to commencement of intrusive investigation works. Investigation locations were scanned by a suitably qualified and experienced underground services clearance sub-contractor using an electromagnetic detector to check for buried services.
Excavation method	<p>Intrusive Locations to Target Depth of 1 m and 2 m bgs</p> <p>Intrusive borehole locations to a target depth of 1 or 2 m bgs were carried out using a Geoprobe drill rig with topsoil/fill samples collected using a shovel and push tube into the natural material. Test pits locations to depths up to 1m using an excavator.</p> <p>Intrusive Locations up to a Depth of 28 m bgs</p> <p>Intrusive locations up to a depth of 28 m bgs in the Contaminated Land Program were completed using a drilling rig equipped with solid stem augers and NMLC triple barrel coring tools.</p> <p>Intrusive Locations Completed in Geotechnical Works Program</p> <p>Intrusive locations completed in the Geotechnical Work Program were drilled using geotechnical drill rig and soil samples were collected directly from the auger flight or from the Standard Penetration Test (SPT) split tube samples, or from the coring barrel</p> <p>Hand Sample Locations</p> <p>Hand samples were collected using a trowel to a depth up to 0.2 m bgs.</p>
Sampling Frequency	<p>Soil samples were collected from boreholes and / or hand dug locations and were directly collected from the auger, push tubes, driven split tubes, shovel/trowel. Samples were collected from near surface 0-0.1m bgl, 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. Rock core samples were collected at approximately 2m intervals.</p> <p>Soil samples were collected at approximately 1 m intervals in soil and approximately 2 m intervals in rock in the Geotechnical Works Program unless there was a requirement for geotechnical testing.</p>
Soil Sampling Containers	<p>Soil samples were placed in clean jars supplied by the laboratory and sealed with a Teflon-lined lid. The laboratory provided 500 g sample bags for soil samples for asbestos analysis in fill materials.</p> <p>Soil samples for PFAS analysis were placed in PFAS specific sample containers provided by the laboratory.</p>
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 scientists or geotechnical engineers in accordance with TTMP's relevant Standard Operating Practice (SOP), Field Description of Soils, in Schedule B2 of the ASC NEPM.

Activity	Detail / Comments
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. Calibration certificates are provided in this DSI report (Refer to Appendix 6) . Headspace screening results were recorded on the soil logs.
Sample Handling and Transportation	<p>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.</p> <p>PFAS specific 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 teflon contamination for PFAS.</p>
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 Section 8.1.

Samples were analysed by Eurofins Pty Ltd and ALS Global Pty Ltd, with both laboratories satisfying ISO 17025 General requirements for the competence of testing and calibration laboratories and using National Association of Testing Authorities (NATA) accredited methods.

Soil samples were analysed for a range of potential COPC as summarised in the following table and at the rates presented in the following section.

Table 13: Soil Laboratory Analysis

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) and Semi-Volatile Compounds (SVOC)	Where visual/olfactory signs of hydrocarbon are present	Where visual/olfactory signs of hydrocarbon are present

Analyte	Fill	Natural
PFAS Extended Suite	Representative samples	Representative samples
Polychlorinated Byphenyls (PCBs)	Representative samples	Where visual/olfactory signs of hydrocarbon are present
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 buffer were also undertaken on selected 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, PAHs and metals.

Representative samples were also tested for Total Organic Carbon (TOC) to facilitate risk assessment

10.5. Groundwater

At the time this version of this report was prepared, the installation of monitoring wells and groundwater sampling activities proposed in the SAQP is ongoing. Groundwater monitoring well locations are shown in Figure 4 and Figure 4A, Figure 4B and Figure 4C in Appendix 1.

Table 14 provides a summary of the groundwater installations which have been installed, installed but in a different location to that proposed in the SAQP due to site access constraints, or have been substituted with an existing monitoring well, and/or is to be installed pending resolution of land access and/or other site access constraints such as buried services.

It is noted that groundwater sampling has not been undertaken from the following wells:

- SBT-GW-1043
- SBT-GW-1048
- SBT-GW-1063
- SBT-GW-1064
- SBT-GW-1037

Table 15 summarises the monitoring wells installed in previous investigations which have been sampled for the DSI at the time of writing.



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The sampling methodology is summarised in Table 15, and laboratory analytical data is summarised in Table 16.

Table 14: Summary of Groundwater Monitoring Wells Installed for the DSI

Location ID	Rationale	Ground Level (m AHD)	Proposed Well Installation (Screened Interval m AHD / m bgs)	Well Screen Interval		Comment
				m bgs	m AHD	
SBT-GW-1042	Groundwater Dependent Ecosystem (GDE) monitoring (continuous) and six monthly water quality monitoring downgradient of potential former cattle dip on alignment at Orchard Hills station, and provide water quality data for this area.	Note 1	32 to 38 m AHD 2 to 8 m bgs	2 to 8	Note 1	Monitoring well constructed near and down-gradient of AEC 20.
SBT-GW-1043	Monitoring well in the vicinity of AEC 20.	39.5	41 to 47	2 to 8	35.5 to 31.5	Monitoring well constructed near and down-gradient of AEC 20.
SBT-GW-1048	Monitoring well. Downgradient of AEC 25	Note 1	32 to 38 m AHD 2 to 8 m bgs	2 to 8	Note 1	
SBT-GW-1063	Level and groundwater EC monitoring to assess potential impact to GDE to east	Note 3	23 to 32 2 to 8 m bgs	Note 3	Note 3	Note 3
SBT-GW-1064	Level and groundwater EC monitoring to assess potential impact to GDE to east	-	30 to 42 2 to 14 m bgs	-	-	Location removed due to land access constraints
SBT-GW-1037	Level and groundwater EC monitoring	39.6	Location not included in SAQP	2 to 8	Note 1	-

Notes:

- 1) Survey of location is to be completed.
- 2) Ground elevation based on existing elevation data; ground elevation to be confirmed following completion of survey.
- 3) Location to be completed and is subject to site access. Site access and/or other constraint may prevent completion of the proposed location.

Table 15: Existing Groundwater Monitoring Wells Sampled for the DSI

Location ID	Installation		Comment
	m bgs	m AHD	
SMGW-BH-A017	15 to 24	19.6 to 28.6	Note 1
SMGW-BH-A113	20 to 29	14.4 to 23	Note 1
SMGW-BH-A117	10 to 16	22.9 to 28.9	Note 1
SMGW-BH-A117S	2.2 to 4.2	34.58 to 36.58	Note 1
SMGW-BH-B310	7 to 14	25.9 to 32.9	Note 1
SMGW-BH-B310s	3 to 6	33.3 to 36.3	Note 1
SMGW-BH-A372	18 to 24	22.8 to 38.8	Existing monitoring well located on the southern side of AEC20
SMGW-BH-A372s	4 to 8	32.7 to 36.7	Existing monitoring well located on the southern side of AEC20

Notes:

- 1) An attempt to locate the monitoring wells by TTMP and CPBG was undertaken in July 2022. The monitoring wells could not be located.

Table 16: Groundwater Installation and Sampling Procedure

Activity	Detail / Comments
Well Installation	<p>The installation of the monitoring wells was completed in general accordance with Coffey'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:</p> <ul style="list-style-type: none"> • 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. <p>Wells were developed using a dedicated disposable bailer (or pump) to remove excess 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.</p> <p>The relative elevation of the top of monitoring well casing 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. At the time of preparing this report one monitoring well had been surveyed. The remaining monitoring wells are to be surveyed by CPBG.</p> <p>Representative samples of materials used in well construction (bentonite, sand, concrete) and uPVC casing (as a rinsate sample) were collected for laboratory analysis. <i>The results of this analysis will be reported separately.</i></p>
Sampling Methods	<p>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 hydrasleeves were used in all monitoring wells.</p> <p>Field parameters (pH, electrical conductivity (EC), redox potential (Eh), dissolved oxygen (DO) and temperature) were recorded for each intake depth.</p> <p>Samples proposed for dissolved metals analysis were filtered in the field using 0.45um disposable filters.</p> <p>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).</p> <p>Groundwater samples collected also included QA/QC samples as detailed in Section 8.7 and Appendix 9.</p> <p>Sampling field records include the following:</p> <ul style="list-style-type: none"> • Time and date <p>Unique sample location identifier</p>

Activity	Detail / Comments
	<ul style="list-style-type: none"> • Weather conditions • Water colour, turbidity, odour, present of surface layer • Other observations as considered relevant for the location <p>Field measurements include included:</p> <ul style="list-style-type: none"> • Gauged water depth prior to sampling • Water Quality parameters measured using a calibrated water quality meter: pH, ORP, EC, DO and temperature • Depth of water sample

Table 17: 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 Byphenyls (PCBs)	All samples
Cation and anions	All samples
Nutrients	All samples

10.6. Decontamination procedures

Drill rigs and drill equipment were inspected to confirm that the equipment had been cleaned prior to the commencement of drilling. A rinsate sample was collected from the drilling equipment (e.g. push tube liner, auger head or coring barrel) immediately 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, hand shovel, IP and WQM) 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 or push tube liners were disposed of appropriately following each use. This equipment was not re-used and therefore did not require decontamination.
- Care was taken at all times to handle the cleaned equipment and samples only with clean disposable nitrile gloves. Equipment was stored after decontamination and prior to use, in clean polypropylene bags, to ensure the cleaned equipment did not come into contact with anything that may introduce contamination to the equipment.
- Care was taken to ensure that the decontamination process did not contribute to the spread of contamination of the site, stormwater or off-site locations.

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

- For equipment used to sample solids, all 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 in a second bucket containing deionised water.
- The equipment was spray rinsed with potable water.

10.7. Management of excavated materials

Excavated soil from boreholes less than 6 m and test pits were 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.

10.8. Drilling Additives

Drilling additives (e.g. muds and lubricants) proposed to be used by drillers were reviewed to confirm that the additives used were unlikely to result in false positives. Representative samples of drilling additives used was undertaken and analysed for the potential contaminants tested in this DSI.

11. Quality Assurance / Quality Control Assessment

A quality assurance / quality control (QA/QC) assessment was undertaken to achieve predetermined data quality objectives (DQOs) and to demonstrate accuracy, precision, comparability, representativeness and completeness of the data generated and the procedures for assessing the DQOs are met. A standalone QA/QC Assessment is presented within **Appendix 8**.

The results of the QA/QC Assessment conclude that the data is complete, comparable, representative, precise, accurate and directly usable for the purposes of this assessment.

12. Results

Intrusive investigation locations from previous investigations and the investigation completed by TTMP are shown in Figure 4, Figure 4A, Figure 4B and Figure 4C, **Appendix 1**.

Logs on the intrusive investigations locations completed by TTMP are provided in **Appendix 6**. A combined tabulated result table from the TTMP investigation is provided in **Appendix 7**.

Laboratory reports are provided in **Appendix 11**.

12.1. Ground Conditions

Ground conditions observed within and/or in the vicinity of each AEC is summarised in Table 18. The following provides a summary of the ground condition observed within the site.

The ground conditions encountered with the site generally comprised topsoil extending to depths ranging from 0.1 m and 0.35 m comprised of clay, silty clay and sandy clay topsoil / fill with roots and was generally very damp or saturated. Topsoil was underlain by natural clay, silty clay and silt to depths ranging between 4.2 m and 8.8 m, overlying siltstone, sandstone, interlaminated siltstone and sandstone.

Fill materials were typically not encountered within the site. Where present, such materials were typically consistent with reworked natural materials. This shallow lithology is considered consistent with the rural residential land use of the site where extensive land filling is unlikely to have occurred.

An exception to this was in the vicinity of AEC 25. The description of the fill materials was similar to natural ground deposits in the area however anthropogenic materials observed including ash, glass, tile and brick. The thickness of fill materials was approximately 0.3 to 0.5 m in this area.

While suspected ACM14 was observed on the soil surface within the shed at 94 – 98 Kent Road, visual / olfactory signs of suspected contamination and ACM were generally not observed within the soil profile during the intrusive investigation works.

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

¹⁴ The suspected ACM have not yet been sampled due to concerns relating to the safe entry into the structure to complete sampling within.

Table 18: Summary of observed ground conditions at AECs sites

AEC ID	Boreholes	Fill	Natural Ground (upper ground deposits to < 1 to 2 m bgs)
11	SBT-BH-1322 SBT-BH-1323 SBT-BH-1035	Depth of Fill: No fill observed with exception of approximately 0.05 m at SBT-BH-1035. No Anthropogenic materials noted with the exception of brick fragments in SBT-BH-1035. No visual/olfactory signs of contamination or ACM were observed.	Natural ground composed of Topsoil (Gravelly Sandy CLAY) underlain Sandy CLAY and/or CLAY
12	SBT-BH-1329 SBT-BH-1328 SBT-BH-1346	SBT-BH-1346: fill materials of 0.3 m thickness and comprised of gravelly silty SAND with brick and tile fragments No fill materials reported in SBT-BH-1329 and SBT-BH-1328. No visual/olfactory signs of contamination or ACM were observed however brick fragments can be a potential indicator of demolition materials with the potential for ACM.	Natural ground composed of Topsoil (Gravelly Sandy CLAY) underlain Sandy CLAY and/or CLAY
13	SBT-BH-1318 SBT-BH-1325	No boreholes directly within the footprint of AEC. Based on site observations on intrusive investigation for AEC 11 and boreholes SBT-BH-1318 and SBT-BH-1325 (which do not report fill) no fill materials are expected within this AEC.	Natural ground composed of Topsoil (Gravelly Sandy CLAY) underlain Sandy CLAY and/or CLAY (based on boreholes in AEC 11, SBT-BH-1318 and SBT-BH-1325).
14	SBT-BH-1317 SBT-BH-1314 SBT-BH-1320 SBT-BH-1332	Depth of Fill: No fill observed No Anthropogenic materials noted. No visual/olfactory signs of contamination or ACM were observed.	Natural ground composed of Topsoil (Gravelly Sandy CLAY) underlain sandy CLAY, Gravelly Sandy CLAY and/or CLAY
15	SBT-BH-1315 SBT-BH-1319 SBT-BH-1320 SBT-BH-1316 SBT-BH-1331 SBT-BH-1334	Depth of Fill: No fill observed No Anthropogenic materials noted. No visual/olfactory signs of contamination or ACM were observed.	Natural ground composed of Topsoil (Gravelly Sandy CLAY) underlain Sandy CLAY and/or CLAY
16	SBT-BH-1341	Hand samples completed directly within AEC. Based on the boreholes SBT-BH-1341 (which does not report fill) no fill materials are expected within this AEC. Topsoil materials were observed in hand samples.	Natural ground composed of Sandy CLAY and CLAY, and underlain by Shale from approximately 0.9 m bgs

AEC ID	Boreholes	Fill	Natural Ground (upper ground deposits to < 1 to 2 m bgs)
17	SBT-BH-1312 SBT-BH-1292 SBT-GW-1037	Hand samples completed directly within AEC. Based on the boreholes SBT-BH-1312, SBT-BH-1292 and SBT-GW-1037 (which do not report fill) no fill materials are expected within this AEC. Asphaltic concrete at SBT-BH-1312 was approximately 100 mm in thickness. Topsoil materials were observed in hand samples.	Natural ground composed of CLAY and Sandy CLAY
18	SBT-BH-1292 SBT-BH-1293 SBT-BH-1330	Hand samples completed directly within AEC. Based on ground levels and SBT-BH-1292, SBT-BH-1293 and SBT-BH-1330 (which do not report fill) no fill materials are expected within this AEC. Topsoil materials were observed in hand samples.	Natural ground composed of CLAY and Sandy CLAY
19	SBT-BH-1291 SBT-BH-1290 SBT-BH-1287 SBT-BH-1289	Depth of Fill: No fill observed No Anthropogenic materials noted. No visual/olfactory signs of contamination or ACM were observed. Topsoil materials were observed in hand samples.	Natural ground composed of Gravelly Sandy CLAY, CLAY and Sandy CLAY
20	SBT-BH-1288 SBT-BH-1285 SBT-GW-1042 SMGW-BH-A372S SMGW-BH-A372	Depth of Fill: No fill observed	Natural ground composed of Sandy CLAY, CLAY and Gravelly CLAY
21	SBT-BH-1286 SBT-BH-1309	Hand samples completed directly within AEC. Based on ground levels and SBT-BH-1286 and SBT-BH-1309 (which do not report fill) no fill materials are expected within this AEC. Topsoil materials were observed in hand samples.	Natural ground composed of Silty CLAY, Sandy CLAY and CLAY.
22	SBT-BH-1309 SBT-BH-1310	Hand samples completed directly within AEC. Based on ground levels and SBT-BH-1309 and SBT-BH-1310 (which do not report fill) no fill materials are expected within this AEC. Topsoil materials were observed in hand samples.	Natural ground composed of Sandy CLAY and CLAY
23	SBT-BH-1310 SBT-BH-1046 SBT-BH-1308	Hand samples completed close to AEC. Based on ground levels and SBT-BH-1310 (which does not report fill) no fill materials are expected within this AEC. The field logs for SBT-BH-1406 has reported fill to 1.3 m and SBT-BH-1308	Natural ground composed of Sandy CLAY, CLAY and Silty CLAY.

AEC ID	Boreholes	Fill	Natural Ground (upper ground deposits to < 1 to 2 m bgs)
		however the ground deposits reported are consistent with other observations of natural ground deposits in the area.	
24	SBT-BH-1283	SBT-BH-1283 is located west of the AEC. Based on ground levels and ground deposits at this location and in nearby areas fill materials are not expected to occur. Fill materials were not observed in SBT-BH-1283.	Based on ground deposits in nearby areas natural materials are expected to be comprise of Sandy CLAY, CLAY and/or Silty CLAY.
25	SBT-BH-1045 SBT-BH-1305 SBT-BH-1282 SBT-BH-1302 SBT-BH-1303 SBT-BH-1304 SBT-OHE-306 SBT-OHE-307 SBT-OHE-308 SBT-OHE-309 SBT-OHE-310 SBT-OHE-311	<p>Fill materials have been observed within and in the vicinity of AEC 25. The description of the fill materials are similar to natural ground deposits in the area however anthropogenic materials have been observed including ash, glass, tile and brick. Further information on materials reported include:</p> <p>SBT-BH-1045: fill materials of 0.5 m thickness and comprised of silty gravels and silty sands and no anthropogenic materials observed.</p> <p>SBT-BH-1282: fill material of 0.3 m thickness comprised of silty CLAY with trace ash and glass fragment.</p> <p>SBT-BH-1304: fill material of 0.5 m thickness comprised of gravelly sandy CLAY with tile and brick fragments</p> <p>SBT-OHE-309, SBT-OHE-31, SBT-OHE-311: fill material (topsoil) reported as gravelly sandy CLAY with no anthropogenic materials observed.</p> <p>No fill materials reported in SBT-BH-1305, SBT-OHE-306, SBT-OHE-307, SBT-OHE-308, SBT-BH-1303, SBT-BH-1302</p>	Natural ground comprised of Sandy CLAY, CLAY and/or Silty CLAY.
26	SBT-BH-1294 SBT-BH-1295 SBT-BH-1296 SBT-BH-1297 SBT-BH-1298 West of AEC	<p>Depth of Fill: No fill observed</p> <p>No Anthropogenic materials noted. No visual/olfactory signs of contamination or ACM were observed.</p>	Natural ground comprised of Sandy CLAY, CLAY and/or Silty CLAY.

AEC ID	Boreholes	Fill	Natural Ground (upper ground deposits to < 1 to 2 m bgs)
	SBT-BH-1277		
27	SBT-BH-1339	Depth of Fill: No fill observed No Anthropogenic materials noted. No visual/olfactory signs of contamination or ACM were observed.	Natural ground comprised of Sandy CLAY, CLAY and/or Silty CLAY.
28	SBT-BH-1306 SBT-BH-1307 SBT-OHE-6215	SBT-OHE-6215: fill materials of 0.5 m thickness and comprised of gravelly sandy CLAY with brick fragments No fill materials reported in SBT-BH-1306 and SBT-BH-1307	Gravelly CLAY
29	SBT-BH-1336 SBT-BH-1337 SBT-BH-1299	Depth of Fill: No fill observed Potential ACM was observed in this AEC and needs to be removed as part of site demolition work.	Gravelly CLAY, CLAY
30	North of AEC SBT-BH-1276 SBT-BH-6217 SBT-BH-1061 SBT-BH-1062	AEC 30 is located outside the construction footprint. Fill materials were not reported in SBT-BH-1061 and SBT-BH-1062. However fill materials of 0.1 m thickness were observed in SBT-BH-6217 and comprised of gravelly sandy CLAY with brick and tile fragments.	Inferred to be CLAY based on nearby boreholes.

12.2. Soil Analytical Results

Result Tables are presented in **Appendix 7**. The following provides a high level summary of the analytical results in comparison to the adopted assessment criteria. Table 19 in Section 12.4 provides a summary of the analytical results for each AEC site.

12.2.1. Human Health

With the exception of concentrations of Benzene in sample SBT-BH-1336, concentrations of CoPC in samples were less than the adopted human health criteria.

The concentrations of benzene were identified in sample SBT-BH-1336 0-0.1 m (4.8 mg/kg) that marginally exceeded the commercial/industrial HSL for sandy soils (3 mg/kg). TRH/BTEX were not detected in the sample SBT-BH-1336_ 0.5-0.6 m bgs in May 2022.

Confirmatory sampling at and in the vicinity of SBT-BH-1336 was undertaken on the 12/8/2022 including resampling from this location and a further 10 locations surrounding this site (refer to Figure 4B, and AEC29 in Table 19). All TRH/BTEXN, VOC/SVOC analytes were not detected in the samples analysed. No visual/olfactory signs of contamination were observed. This additional data indicates that the Benzene detected at SBT-BH-1336 0-0.1 m was localised.

TTMP also notes that concentrations of OPP's (Diazinon, Methyl parathion and Mevinphos (Phosdrin)) were reported at concentrations marginally above the laboratory LOR in sample SBT-BH-1291_0.1-0.2. The concentrations of diazinon (0.4 mg/kg), and methyl parathion (0.4mg/kg) were considerably less the adopted guidelines¹⁵. While the US EPA does not criteria for Mevinphos, TTMP notes that the concentrations of 1.1 mg/kg only marginally exceed the LOR of 0.2mg/kg.

Concentrations of Endrin Aldehyde (0.13 mg/kg) sample QC55-DW-19052022 (primary sample SBT-BH-1307) were identified for which no NEPM or US EPA criteria exist. As such, reference was made to the laboratory LOR of 0.05 mg/kg in the absence of criteria and note that the concentration of Endrin Aldehyde marginally exceeds the level of detection.

TTMP note that pesticides were not detected in any other sample indicating the site had not been subject to broadscale application of such chemicals.

12.2.2. Asbestos

Asbestos was not identified at concentrations exceeding the laboratory limit of reporting of 0.1g/kg in any of the soil samples that were analysed.

Positive detection of asbestos (chrysotile as asbestos fines / fibrous asbestos) was reported in SBT-BH-1295_0.10-0.2. No fill and/or visual signs of ACM was observed at this location in soil material. SBT-BH-1295 is located immediately adjacent to a shed which is to be removed during preparatory works.

12.2.3. Ecological

With the exception of concentrations of copper and zinc in four samples concentrations of CoPC were less than the adopted ecological criteria.

Concentrations of copper were identified in samples SBT-BH-1045_0.10-0.2 and SBT-BH-6218_0.0-0.1 (64mg/kg and 58mg/kg) which marginally exceeded the site-specific EIL.

Concentrations of zinc were identified in samples SBT-BH-1309_0.0-0.1 and SBT-BH-6236_0.0-0.1 (520 mg/kg and 890 mg/kg respectively) which exceeded the site-specific EIL of 500 mg/kg.

Given the intended commercial/industrial use of the property following redevelopment and limited access to soil, TTMP considers the risk to ecological receptors as low.

¹⁵ The adopted guidelines included Canadian or USEPA Regional Screening Levels (refer to Section 12.3).

12.3. Discussion of Data Gaps and Previously Identified AEC's

TTMP reissued a Technical Memorandum relating to the contamination status on 24 August 2022 (TTMP Ref: SMWSASBT-CPG-SWD-SW000-GE-MEM-040554). The purpose of the memo was to provide an outline of the findings to date with regards to the contamination risk rating of the site and make recommendations for preparatory works.

The EIS outlined 20 AEC's (numbered 11 to 30) within the site which had been assigned risk ratings of either 'medium' or 'high'. Following completion of TTMP's fieldwork program and receipt of laboratory analytical results, TTMP proposed downgrading the risk rating of AEC's 11 to 30 to Low Risk of contamination to the project given that no gross¹⁶ contamination was identified within these areas of the site, as such these specific AEC's have not been considered in the updated CSM.

Further to this, based on the findings of the investigation including the laboratory results, TTMP also did not identify additional AEC's, outside of those highlighted in the EIS that would warrant a risk rating of 'Medium' or 'High'.

Table 19 outlines the AEC and the rationale for reducing the applicable risk ratings below.

¹⁶ Gross contamination is considered to be an area of wide-spread contamination which exceeds relevant commercial/industrial health guidelines triggers a requirement for remediation to mitigate contamination impacts that are over and above the standard construction practices to make the site suitable for commercial/industrial use.

Table 19: Summary of Analytica Data for AEC Sites

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
11	<p>Potential workshops, AST, significant (>100m²) unlicensed waste disposal to land or storage to land and use of hazardous building material.</p> <p>Chemicals of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-1321</p> <p>SBT-BH-1322</p> <p>SBT-BH-1323</p> <p>SBT-BH-1324</p> <p>SBT-BH-1325</p> <p>SBT-BH-1326</p> <p>SBT-BH-1035</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial health guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. Low concentrations of metals Non-detects for organics (TRH/BTEXN, PAH/Phenols, OCPs/OPPs) with exception of SBT-BH-1322_0.1-0.2 which reported a low TRH concentration in the C29-C36 fraction, and in SBT-BH-1035 in the F3 C16-C34 and F4 C34-C40 fractions. TRH concentrations were below the commercial/industrial guidelines. Minor detects of xylene and PAHs were reported in several of the deeper samples from SBT-BH-1035 and will be discussed further in the DSI report. Trace PFAS in soil materials 0.1-0.2 m bgs, and non-detect for PFAS in soil materials 0.5-0.6 m bgs. 	<ul style="list-style-type: none"> EIS rated AEC 11 as high risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). EIS consider risk to groundwater and surface water receptors as low risk. The DSI investigation has not identified a potential source of contamination of concern in soil in AEC 11, and no AST was observed. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC.
12	<p>Dumped Waste Area</p> <p>Chemicals of potential concern include heavy metals, TRH, PAH & asbestos.</p>	<p>SBT-BH-1346</p> <p>SBT-BH-1329</p> <p>SBT-BH-1328</p> <p>SBT-BH-1326</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial health guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. Low concentrations of metals and non-detects for TRH, BTEXN, PAH/Phenols, OCPs/OPPs. Trace PFAS in soil materials 0.1-0.2 m bgs. 	<ul style="list-style-type: none"> EIS rated AEC 12 as high risk based on perceived potential significance of source of contamination and potential impact to receptors. DSI fieldwork indicated that vast majority of the potential sources had been removed and what little anthropogenic material that remained on the surface was comprised of sporadic pieces of metal and plastic materials. Anthropogenic material was not identified within near surface soil.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
				<ul style="list-style-type: none"> It is also considered that if material, such as hazardous building material are identified within soil it can likely be managed under an unexpected finds protocol and managed appropriately. No material suspected of containing asbestos was identified Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC. It is also considered that if material, such as hazardous building material are identified within soil it can likely be managed under an unexpected finds protocol and managed appropriately.
13	<p>Potential hazardous building materials.</p> <p>Chemical of potential concern include heavy metals (lead-based paint), & asbestos.</p>	<p>SBT-BH-1318</p> <p>SBT-BH-1321</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial health guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface Low concentrations of metals and non-detects for TRH, BTEXN, PAH/Phenols, OCPs/OPPs. Trace PFAS in soil materials 0.1-0.2 m bgs. 	<ul style="list-style-type: none"> EIS rated AEC 13 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in sound condition. Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
				<ul style="list-style-type: none"> TTC consider the AEC can be re-classified as Low Risk on the basis that the house appeared to be in sound condition, not debris suspected of containing hazardous building materials was observed on the ground surface in close proximity to the house and hazardous building materials within the built structure should not be considered contamination.
14	<p>Potential hazardous building materials.</p> <p>Chemical of potential concern include heavy metals (lead-based paint), & asbestos.</p>	<p>SBT-BH-1306</p> <p>SBT-BH-1317</p> <p>SBT-BH-1318</p> <p>SBT-BH-1314</p> <p>SBT-BH-1320</p> <p>SBT-BH-1332</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. Low concentration of TRH in the C29-C36 fraction reported in one sample (SBT-BH-1320_0.1-0.2) and was below the adopted commercial/industrial guidelines. TRH non-detect in all other samples. Non-detects for BTEXN, PAH/Phenols, OCPs/OPPs and other VOC/SVOCs in all samples. Trace PFAS in soil materials 0.1-0.2 m bgs, and 0.5-0.6 m bgs in one sample. Non-detect for PFAS in samples from 0.6 m bgs to 14 m bgs. Low concentrations of metals including lead. 	<ul style="list-style-type: none"> EIS rated AEC 14 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in sound condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that the house appeared to be in sound condition, not debris suspected of containing hazardous building materials was observed on the ground surface in close proximity to the house and hazardous building materials within the built structure should not be considered contamination.
15	<p>Use of herbicides and pesticides on former cultivated land and use of</p>	<p>SBT-BH-1313</p> <p>SBT-BH-1315</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. 	<ul style="list-style-type: none"> EIS rated AEC 15 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors).

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	<p>hazardous building materials.</p> <p>Chemicals of potential concern include heavy metals, pesticides/herbicides and asbestos.</p>	<p>SBT-BH-1316</p> <p>SBT-BH-1319</p> <p>SBT-BH-1327</p> <p>SBT-BH-1331</p> <p>SBT-BH-1334</p> <p>SBT-BH-1340</p>	<ul style="list-style-type: none"> Low concentration of TRH in the C29-C36 fraction reported in one sample (SBT-BH-1340_0.1-0.2) and was below the adopted commercial/industrial guidelines. TRH non-detect in all other samples. Non-detects for BTEXN, PAH/Phenols, OCPs/OPPs and other VOC/SVOCs in all samples. Low concentrations of metals including lead. Trace PFAS in soil materials 0.1-0.2 m bgs, and non-detect for PFAS in soil materials 0.5-0.6 m bgs. 	<ul style="list-style-type: none"> The DSI investigation has not identified a potential source of contamination in soil in AEC 15. The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in sound condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC.
16	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy</p>	<p>SBT-BH-1341</p> <p>SBT-BH-6225</p> <p>SBT-BH-6226</p> <p>SBT-BH-6227</p> <p>South west of AEC:</p> <p>SBT-OHE-305</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. TRH reported in two samples (SBT-BH-6226_0.0-0.1 and SBT-BH-6227_0.0-0.1) in the F2 C10-C16, F3 C16-C34 and/or F4 C34-C40 fractions with concentrations below the adopted commercial/industrial guidelines. An additional surface sampling point was collected on the 29/7/22 (SBT-OHE-305) which is located adjacent to the water storage dam. All analytes were below the adopted commercial/industrial guidelines and non- 	<ul style="list-style-type: none"> EIS rated AEC 16 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). The DSI investigation has not identified a potential minor source of TRH contamination in soil at SBT-BH-6226 and SBT-BH-6227 which does not require remediation based on the analytical data. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	metals, TRH, & asbestos.		<p>detects were reported for TRH/BTEX, PAH/Phenols, OCP/OPPs and PFAS analytes.</p> <ul style="list-style-type: none"> • TRH not detected in other samples. • Low concentrations of metals and non-detects for BTEXN, PAH/Phenols, OCPs/OPPs. • Trace PFAS in soil 0.1-0.2 m bgs. 	<ul style="list-style-type: none"> • Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. • TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination of concern has been identified within the AEC.
17	<p>Potential workshop, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-1312</p> <p>SBT-BH-1292</p> <p>SBT-BH-6218</p> <p>SBT-BH-6219</p> <p>SBT-BH-6220</p> <p>SBT-OHE-6200</p> <p>North- west of AEC:</p> <p>SBT-VWP-1037</p>	<ul style="list-style-type: none"> • All analytes below commercial/industrial guidelines • No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. • Sample SBT-BH-1312_ 0.0-0.1 has reported detectable concentrations of TRH/PAH associated with the asphalt. No visual/olfactory signs of hydrocarbon contamination were observed at this sample locations. BTEXN and Phenols were not detected in this sample. • TRH reported in two samples (SBT-BH-6218_ 0.0-0.1 and SBT-OHE-6200) in the C10-C14, F3 C16-C34 and/or F4 C34-C40 fractions with concentrations below the adopted commercial/industrial guidelines. BTEX, PAH/Phenols were not detected in these samples. • TRH, PAH/Phenols and BTEXN not detected in other samples. • Low concentrations of metals and non-detects for OCPs/OPPs. • Trace PFAS in soil 0.1-0.2 m bgs. 	<ul style="list-style-type: none"> • EIS rated AEC 17 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). • The DSI investigation has not identified a potential minor source of TRH contamination in soil at SBT-BH-6218, SBT-OHE-6200, and SBT-BH-6226 which does not require remediation based on the analytical data. • Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. • Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. • Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. • TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination of concern has been identified within the AEC.
18	Potential workshops, minor waste disposal, use or storage of	<p>SBT-BH-1293</p> <p>SBT-BH-1330</p> <p>SBT-BH-6221</p>	<ul style="list-style-type: none"> • All analytes below commercial/industrial health guidelines • No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. 	<ul style="list-style-type: none"> • EIS rated AEC 18 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). • The DSI investigation has not identified a potential source of contamination in soil in AEC 18

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	<p>hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-6224</p> <p>SBT-BH-6223</p> <p>SBT-BH-6222</p>	<ul style="list-style-type: none"> Low concentrations of metals and non-detects for organics TRH/BTEXN, PAH/Phenols, OCPs/OPPs Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC.
19	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-1291</p> <p>SBT-BH-6228</p> <p>SBT-BH-6229</p> <p>SBT-BH-6230</p> <p>West of AEC</p> <p>SBT-BH-1290</p> <p>South of AEC:</p> <p>SBT-BH-1287</p> <p>SBT-BH-1289</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial health guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. Low concentration of xylene in sample SBT-BH-1289_0.0-0.1 and was below adopted commercial/industrial guidelines. TRH, PAH/Phenols were not detected in sample. Sample is located in a depression/drainage line. Low concentration of TRH C10-C14 in sample SBT-BH-1287_0.0-0.1 and was below adopted commercial/industrial guidelines. BTEXN, PAH/Phenols were not detected in sample. Sample is located in a depression/drainage line. TRH in the F2 C10-C16, F3 C16-C34 and/or F4 C34-C40 fractions reported in samples SBT-BH-1291_0.1-0.2, SBT-BH-6228_0.0-0.1, SBT-BH-6229_0.0-0.1 and SBT-BH-6230_0.0-0.1 with concentrations below the adopted commercial/industrial land guidelines. BTEXN, PAH/Phenols were not detected in these samples. 	<ul style="list-style-type: none"> EIS rated AEC 17 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). The DSI investigation has identified a potential minor source of TRH contamination in soil at SBT-BH-1289, SBT-BH-1287, SBT-BH-1291, SBT-BH-6228, SBT-BH-6229 and SBT-BH-1289 which does not require remediation based on the analytical data. The DSI investigation has identified a localised area of soil containing OPP at concentrations that were below published health investigation levels, and hence does not require remediation. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
			<ul style="list-style-type: none"> • Low concentration of TRH in the C29-C36 fraction reported in sample SBT-BH-1290_0.1-0.2 and was below the adopted. commercial/industrial guideline. Non-detects for BTEXN, PAH/Phenols in this sample. • TRH not detected in other samples tested from this AEC. • Low concentrations of metals • Non-detects for OCPs/OPPs with exception of sample SBT-BH-1291_0.1-0.2 which had low concentrations of the OPPs Diazinon, Methyl parathion and Mevinphos (Phosdrin). There are no NEPM guidelines for these compounds. The concentration of Diazinon (0.4 mg/kg) was below Canadian guidelines¹⁷, and Methyl parathion is below USEPA Regional Screening Criteria¹⁸. There is no applicable guideline for Mevinphos (Phosdrin) OPPs were not detected in other samples collected from this AEC, or at this location at 0.5 mbgs (next sample depth interval). On this basis, it is assessed the OPP impact is likely to be limited in lateral and vertical extent. • Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> • TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination of concern has been identified within the AEC.
20	Potential cattle or sheep dip, large shed with associated stressed vegetation	SBT-BH-1039 SBT-BH-1288 SBT-BH-1038	<ul style="list-style-type: none"> • All analytes below commercial/industrial health guidelines • Due to safety concerns samples were not collected from inside the shed; these samples will be collected post demolition. 	<ul style="list-style-type: none"> • EIS rated AEC 20 as high risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors).

¹⁷ The British Columbia *Contaminated Site Regulation 2019* soil guideline for commercial/industrial land for diazinon is 150 mg/kg (<https://www.canlii.org/en/bc/laws/regu/bc-reg-375-96/146470/bc-reg-375-96.html>), and the Alberta Government (20190 *Alberta Tier 1 Soil Remediation Guidelines* for commercial/industrial land is 4.2 mg/kg (<https://open.alberta.ca/dataset/842becf6-dc0c-4cc7-8b29-e3f383133ddc/resource/a5cd84a6-5675-4e5b-94b8-0a36887c588b/download/albertatier1guidelines-jan10-2019.pdf>))

¹⁸ The USEPA Regional Screening Level for Methyl parathion for industrial land is 21 mg/kg

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	<p>and use of hazardous building materials.</p> <p>Chemicals of potential concern include heavy metals, pesticides and asbestos.</p>	<p>SBT-BH-1040</p> <p>SBT-BH-1284</p> <p>SBT-GW-1042</p> <p>SBT-BH-1285</p> <p>SBT-BH-6201</p> <p>SBT-BH-6202</p> <p>SBT-BH-6203</p> <p>SBT-BH-6204</p> <p>SBT-BH-6233</p> <p>SBT-BH-6234</p> <p>SBT-BH-6235</p> <p>SBT-BH-6236</p> <p>SBT-BH-6237</p> <p>SBT-BH-6238</p> <p>SBT-BH-6239</p> <p>SBT-GW-1043</p>	<ul style="list-style-type: none"> • For soil materials within the first 1 m of soil: <ul style="list-style-type: none"> ○ non-detectable concentrations of BTEXN, PAH/Phenols, and OCP/OPPs. ○ low concentrations of metals including arsenic in the majority of samples and minor concentrations of zinc (most likely associated with the shed) and lead in one sample. Zinc exceeded the adopted EIL in one sample (SBT-BH-6236). ○ low concentrations of TRH in the C15-C28, F3 C16-C34 and/or F4 C34-C40 fractions in three samples (SBT-BH-6234_0.0-0.1, SBT-BH-6238_0.0-0.1, SBT-BH-6239_0.0-0.1) and were below the adopted commercial/industrial guidelines. ○ Trace PFAS in soil materials 0.1-0.2 m bgs and non-detect or PFS in samples from 0.5-0.6 m • For materials deeper than 1 m <ul style="list-style-type: none"> ○ Low concentrations of toluene/xylene and TRH in five samples of rock materials and below the NEPM HSL for vapour intrusion (commercial/industrial). These are potentially false positives during drilling and will be discussed further in the DSI Report ○ Non-detects for PAH/Phenols, VOCs/SVOCs and PFAS ○ Trace PFAS in one rock sample. 	<ul style="list-style-type: none"> • Historical investigation undertaken by Cardno and the TTC DSI investigation did not identify concentrations of CoPC indicative of a potential source of contamination, and no evidence of a cattle dip site has been observed. The site is not a reported cattle dip by the NSW Department of Primary Industries¹⁹ and it is noted that cattle dips in NSW were historically located in the far north coast of NSW and along the Qld border²⁰. • The DSI investigation has identified a potential minor source of TRH contamination in soil within this AEC which does not require remediation based on the analytical data. • Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. • Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. • Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. • TTC consider the AEC can be re-classified as Low Risk on the basis that no substantial source of contamination has been identified within the AEC. • Coffey recommends completion of allocated samples in within the footprint of the shed (following demolition) to inform material management, including collections of representative samples of the suspected ACM.

¹⁹ <https://www.dpi.nsw.gov.au/animals-and-livestock/beef-cattle/health-and-disease/parasitic-and-protozoal-diseases/ticks/cattle-dip-site-locator>

²⁰ <https://www.dpi.nsw.gov.au/agriculture/chemicals/animal-chemicals/cattle-dip-yards>

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
		SMGW-BH-A372S (Cardno) SMGW-BH-A372 (Cardno) SMGW-BH-A373 (Cardno) SMGW-BH-A375 (Cardno)	<ul style="list-style-type: none"> No major sources of contamination were identified. No infrastructure indicative of a cattle dip being present was identified within the shed during the SAQP site walkover. Suspected ACM identified within the shed was localised to an area approximately 1 m² and appeared to be on the surface. No stained or malodourous soils were identified. Sampling was not completed directly beneath the shed due to safety concerns however sampling within the shed was previously undertaken by Cardno. PAH, OCPs/OPPs were not reported in the groundwater sample collected from this AEC in August 2022. Hydrocarbons were reported in one groundwater sample and the laboratory has advised the detection is unlikely to be associated with a petroleum source (refer to Section 12.4). 	
21	Potential hazardous building materials.	SBT-BH-1286 SBT-BH-6231 SBT-BH-6232	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. Low TRH in the F3 C16-C34 fraction reported in sample SBT-BH-6231_0.0-0.1 with concentrations below the adopted commercial/industrial land guidelines. Non-detects for BTEXN, PAH/Phenols and OCPs/OPPs Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> EIS rated AEC 21 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in relatively good condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface. The DSI investigation has identified a potential minor source of TRH contamination in soil within this AEC which does not require remediation based on the analytical data. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
				<ul style="list-style-type: none"> Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that the house appeared to be in sound condition, not debris suspected of containing hazardous building materials was observed on the ground surface in close proximity to the house and hazardous building materials within the built structure should not be considered contamination.
22	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-1309</p> <p>SBT-BH-1310</p> <p>SBT- OHE-6247</p> <p>SBT- OHE-6248</p> <p>SBT- OHE-6249</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. Low concentration of xylene reported in sample SBT-BH-1309_0.0-0.1 and was below the adopted commercial industrial guidelines. BTEXN were non-detect in all other samples. Low concentration of metals with the exception of a minor exceedance of the EIL for zinc in SBT-BH-1309 0-0.1 m and below the EIL at this location at 0-0.1 m. TRH reported in two samples in the C15-C28 and/or C29-C36 fractions (SBT-BH-1310_0.0-0.1 and SBT-BH-OHE-6247) were below the adopted commercial/industrial guidelines. Non-detects for PAH/Phenols and OCPs/OPP Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> EIS rated AEC 22 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). The concrete slab was found to be in good condition and therefore the risk to underlying soil materials is low The DSI investigation has identified a potential minor source of TRH contamination in soil within this AEC which does not require remediation based on the analytical data. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
23	<p>Potential hazardous building materials.</p> <p>Chemical of potential concern include heavy metals & asbestos.</p>	<p>SBT-BH-OHE-6250</p> <p>SBT-BH-OHE-6251</p> <p>South of AEC:</p> <p>SBT-BH-1308</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. TRH in the F2 C10-C16, F3 C16-C34 and/or F4 C34-C40 fractions reported in both samples with concentrations below the adopted commercial/industrial land guidelines. Low concentration of Indeno(1,2,3-c,d)pyrene detected in one sample (SBT-BH-OHE-6250) yet PAH was below commercial industrial guideline. BTEXN, Phenols and OCPs/OPPs were not detected. Non-detects for BTEXN, Phenols and OCPs/OPPs Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> EIS rated AEC 23 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in relatively good condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface. The analytical data indicates minor areas of hydrocarbon impact around the shed which does not require remediation. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that the house appeared to be in sound condition, not debris suspected of containing hazardous building materials was observed on the ground surface in close proximity to the house and hazardous building materials within the built structure should not be considered contamination.
24	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p>	<p>SBT-BH-1046</p> <p>SBT-BH-1283</p> <p>SBT-OHE-3004</p> <p>SBT-OHE-3005</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. TRH in the F3 C16-C34, and/or F4 C34-C40 fractions reported in samples SBT-OHE-3004 and SBT-OHE-3005 with concentrations below the adopted commercial/industrial land guidelines. 	<ul style="list-style-type: none"> EIS rated AEC 24 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in relatively good condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.		<ul style="list-style-type: none"> Low concentrations in the C15 – C28 and C29 – C36 fractions in SBT-BH-1283_0.0-0.1 with concentrations below the equivalent NEPM F3/F4 fractions for commercial/industrial guidelines. Low concentration of PAH detected in one sample (SBT-OHE-3005) and was below commercial industrial guideline. BTEXN, Phenols and OCPs/OPPs were not detected. Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> The analytical data indicates minor areas of hydrocarbon impact around the buildings which does not require remediation. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, concentrations below the adopted EILs, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that the house appeared to be in sound condition, not debris suspected of containing hazardous building materials was observed on the ground surface in close proximity to the house and hazardous building materials within the built structure should not be considered contamination.
25	Potential workshops, AST, significant (>100m ²) unlicensed waste disposal to land or storage to land and use of hazardous building material.	SBT-BH-1045 SBT-BH-1305 SBT-OHE-3001 SBT-OHE-3002 SBT-OHE-3003 SBT-BH-1282 SBT-BH-1302	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed in soil materials. No visual/olfactory signs of contamination on the ground surface. TRH in the F3 C16-C34, and/or F4 C34-C40 fractions reported in sample SBT-BH-1045_0.10-0.2 with concentrations below the adopted commercial/industrial land guidelines. Low concentration of toluene, xylene, naphthalene and/or 2-methylnaphthalene reported in two deeper samples (SBT-BH-1045_17.00-17.1 and SBT-BH-1045_21.00-21.1) with concentrations below the adopted commercial/industrial guidelines. Results for 	<ul style="list-style-type: none"> EIS rated AEC 25 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in relatively good condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface. The analytical data indicates minor areas of hydrocarbon impact which does not require remediation. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	Chemicals of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.	SBT-BH-1303 SBT-BH-1304 SBT-BH-1305 SBT-OHE-306 SBT-OHE-307 SBT-OHE-308 SBT-OHE-309 SBT-OHE-310 SBT-OHE-311 SBT-OHE-312 South of AEC SBT-BH-1281	<p>these samples will be discussed further in a revision to the DSI report following the receipt of groundwater quality data. Low concentrations of PAHs below the commercial/industrial guidelines in SBT-OHE-310 and SBT-OHE-311. All other samples reported non-detects for BTEX/PAH analytes.</p> <ul style="list-style-type: none"> Phenols and OCPs/OPPs were not detected in the majority of samples tested. Low concentrations of dieldrin reported in SBT-OHE-310 and SBT-OHE-311 and were below the commercial/industrial guidelines. Low concentrations of Heptachlor and Heptachlor epoxide were reported in sample SBT-BH-1282_0.10-0.2 with concentrations below the USEPA Regional Screening Criteria²¹. Detectable concentrations of arsenic below the commercial/industrial guidelines were reported in surface in samples from SBT-BH-1281, SBT-BH-1282, SBT-BH-1302, SBT-BH-1303 and SBT-BH-1304. The concentrations reported indicate the potential historical application of arsenic-based pesticides in this area. With the exception of SBT-BH-1304 the elevated concentration of arsenic was limited to surface materials (0.1-0.2 m bgs). Detectable concentrations of arsenic were reported in SBT-BH-1304 at 0.5-0.6 m. An additional sample at 0.7 m is being analysed and will be reported in the DSI report. Trace PFAS in soil materials 0.1-0.3 m bgs 	<ul style="list-style-type: none"> Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk based on the information at the time of writing on the basis that the house appeared to be in sound condition, not debris suspected of containing hazardous building materials was observed on the ground surface in close proximity to the house and hazardous building materials within the built structure should not be considered contamination.

²¹ The USEPA Regional Screening Level for industrial land for Heptachlor is 6.3 mg/kg and Heptachlor epoxide is 3.3 mg/kg. A multiplication factor of 10 has been used for the USEPA screening criteria for consistency with the approach used in the NEPM).

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26	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-1294</p> <p>SBT-BH-1295</p> <p>SBT-BH-1296</p> <p>SBT-BH-1297</p> <p>West of AEC</p> <p>SBT-BH-1277</p> <p>North west of AEC</p> <p>SBT-BH-1298</p> <p>SBT-BH-1050</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines Positive detection of asbestos (chrysotile as asbestos fines / fibrous asbestos) was reported in SBT-BH-1295_0.10-0.2. No fill and/or visual signs of ACM was observed at this location in soil material. SBT-BH-1295 is located immediately adjacent to a shed which is to be removed during preliminary works. No asbestos detected in the other samples analysed, and no ACM observed in soil materials at these locations. No visual/olfactory signs of contamination on the ground surface. All metals including arsenic were below commercial/guidelines. Arsenic was reported in sample location in SBT-BH-1277 at 0.1-0.2 and 0.5-0.6 m bgs, and may indicate historical application of arsenic-based pesticides in this area. Non-detects for TRH/BTEXN, PAH/Phenols, OCPs/OPPs in surface soil materials. Low concentration of benzene, toluene, xylene and/or PAHs reported in sample SBT-BH-1054_23.00-23.1, SBT-BH-1053_20.00-20.1, SBT-BH-1050_9.00-9.1, SBT-BH-1050_21.00-21.1 and SBT-BH-1050_25.00-25.1 and with concentrations below the adopted commercial/industrial guidelines. Results for these samples will be discussed further in a revision to the DSI report following the receipt of groundwater quality data. All other samples reported non-detects for BTEX/PAH analytes. Phenols and OCPs/OPPs were not detected samples analysed. Trace PFAS in soil materials 0.1-0.5 m bgs 	<ul style="list-style-type: none"> EIS rated AEC 26 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). The site inspections undertaken as part of both the SAQP and DSI found the building to be constructed of materials that were observed to be in relatively good condition Hazardous materials suspected of containing asbestos or lead paint were not observed on the ground surface, however asbestos fines/fibrous asbestos was reported in the surface sample from SBT-BH-1295 next to an existing shed. Recommendations have been included in the Technical Memorandum for the management of soil material removed during demolition activities including the shed associated with this sample location. Confirmatory sampling is to be undertaken as part of the recommended actions in the footprint of the shed and is to include analysis for asbestos. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. <p>TTC consider the AEC can be re-classified as Low Risk based on the information at the time of writing on the basis that the asbestos material in soil is expected to be removed as part of site demolition activities, and an remaining soils will be covered in hard landscaping. If disturbed, this material should be managed in accordance with CPG's Asbestos Management Plan (ref: SMWSASBT-CPG -1NL-NL000-SF-PLN-000024)</p>

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27	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	<p>SBT-BH-1339 SBT-OHE-6300</p> <p>South of AEC SBT-BH-1051</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in the other samples analysed, and no ACM observed in soil materials at these locations. No visual/olfactory signs of contamination on the ground surface however a rubbish stockpile containing plaster board, corrugated iron, timber, plastics and metals was observed. Low concentrations of metals Non-detects for TRH/BTEXN, PAH/Phenols, OCPs/OPPs and PFAS. 	<ul style="list-style-type: none"> EIS rated AEC 27 is small area with a medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk based on the information at the time of writing. <p>Recommendations have been included in the Technical Memorandum for the management of soil material removed from beneath the rubbish pile. Confirmatory sampling should be undertaken following the removal of soil materials beneath the rubbish pile.</p>
28	<p>Use of herbicides and pesticides on former cultivated land and use of hazardous building materials.</p> <p>Chemicals of potential concern include heavy</p>	<p>SBT-BH-1307 SBT-BH-1306 SBT-OHE-6257 SBT-OHE-6258 SBT-OHE-6259 SBT-OHE-6260 SBT-OHE-6261</p>	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed, and no ACM observed on the soil surface TRH reported in the C10-C14 and/or F3 C16-C34 fractions in two samples SBT-OHE-6260, SBT-BH-OHE-6241 and SBT-BH-OHE-6245 with concentrations below the adopted commercial/industrial guidelines. BTEXN, PAH/Phenols and OCPs/OPPs were not detected with exception of a duplicate sample where a low concentration of Endrin aldehyde (0.13 mg/kg) was reported in the duplicate sample (QC55-DW-19052022) and not the primary sample. Concentration 	<ul style="list-style-type: none"> EIS rated AEC 28 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). The SAQP site walkover did not identify a workshop within the AEC area, with two 20-foot shipping containers observed which have metal floors. The garage/potential workshop to the south of the AEC area appeared to be in good condition and of recent construction. The soil forming a ramp/mound appeared to comprise site won material.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	metals, pesticides/herbicides and asbestos.	SBT-OHE-6215 SBT-GW-1048 North of AEC SBT-BH-OHE-6240 SBT-BH-OHE-6241 SBT-BH-OHE-6242 SBT-BH-OHE-6243 SBT-BH-OHE-6244 SBT-BH-OHE-6245	<p>is less than USEPA screening criterion for Endrin (250 mg/kg THQ=1). While this this guideline may not be directly applicable the concentration is three orders of magnitude below this guideline and was not reported in any other sample. Endrin Aldehyde is a breakdown product of Endrin and Endrin was not reported.</p> <ul style="list-style-type: none"> Low concentration of ethyl benzene and xylene reported in the interlaboratory duplicate (and not primary and intra-laboratory duplicate) for SBT-GW-1048_0.00-0.2 Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> The DSI investigation has not identified a potential source of contamination in soil in AEC 28. The suspected ACM that was identified within the small skip bin during the SAQP site walkover, was observed to be confined to the bin, which was noted to be in good condition and appeared to have been placed there with purpose. TTMP did not observe suspected ACM on the ground surface around the bin or in other portions of the property during SAQP site walkover or during the DSI investigation. No suspected ACM was identified on the ground surface surrounding the skip bin or elsewhere on the property. No stained or malodourous soils were identified. Risk to human health is considered to be low based on soil results below commercial/industrial guidelines, and future landuse being commercial/industrial with the site predominately covered with hard landscaping. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC.
29	Potential workshops, minor waste disposal, use or storage of hazardous building materials.	SBT-BH-1336 SBT-BH-1299 SBT-BH-1337 SBT-BH-1300	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed BTEX reported in sample SBT-BH-1336_0.0-0.1 with a concentration of benzene which exceeded the adopted NEPM HSL for vapour intrusion. The location where this sample was collected was intended to be re-sampled approximately one month later and returned BTEX/TRH concentrations which were non- 	<ul style="list-style-type: none"> EIS rated AEC 29 as medium risk based on perceived potential source of contamination and potential impact to receptors (construction workers, future site users, and ecological receptors). The workshop/shed appeared to be in good condition and of recent construction at the time the SAQP site walkover was undertaken.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
	Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.	SBT-OHE-6216 SBT-BH-1280 SBT-BH-1279 SBT-OHE-6252 SBT-OHE-6253 SBT-OHE-6254 SBT-OHE-6255 SBT-OHE-6256 SBT-OHE-320 SBT-OHE-321 SBT-OHE-322 SBT-OHE-323 SBT-OHE-324 SBT-OHE-325 SBT-OHE-326 SBT-OHE-327 SBT-OHE-328 SBT-OHE-329 SBT-OHE-330	<p>detect however it has subsequently been identified that the sample collected was at SBT-BH-1337. Further confirmatory sampling in the vicinity of SBT-BH-1336 was undertaken on the 12/8/2022 including resampling from this location and the completion of SBT-OHE-320, SBT-OHE-321, SBT-OHE-322, SBT-OHE-323, SBT-OHE-324, SBT-OHE-325, SBT-OHE-326, SBT-OHE-327, SBT-OHE-328 and SBT-OHE-329. All TRH/BTEXN, VOC/SVOC analytes were not detected in the samples analysed. No visual/olfactory signs of contamination were observed.</p> <ul style="list-style-type: none"> • Low concentrations of xylenes were detected in three other samples (SBT-BH-1337_ 0.0-0.1, SBT-BH-1300_ 0.0-0.1 and SBT-BH-1280_ 0.0-0.1) with concentrations below the adopted commercial/industrial guidelines. • TRH were reported in five samples (mainly in the F3 C16-C34 fraction) with concentrations which were below the adopted commercial/industrial guidelines. These samples included: SBT-BH-1337_ 0.0-0.1, SBT-OHE-6216, SBT-OHE-6252, SBT-OHE-6254, SBT-OHE-6255, SBT-OHE-6256, and SBT-OHE-334. • TRH was reported in SBT-OHE-6213 in the F3 C16-C34 and F4 C34-40 fractions with concentrations which were below the adopted commercial/industrial guidelines. • PAHs were reported in three samples SBT-OHE-6252, SBT-OHE-6253 and SBT-OHE-6213 were below the NEPM commercial/industrial guidelines. • Phenols and OCPs/OPPs were not detect in samples. • TRH/BTEX, PAH/Phenols, and OCPs/OPPs were non-detect in samples from 0.5 m bgs and indicate that contamination from hydrocarbons is limited to surface materials. • Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> • Stored asbestos containing materials have been observed in this area and will need to be removed as part of demolition works • The DSI investigation has identified minor areas of hydrocarbon contamination in surface materials which do not require remediation. • Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. • Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. • Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. • TTC consider the AEC can be re-classified as Low Risk on the basis that no source of contamination has been identified within the AEC.

AEC ID	EIS Description	Investigation Locations	Analytical Data Summary	Qualitative Risk Assessment
		SBT-OHE-331 SBT-OHE-332 SBT-OHE-334 SBT-OHE-6212 SBT-OHE-6213		
30	<p>Potential workshops, minor waste disposal, use or storage of hazardous building materials.</p> <p>Chemical of potential concern include heavy metals, TRH, SVOCs, VOCs & asbestos.</p>	SBT-OHE-300 SBT-OHE-302 SBT-OHE-301 SBT-OHE-303 SBT-OHE-304 North of AEC SBT-BH-1301 SBT-BH-1061 SBT-BH-1062 SBT-OHE-3006 SBT-OHE-3007 SBT-BH-1276 SBT-BH-1278	<ul style="list-style-type: none"> All analytes below commercial/industrial guidelines No asbestos detected in samples analysed Xylene reported in sample SBT-BH-1276_0.0-0.1 with a concentration below the commercial/industrial guidelines. Non-detect for BTEX in all other samples. TRH were reported in three samples in the F2 C10-C16, F3 C16-C34 and F4 C34-C40 fraction with concentrations which were below the adopted commercial/industrial guidelines. These samples included: QC51-DW-19052022 (duplicate of SBT-BH-1276_0.0-0.1), QC49-DW-19052022 (duplicate of SBT-BH-1278_0.0-0.1) and SBT-OHE-3006_0.00-0.0 PAH and OCPs/OPP were not detect in samples. Low concentration of 2-Methyphenol reported in QC51-DW-19052022 (duplicate of SBT-BH-1276_0.0-0.1) and was below the USEPA screening level of 41,000 mg/kg for commercial/industrial land. Phenols not detected in the primary sample and all other samples. Trace PFAS in soil materials 0.1-0.2 m bgs 	<ul style="list-style-type: none"> EIS rated AEC 30 as medium risk based on perceived potential significance of source of contamination and potential impact to receptors (construction workers). Risk to human health is considered to be low based on soil results below commercial/industrial guidelines. Risk to groundwater/surface water receptors is considered to be low based on no potential source of contamination of concern being identified. Risk to ecological receptors is considered to be low based on no potential source of contamination of concern being identified, and future use of the site being commercial/industrial and predominately hard landscaping. TTC consider the AEC can be re-classified as Low Risk based on the information at the time of writing. Recommendations have been included in the Technical Memorandum for the management of soil material removed from beneath sheds and storage containers north of the AEC. Confirmatory sampling should be undertaken following the removal of soil materials beneath the sheds.

12.3.1.1. Ground deposits deeper than 1 m bgs

All soil results from ground deposits deeper than 1 m bgs had concentrations below the adopted commercial industrial guidelines (health and ecological).

Low concentrations of toluene and/or xylene were reported in the following samples:

SBT-BH-1035_21.00-21.10	SBT-BH-1045_21.00-21.1	SBT-BH-1055_25.00-25.1
SBT-BH-1038_25.0-25.1	SBT-BH-1050_21.00-21.1	SBT-BH-1055_29.00-29.1
SBT-BH-1039_19.0-19.1	SBT-BH-1050_25.00-25.1	SBT-BH-1059_17.33-17.4
SBT-BH-1040_18.00-18.1	SBT-BH-1054_23.00-23.1	SBT-BH-1059_21.49-21.6
SBT-BH-1045_17.00-17.1	SBT-BH-1055_17.00-17.1	SBT-VWP-1043_19.00-19.1.

A low concentration of benzene at the limit of report was detected in SBT-BH-1050_21.00-21.1

Low concentrations of TRH in the F1 C6 - C10, F2 C10 - C16, and F3 C16 - C34 fractions were reported in the following samples:

SBT-BH-1038_25.0-25.1	SBT-BH-1055_29.00-29.1
SBT-BH-1040_18.00-18.1	SBT-BH-1059_17.33-17.4
SBT-BH-1040_26.00-26.1	SBT-VWP-1043_19.00-19.1
SBT-BH-1050_21.00-21.1	SBT-BH-1060_8.00-8.1
SBT-BH-1055_17.00-17.1	QC2-PK-7072022 (SBT-BH-1060 11.8-12)
SBT-BH-1055_25.00-25.1	SBT-VWP-1043_11.00-11.1.

All other samples analysed from depths greater than 1 m bgs reported non-detects for TRH/BTEX analytes.

PAH/Phenols and OCPs/OPPs were not detected in the samples from greater than 1 m depth.

PFAS was not detected in samples from depths greater than 1 m bgs with the exception of SBT-VWP-1043_11.00-11.1.

12.3.2. Re-use

With the exception of concentrations of benzene in sample SBT-BH-1336²², the concentrations of CoPC in all samples were less than the Airport Regulations criteria for re-use.

The concentrations of benzene were identified in sample SBT-BH-1336 (4.8mg/kg) that exceeded the Airport Regulations Re-use Criteria (1 mg/kg).

12.3.3. Preliminary Waste Classification

With the exception of four samples containing concentrations of nickel and lead, the concentrations of CoPC were less than the threshold for General Solid Waste.

Concentrations of nickel were identified in three samples which exceeded the CT1 threshold.

Concentrations of lead were identified in one sample which exceeded the CT1 threshold²³.

Results for Toxicity Characteristic Leaching Procedure (TCLP) for three of the samples indicated the leachability of the applicable metal in those samples was below the TCLP1 threshold, which indicates the soil within the site would provisionally classify as General Solid Waste.

12.4. Groundwater

As noted in Section 10.5 the installation and sampling from the groundwater which were proposed to be installed in the SAQP was ongoing at the time this report was compiled. Groundwater monitoring well locations are shown in Figure 4, Figure 4A, Figure 4B, and Figure 4C in Appendix 1.

A groundwater sampling event was completed on the 4 August 2022. Monitoring wells sampled included monitoring wells installed by TTMP which were available for sampling and previously installed monitoring wells which could be located.

Groundwater sampling field sheets are presented in Appendix 6, and field parameters are summarised in Table 20.

Table 20: Groundwater Field Parameters and Observations

Well ID	SBT-GW-1042	BH-A372	BH-A372S
Water Level (mBTOC)	1.8	5.9	1.48
Water Level (m AHD)	Note 1	34.9	39.3
Total Depth (mBTOC)	8.46	8.93	5
Sample depth (mBTOC)	5.5	8	3
Date Measured	4/08/2022	4/08/2022	4/08/2022
Dissolved Oxygen (mg/l)	0.61	0.56	0.85

²² Coffey notes that concentrations of BaP and Total PAHs in sample SBT-BH-1312_ 0.0-0.1. Concentrations of phenols were less than the laboratory LOR indicating that coal tar was not present. Review of soil logs indicate with sample was taken from asphalt material; Asphalt waste is pre-classified as General Solid Waste (non-putrescible). Asphalt materials comprising the driveway could be managed under the NSW EPA Resource Recovery Order (Reclaimed Asphalt Pavement Order), provided this material does not contain coal tar or asbestos.

²³ At the time this report was prepared, TCLP results on the CT1 exceedance in sample SBT-BH-1036 had not been scheduled.

Well ID	SBT-GW-1042	BH-A372	BH-A372S
Electrical Conductivity ($\mu\text{S}/\text{cm}$)	13438	15703	1670
pH	5.26	6.80	7.45
Redox Potential (Ag/AgCL 3.5M)	135.2	-193.6	-121.7
Temperature ($^{\circ}\text{C}$)	16	17.1	15.3
Comments	Cloudy pale brown, no odour. NAPL not observed	Cloudy pale brown, no odour. NAPL not observed	Cloudy pale brown, no odour. NAPL not observed

Note 1: Survey of location is to be completed.

Groundwater elevations recorded ranged between approximately 35 m AHD and 39 m AHD. Groundwater levels and flow direction at the site has been interpreted in the HIR and is shown in Figure 6, Appendix 1. Groundwater in the southern portion of the site is expected to discharge into Blaxland Creek, which flows through the southern portion of the site. Regional groundwater flows in a east-southeast direction towards South Creek. Groundwater level data is currently being collected at the site from vibrating wire piezometers (VWPs) and will inform future updates of the HIR.

Electrical conductivity ranged from fresh to brackish water. Variations in conductivity are potentially attributed to freshwater recharge (i.e. in response to rain) and/or leakage from water pipes.

No odours were observed in the groundwater samples collected.

12.4.1. Groundwater Analytical Results

Available groundwater monitoring results were collated and presented in Appendix 7.

The following provides a summary of the groundwater monitoring results for the monitoring wells that have been installed and sampled to date including previous investigations.

12.4.1.1. Metals

Dissolved phase metals including lead, nickel and zinc were detected in samples collected by TTMP during the recent groundwater monitoring event at concentrations exceeding the Freshwater guideline values. In general, the reported concentrations were within the range of concentrations reported in samples collected in previous investigations (refer Table 9).

Elevated concentration of nickel and zinc have previously been observed in groundwater samples from the following locations:

- North of OHE site: SMGW-BH-A113
- Southern portion of OHE site: SMGW-BH-A117 and SMGW-BH-A117S, SMGW-BH-A315, SMGW-BH-A315S
- Central portion of OHE site: SMGW-BH-A310S, SMGW-BH-A311.

Metals in groundwater are likely to be attributed to a combination of natural and urban sources in the area.

12.4.1.2. Hydrocarbons

Hydrocarbons in the F2 (C10-C16) and/or F3 (C16-C34) fractions were reported in groundwater samples from SBT-BH-A372 and were not detected in SBT-BH-A372s. TTMP note that

hydrocarbons detected may derive from naturally occurring hydrocarbons within shale bedrock and/or organic matter present within the samples submitted for analysis. The laboratory has advised from a review of the chromatograms that the hydrocarbon detected is potentially carboxylic acid and acetophenone. Both compounds occur naturally. The VOC caprolactam was also reported. Caprolactam is used in the manufacturing of synthetic fibres and can also be naturally occurring.

Hydrocarbon odours were not observed in the groundwater samples collected, and potential sources of hydrocarbons have not been identified in the soil analytical results.

Similar concentrations of TRH were also reported in previous groundwater sampling events from SMGW-BH-A017, SMGW-BH-A113, SMGW-BH-A310, SMGW-BH-A310S, SMGW-BH-A311 and SMGW-BH-A315.

At the time this report was compiled, TTMP had requested further detailed interpretation of the TRH results in these samples.

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

BTEX were not detected in the groundwater samples collected during the current investigation. Trace levels of Toluene were previously reported in samples from SMGW-BH-A017, SMGW-BH-A113, SMGW-BH-A310S, SMGW-BH-A311, SMGW-BH-A315 and SMGW-BH-A315S. These did not exceed the freshwater guideline value, and drinking water guideline.

PAH, OCP/OPPs were not detected in the groundwater samples analysed.

The OCP DDD (a breakdown product of DDT) was previously reported in SMGW-BH-A315S at the laboratory limit of reporting. SMGW-BH-A315S is located near AEC-26. OCPs were not detected in soil samples from this AEC.

Phenolic compounds were not detected in the groundwater samples analysed.

12.4.1.4. PFAS

PFAS was not detected in the groundwater samples collected, however PFAS has been reported in samples collected during previous investigations.

12.4.1.5. Nutrients

Ammonia and phosphorus exceeded the adopted freshwater guidelines in previous sampling events. Higher concentrations of ammonia were reported in:

SMGW-BH-A017

SMGW-BH-A113

SMGW-BH-A117

- North of OHE site: SMGW-BH-A113
- Southern portion of OHE site: SMGW-BH-A117
- Central portion of OHE site: SMGW-BH-A017

13. Updated Conceptual Site Model

With the exception of sample SBT-BH-1336 collected at 0.0-0.1mbgl (collected 20 May 2022), concentrations of CoPC were less than the adopted criteria. The concentrations of benzene identified in sample SBT-BH-1336 exceeded the adopted HSL. The sample also contained concentrations of 1,2 dichlorobenzene and chlorinated hydrocarbons and Total Monocyclic Aromatic Hydrocarbons. TTMP undertook follow up sampling at that location and at 10 additional locations, stepped out from SBT-BH-1336 for the purpose of delineation. Concentrations of TRH and BTEX in the replication sample of SBT-BH-1336 (assigned the same ID, dated 12 August 2022) collected at 0-0.1 bgs were less than the laboratory LOR and no visual or olfactory signs of contamination were noted. Concentrations of TRH and BTEXN in the 10 step-out samples were also less than the laboratory LOR. The PID readings at the resampled location and step-out locations were also less than 2.5 ppm indicating the VOC were unlikely to be present. TRH/BTEX were not detected in the sample SBT-BH-1336_ 0.5-0.6 m bgs in May 2022 which indicated the contamination observed in May 2022 was limited in its vertical extent.

Given the above, it is considered that the source of the benzene (and other COPC) in sample SBT-BH-1336 is likely to be isolated and the possible result of a small spill. It has also potentially volatilised and no longer present. TTMP considers the risk to receptors as low as the pathway linking the source and receptor is incomplete given that there is unlikely to be a vapour risk present. The reported concentration of Benzene is also significantly less than the Direct Contact HSL of 430 mg/kg.

Given that the concentrations of TRH and BTEXN, particularly benzene were less than the laboratory LOR within the replicated sample and step-out samples, negligible PID readings during field screening, TTMP considers that the original detection of Benzene (and other associated CoPC) in that sample were likely present due to a minor spill that had occurred at that location.

In review of the laboratory results for the samples collected at the site, a number of detections of PFAS marginally above the laboratory LOR were noted. The majority of the detections were at or near surface and no detections exceeded the adopted criteria. In the deeper ground deposits PFAS was not detected in the majority of samples analysed with the exception of SBT-VWP-1043_11.00-11.1. This result is potentially a false positive on the basis that all other PFAS results at this location were non-detect, and with consideration to the results for all other deeper samples.

TTMP considers that the presence of PFAS in near surface soils to be reflective of background concentrations in the environment and considers that the risk posed by PFAS to potential receptors at the site as low.

Minor concentrations of TRH and BTEX have been reported in groundwater in previous sampling events the concentrations reported are not considered to pose an unacceptable risk to human health or ecological receptors. Minor hydrocarbons reported in the sampling event and are likely to be natural in origin. Six-monthly groundwater monitoring is proposed during construction as outlined in the Groundwater Monitoring Plan (GMP) (TTMP ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040404). The GMP outlines trigger values, which if exceeded require that further investigation be undertaken.

PFAS has also been reported in groundwater in previous sampling events and considered to be associated with background concentrations in the environment.

Elevated concentrations of metals have been reported in groundwater and potentially natural and/or urban in origin. Elevated concentrations of metals of concern have not been reported in soil and rock materials within the site. Metals in groundwater are considered unlikely to pose unacceptable risk to construction workers, given infrequent contact with groundwater.

The DSI was completed prior to demolition. There is a potential risk from ACM post-demolition, and it is recommended that an asbestos clearance certificate be obtained post demolition and prior to the commencement of earthworks. Where demolition works result in the deposition of ACM on soil, further assessment and/or remedial works may be required.

Potential also exists for contamination to be uncovered from areas which were inaccessible during the investigation such as beneath concrete slabs, sheds, septic tanks, etc. Ground conditions will need to be inspected by a competent person post demolition to check for indicators of contamination.

These data gaps were identified in the Technical Memorandum (24/8/2022). Management controls were recommended to mitigate these data gaps and have been reproduced in Section 14.

14. Management of Materials Post Demolition and Site Clearance

The DSI was completed prior to demolition of existing structures on site. There is a potential risk from ACM in soil materials in areas where ACM was present and removed as part of demolition activities and in areas where potential ACM has previously been observed. CPBG has advised that the preference is to directly dispose these surface fill materials to landfill rather than retain them on-site for reuse. Potential also exists for contamination to be uncovered from areas which were inaccessible during the investigation such as beneath concrete slabs, sheds, septic tanks, and heavily vegetated areas that were not accessible during the investigation, etc. TTMP recommends that ground conditions be inspected by a competent person post demolition to check for indicators of contamination.

With the exception of AEC20, the following management measures apply to areas where structures have been demolished, areas where waste materials are present and require removal, areas where fill materials containing anthropogenic materials are encountered, and/or areas where potential ACM materials have been previously observed:

- Shallow soil materials within the footprint of former structures, waste storage areas, areas of fill etc. are to be scraped to a nominal depth of 300mm, or the surface of undisturbed natural ground. This material shall be stockpiled separately from other materials for assessment to determine its waste classification in accordance with the Waste Classification Guidelines (NSW EPA, 2014) prior to disposal off site as waste.
- Laboratory analytical data will be collated to determine the waste classification of the shallow soil and shall also be compared to the health and ecological investigation levels for a generic Commercial/Industrial land use as a gauge to assess whether potentially unacceptable contamination may remain within in-situ soil.
- A competent person shall complete a detailed inspection of the soil materials exposed (following removal of the nominal 300mm surface materials) within the footprint of former structures, waste

storage areas, areas of fill etc. for indicators of potential contamination. Indicators of potential contamination may include stained or odorous soils, materials suspected to contain ACM etc.

- In the event that fill remains below a depth of 300mm and is to be retained, or where indicators of potential contamination are noted on fill/exposed natural soil, confirmatory samples shall be collected from in-situ soil within the excavation area and analysed for the following COPC to confirm the suitability of these materials to remain on site:
 - **Residence:** heavy metals (8), OCPs/OPPs and asbestos.
 - **Workshop/shed:** heavy metals (8), BTEX, PAH, TRH, phenols, PFAS, OCPs/OPPs and asbestos.
- The approach shall be determined based on the guidance provided within the ASC NEPM (NEPC, 2013). The sampling density adopted should take account of existing investigation data collated for this site.

Shed at AEC 20: The following management measures apply to the footprint of the large shed at AEC 20. Soil materials are to be scraped to the depth of undisturbed natural ground. Materials from this shed are to be stockpiled and tested to determine its waste classification in accordance with the NSW EPA Waste Classification Guidelines (2014). Confirmatory samples shall be collected from the surface/shallow soil exposed beneath the footprint of this shed and analysed for COPC including heavy metals (8), TRH/BTEXN, PAH/Phenols, PFAS, OCPs/OPPs and asbestos to confirm the suitability of these materials to remain on site. The investigation approach and sampling density shall be determined based on the guidance provided within the NSW EPA (2022); 'Sampling Design Part 1 – Application' and the ASC NEPM (NEPC, 2013).

Fill materials: were typically not encountered on site. Where present, such materials were typically consistent with reworked natural materials. This shallow lithology is consistent with the rural residential land use of the site where extensive land filling is unlikely to have occurred. Where deeper fill is encountered that is not consistent with reworked natural material and/or contains indicators of potential contamination (e.g. stained or odourous soils, buried wastes, suspected ACM etc.), this would be managed using the unexpected finds procedure.

Areas (not including beneath structures or vegetated areas) are to be visually inspected following the scrape-back of fill/topsoil to assess for indications of contamination such as drums or fibre cement sheeting suspected of containing asbestos. Where indications of contamination are noted, CPBG shall implement the Unexpected Finds Procedure (UFP).

Vegetated Areas: Following clearing of currently vegetated areas, a walkover to observe surface conditions will be undertaken. If visual indications of potential contamination are identified such as the presence of drums or fibre cement sheeting suspected of containing asbestos, additional sampling will be undertaken.

Groundwater: An assessment of groundwater related risks associated with each AEC is provided in Section 12.3. Site levelling work and bulk excavation of the station box beneath the groundwater table will intercept and drawdown groundwater from approximately 36-38 m AHD. Based on the findings of the DSI and surrounding area being rural residential, there is low potential for significant contamination in groundwater which triggers the requirement for remediation during construction. Groundwater dewatered during construction is to be treated to comply with Planning Condition E129 or an Environmental Protection License (EPL_ approved by the NSW EPA. Groundwater managed

during construction is to be managed in accordance with CPBGs Construction EMP and Soil and Water Management Plan.

Unforeseen potential contamination: Ground disturbance during Preparatory Works within the OH site is proposed to be managed by CPBG through implementation of standard construction practices including soil and water management techniques as outlined in the Project Construction Environmental Management Plan (CEMP) including the Soil and Water CEMP Sub-Plan which includes an Unexpected Finds Procedure (UFP). TTMP recommends that a competent person is present during disturbance of soil materials (outside of the areas listed above) to visually monitor for signs of potential contamination. Where these materials are encountered, they should be sampled, either in-situ or the materials may be stockpiled separately for subsequent investigation by TTMP in line with the Unexpected Finds Protocol (UFP). The competent person must be experienced in the undertaking of excavation/remediation works and have the necessary experience to identify soil materials containing ACM and/or other unforeseen contamination.

Material Reuse: Based on project changes the required cut for site levelling activities is deeper than that considered during the development of the SAQP. The deeper cut will require excavation of natural materials. Based on the current analytical data for Orchard Hills, site won natural materials are considered suitable for re-use (from a contamination perspective) at Orchard Hills during site levelling activities provided they have been monitored by a competent person and do not contain ACM and/or other indicators of contamination. CPBG is to maintain a record of where materials have been cut and placed as fill within the site.

15. 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*.

Notwithstanding the additional results that are yet to be received, based on review of the field observations, logs, and soil analytical results, TTMP did not identify sources of contamination that pose a significant risk to potential receptors at the site. TTMP considers that where assessed, the soil within the site poses a low risk of contamination to the project.

The investigation has identified that there is the potential for ACM in soil materials in areas where ACM was removed as part of demolition activities and in areas where potential ACM has previously been observed. Potential also exists for contamination to be uncovered from areas which were inaccessible during the investigation such as beneath concrete slabs, sheds, septic tanks, etc. TTMP recommends that ground conditions be inspected by a competent person post demolition to check for indicators of contamination.

Specific management controls post-demolition is described in Section 14 and are to be implemented during construction.

Ground disturbance during future works is proposed to be managed through implementation of standard construction practices including soil and water management techniques.

Unexpected contamination, if identified during future works, can be managed through implementation of an Unexpected Contaminated Finds Protocol included in the Project construction environmental management plan (CEMP).

The following is also recommended:

- A competent person is present during disturbance of soil materials to monitor for signs of potential contamination (e.g. stained or odourous soils, buried wastes, etc) and potential ACM. Where these materials are encountered, the materials should be stockpiled separately for subsequent investigation by TTMP in line with the unexpected finds protocol. The competent person must be experienced in the undertaking of excavation/remediation works and have the necessary experience to identify soil materials containing ACM and unforeseen contamination.
- The DSI was completed prior to demolition. There is a potential risk from ACM post-demolition, and it is recommended that an asbestos clearance certificate be obtained post demolition and prior to the commencement of Preparatory Works.
- Topsoil and fill materials are stockpiled separately to natural soils, and stockpiles are managed in accordance with the requirements of the CEMP.
- CPBG is to maintain a record of where materials have been cut and placed as fill within the OHE site.
- Soil materials removed from the site as waste should be classified in accordance with the NSW EPA Waste Classification Guidelines (2014) which includes the preparation of a Waste Classification Report and/or a Material Classification Report.
- Groundwater samples should be collected from the monitoring wells which have been installed and not sampled at the time of writing and the results are to be included as an addendum to the DSI for inclusion in the RAP.
- Six-monthly construction groundwater monitoring be carried out to detect changes in groundwater quality as outlined in the Groundwater Monitoring Plan (TTMP ref: SMWSASBT-CPG-SWD-SW000-GE-RPT-040404). This monitoring would also confirm the inferred groundwater flow direction.
- Fill soil at AEC26 (sample location ref: SBT-BH-1295), where detections of FA/AF were identified should be managed in accordance with CPG's AMP (ref: SMWSASBT-CPG -1NL-NL000-SF-PLN-000024).
- In order to satisfy the requirements of the Deed, a remedial action plan (RAP) should be prepared to inform the management of excavated spoil, additional soil characterisation, unexpected finds (if encountered) and the management of water associated with excavation and dewatering.

15.1. Project Operational and Maintenance Phases

Sydney Metro has advised that the station box is to be an undrained (tanked) structure, and therefore groundwater inflow into the station box would be expected to be minimal. Groundwater inflow into the station and dive structure may require treatment prior to discharge.

The DSI has assumed that the Project will be a commercial site 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.

16. References

ANZECC/ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000*

ANZG (2018) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018*

Cardno (2021); Contamination Assessment Report – Phase D/E, Sydney Metro Western Sydney Airport (Ref: 80021888; RevB, dated 22nd November 2021)

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

CRC Care (2011) *Technical Report No. 10, Health screening levels for petroleum hydrocarbons in soil and groundwater*

GHD (2019) *Western Sydney Airport, Remediation Action Plan* (Ref: WSA00-WSA-0040-EN-PLN-00001, dated June 2019)

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

NEPC (2013); National Environmental Protection (Assessment of Site Contamination) Measure 1999 (the 'ASC NEPM')

NSW EPA (1995); Sampling Design Guidelines

HEPA (2020) *PFAS National Environmental Management Plan (PFAS NEMP) 2.0, 2020.*

M2A (2020) *Sydney Metro - Western Sydney Airport Technical Paper 8 Contamination*

TTMP (2022a) *Western Sydney Airport Station Boxes and Tunnels Tender, Hydrogeological Interpretative Report.*

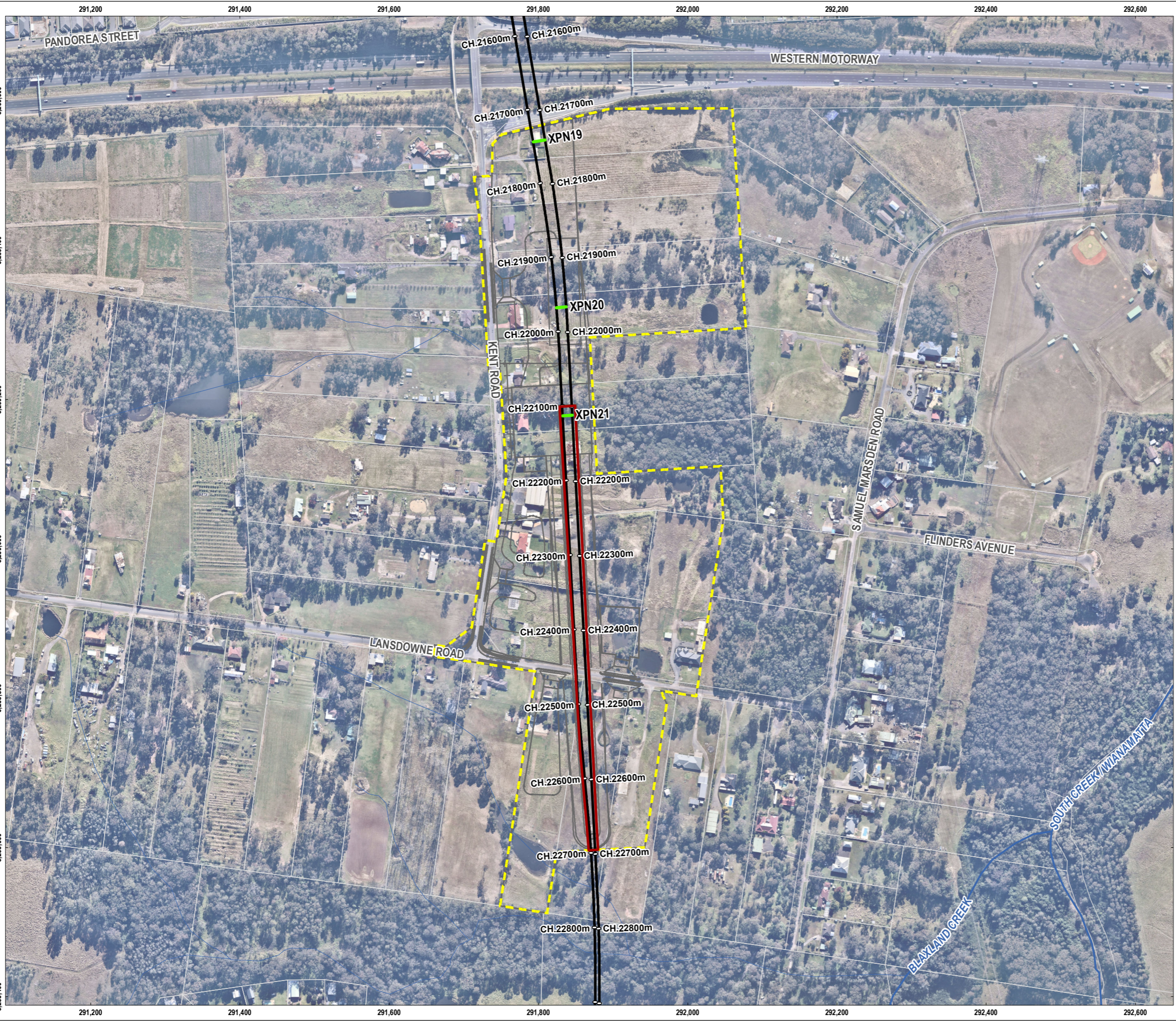
TTMP (2022b) *Western Sydney Airport Station Boxes and Tunnels Tender, Orchard Hills Sampling and Analysis Quality Plan.*



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

Appendix 1 Figures

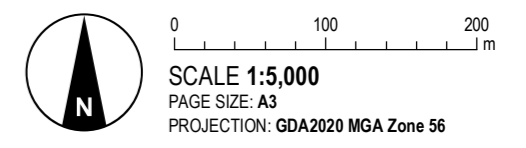




LEGEND

- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Orchard Hills and Portal Dive Structure Site Layout
- Perennial Watercourse
- Non-perennial Watercourse
- Cadastral Boundary
- OH Site Boundary
- Station Box and Portal Dive Structure

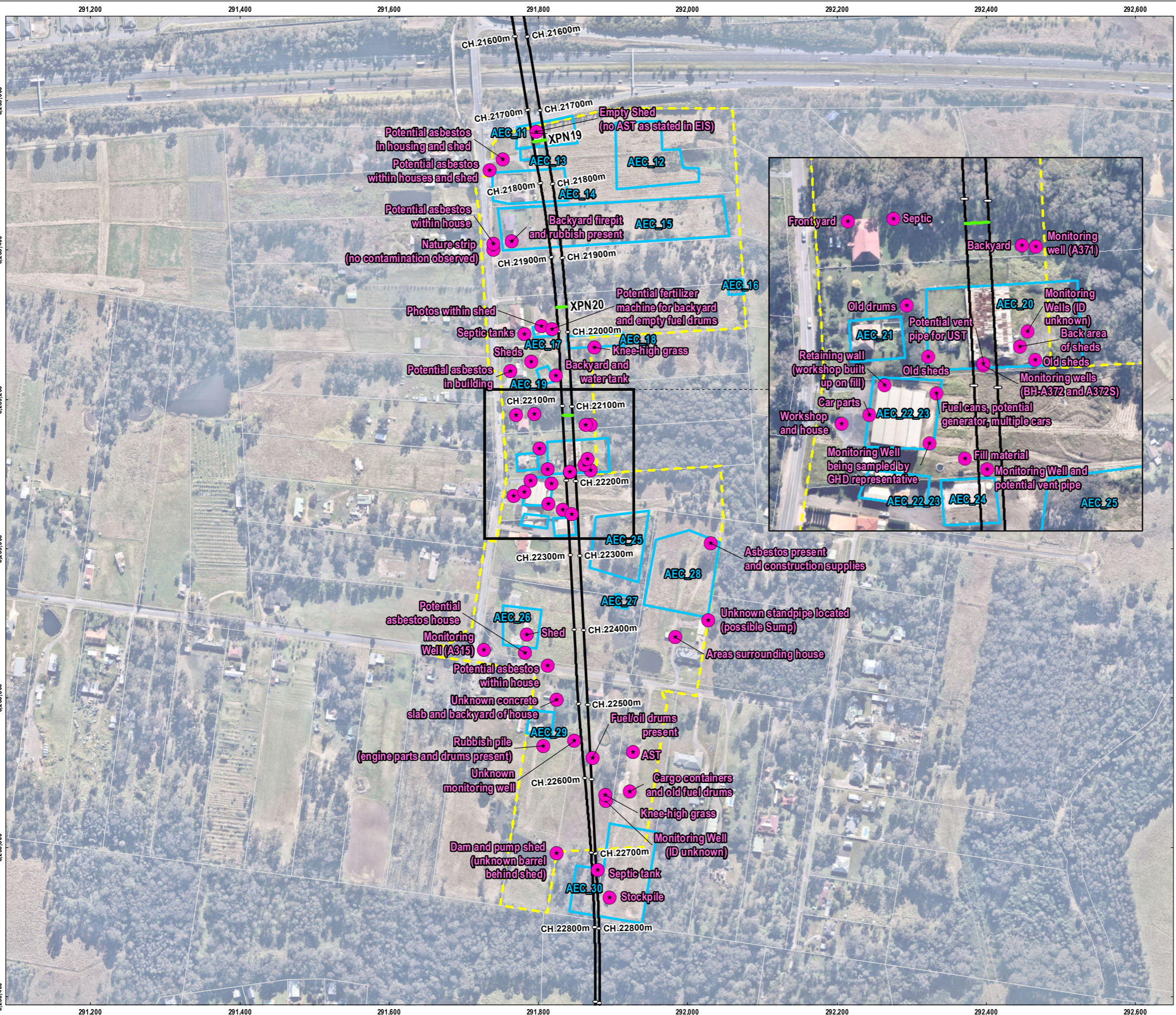
SOURCE
 Site boundary from Tetra Tech Coffey.
 Alignment, station box and site layout supplied by CPBG.
 Cadastre from DFSI.
 Aerial imagery from Nearmap (capture date 14-06-2022).



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 WESTERN SYDNEY AIRPORT
 STATION BOXES AND TUNNELLING WORKS

FIGURE 2
 Project Footprint - Orchard Hills Station
 and Portal Dive Structure


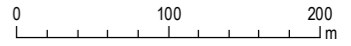




LEGEND

- ★ Site Observation
- Tunnel Alignment
- Tunnel Alignment - Chainage
- Tunnel Alignment - Cross Passage
- Cadastral Boundary
- OH Site Boundary
- Area Of Environmental Concern

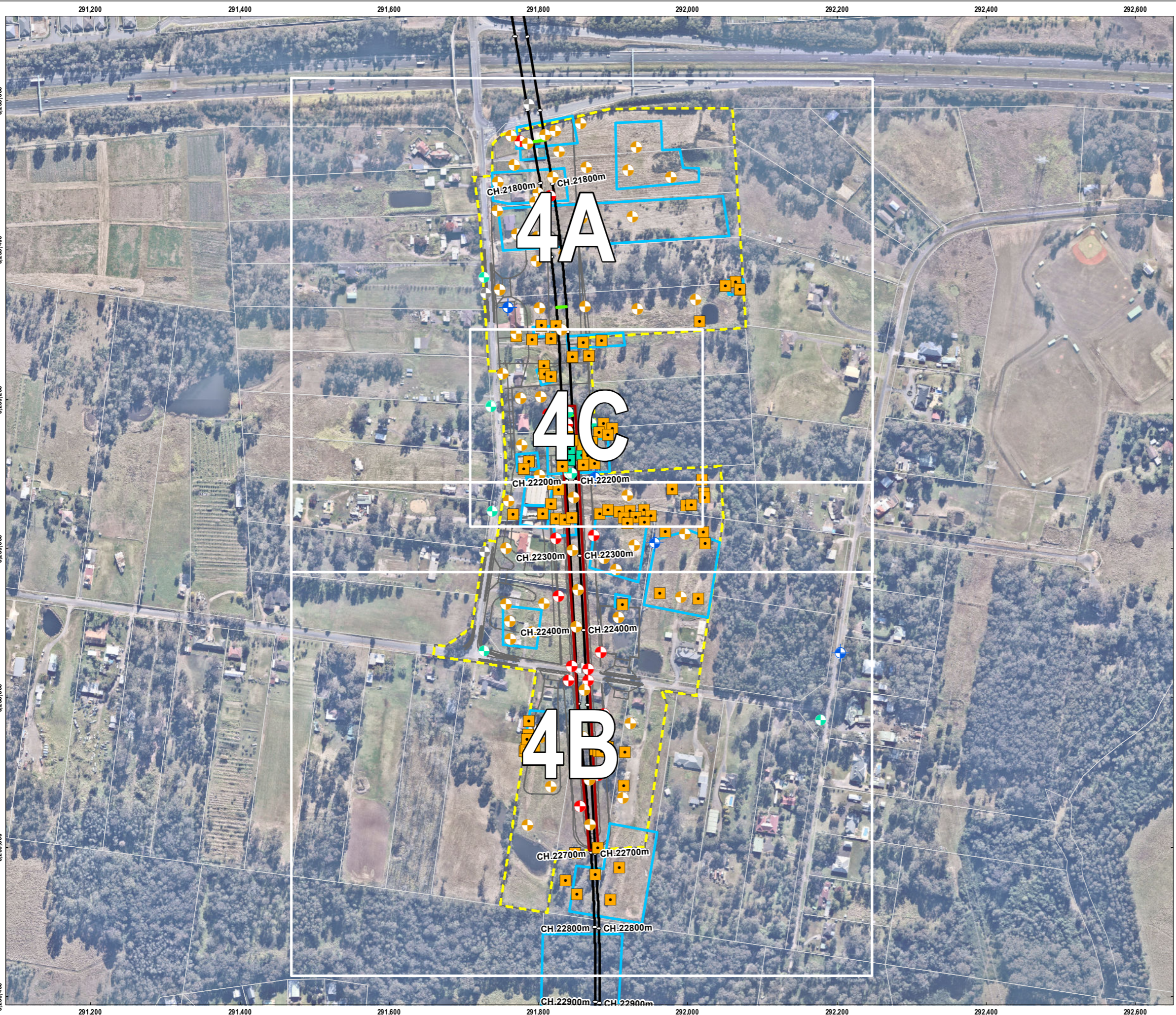
SOURCE
 Site observations and boundaries from Tetra Tech Coffey.
 Alignment supplied by CPBG.
 Cadastre from DFSI.
 Aerial imagery from Nearmap (capture date 14-06-2022).

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 WESTERN SYDNEY AIRPORT
 STATION BOXES AND TUNNELLING WORKS

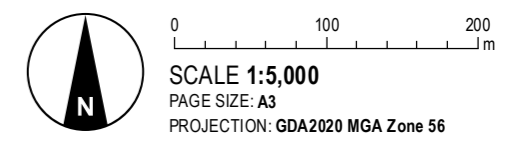
FIGURE 3
 Site Observations - Orchard Hills
 Station and Portal Dive Structure



LEGEND

- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
- Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
- Existing Investigation Location
 - Borehole
- Investigation Location - Cardno
 - Borehole
 - Hand Auger
- Tunnel Alignment
 - Tunnel Alignment
 - Tunnel Alignment - Chainage
 - Tunnel Alignment - Cross Passage
- Orchard Hills and Portal Dive Structure Site Layout
 - Cadastral Boundary
 - Areas of Environmental Concern
 - OH Site Boundary
 - Station Box and Portal Dive Structure

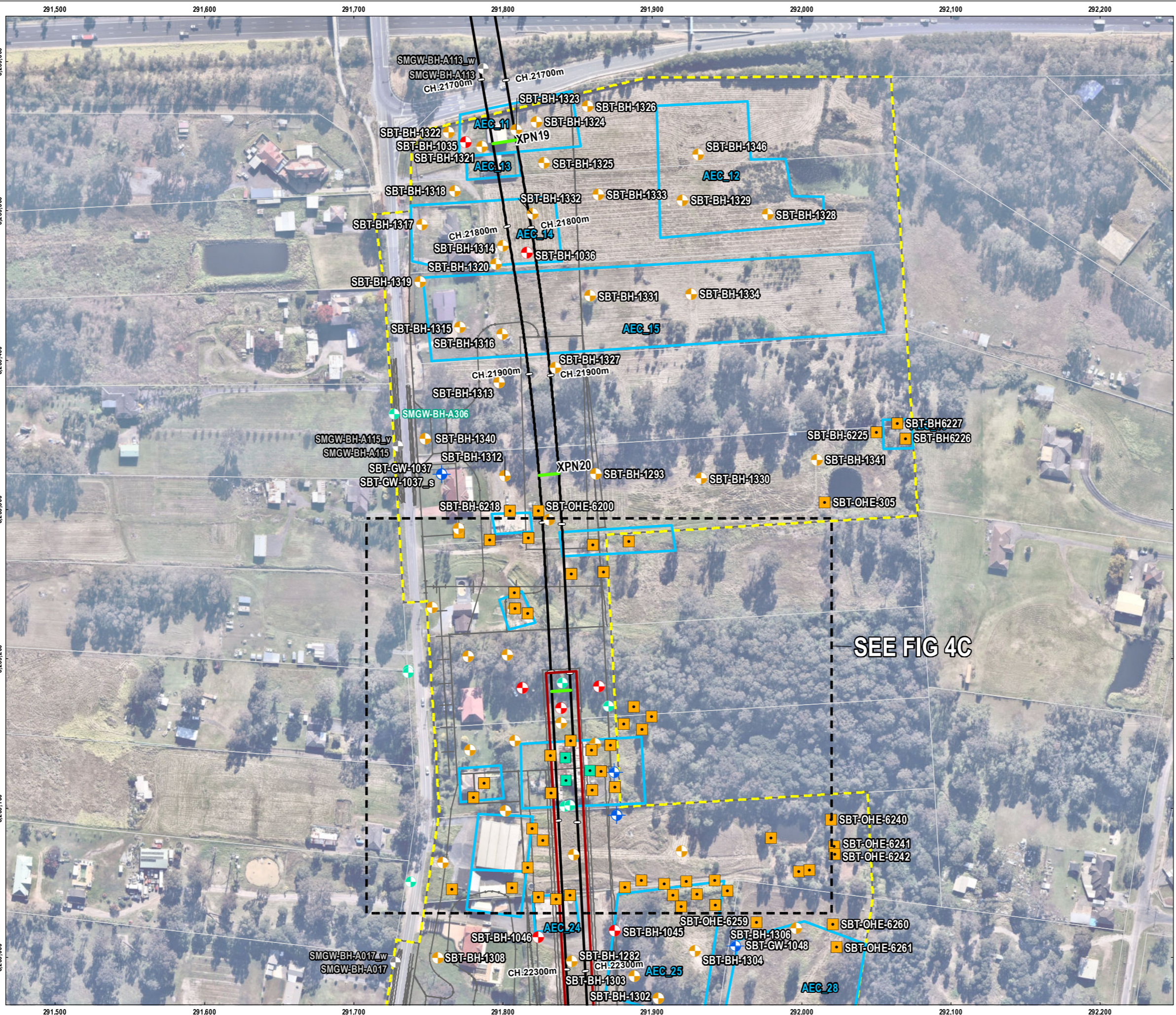
SOURCE
 Contaminated land locations, additional investigations, site boundary, and hand samples from Tetra Tech Coffey.
 Existing investigations, site layout, station box and alignment supplied by CPBG.
 Investigation locations from Cardno.
 Cadastre from DFSI.
 Aerial imagery from Nearmap (capture date 14-06-2022).



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 WESTERN SYDNEY AIRPORT
 STATION BOXES AND TUNNELLING WORKS

FIGURE 4
 Contaminated Land Locations -Orchard Hills Station and Portal Dive Structure



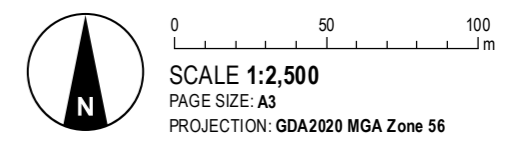


SEE FIG 4C



- LEGEND**
- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
 - Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
 - Existing Investigation Location
 - Borehole
 - Investigation Location - Cardno
 - Borehole
 - Hand Auger
 - Tunnel Alignment
 - Tunnel Alignment - Chainage
 - Tunnel Alignment - Cross Passage
 - Orchard Hills and Portal Dive Structure Site Layout
 - Cadastral Boundary
 - Areas of Environmental Concern
 - OH Site Boundary
 - Station Box and Portal Dive Structure

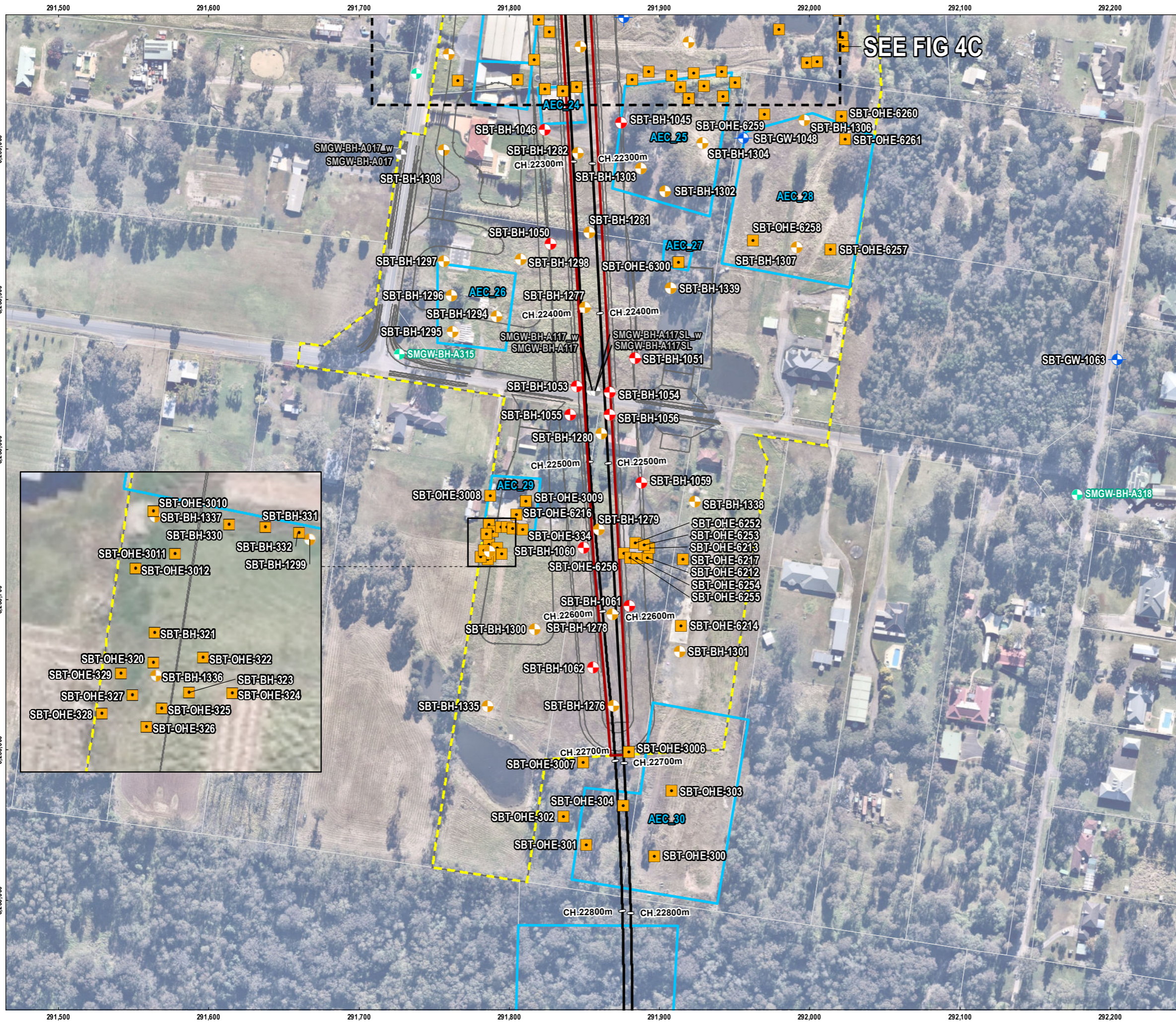
SOURCE
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 Existing investigations, site layout, station box and alignment supplied by CPBG.
 Investigation locations from Cardno.
 Cadastre from DFSI.
 Aerial imagery from Nearmap (capture date 14-06-2022).



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 STATION BOXES AND TUNNELLING WORKS

FIGURE 4A
 Contaminated Land Locations -Orchard Hills Station and Portal Dive Structure





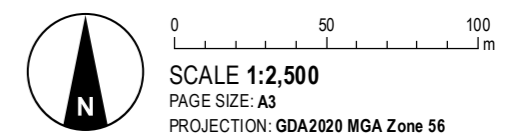
SEE FIG 4C



LEGEND

- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
- Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
- Existing Investigation Location
 - Borehole
- Investigation Location - Cardno
 - Borehole
- Tunnel Alignment
 - Tunnel Alignment - Chainage
- Orchard Hills and Portal Dive Structure Site Layout
 - Cadastral Boundary
 - Areas of Environmental Concern
 - OH Site Boundary
 - Station Box and Portal Dive Structure

SOURCE
 Contaminated land locations, additional investigations, site boundary, and hand samples from Tetra Tech Coffey. Existing investigations, site layout, station box and alignment supplied by CPBG. Investigation locations from Cardno. Cadastre from DFSI. Aerial imagery from Nearmap (capture date 14-06-2022).

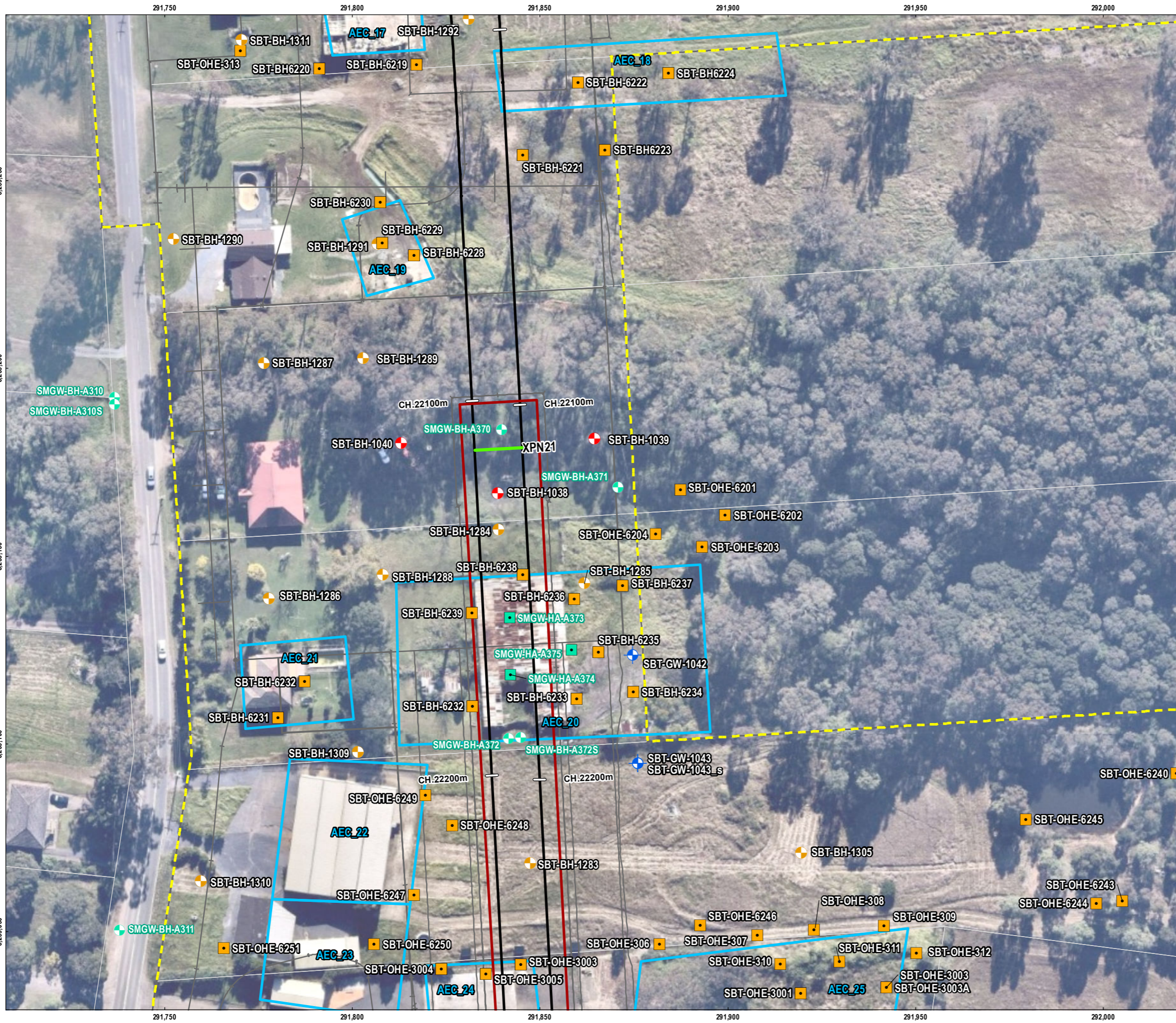


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 STATION BOXES AND TUNNELLING WORKS

FIGURE 4B
 Contaminated Land Locations -Orchard Hills Station and Portal Dive Structure



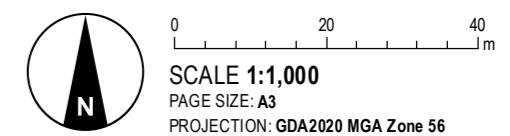
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LEGEND

- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
- Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
- Investigation Location - Cardno
 - Borehole
 - Hand Auger
- Tunnel Alignment
 - Tunnel Alignment
 - Tunnel Alignment - Chainage
 - Tunnel Alignment - Cross Passage
- Orchard Hills and Portal Dive Structure Site Layout
 - Cadastral Boundary
 - Areas of Environmental Concern
 - OH Site Boundary
 - Station Box and Portal Dive Structure

SOURCE
 Contaminated land locations, additional investigations, site boundary, and hand samples from Tetra Tech Coffey. Existing investigations, site layout, station box and alignment supplied by CPBG.
 Investigation locations from Cardno.
 Cadastre from DFSI.
 Aerial imagery from Nearmap (capture date 14-06-2022).

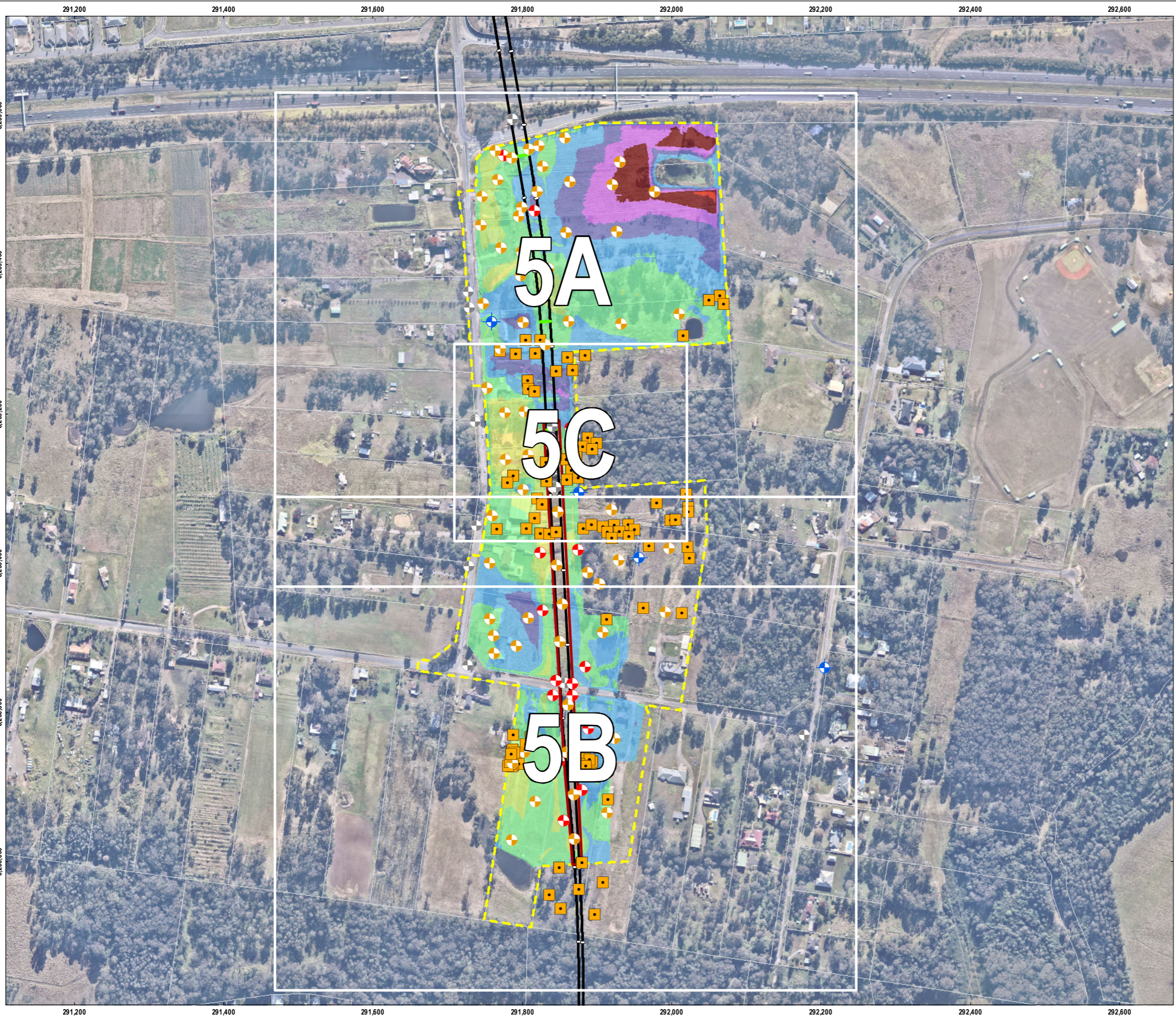


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 STATION BOXES AND TUNNELLING WORKS

FIGURE 4C
 Contaminated Land Locations -Orchard Hills Station and Portal Dive Structure



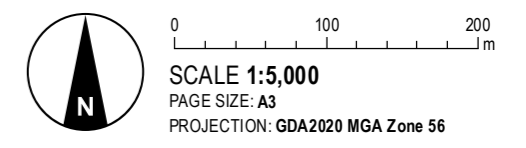
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LEGEND

- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
- Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
- Existing Investigation Location
 - Borehole
- Tunnel Alignment
 - Tunnel Alignment
 - Tunnel Alignment - Chainage
 - Tunnel Alignment - Cross Passage
- Cadastral Boundary
 - Cadastral Boundary
 - OH Site Boundary
 - Station Box and Portal Dive Structure
- Cut and Fill
 - 4 m to -3 m
 - 3 m to -2 m
 - 2 m to -1 m
 - 1 m to 0 m
 - 0 m to 1 m
 - 1 m to 2 m
 - 2 m to 3 m
 - 3 m to 4 m
 - 4 m to 5 m

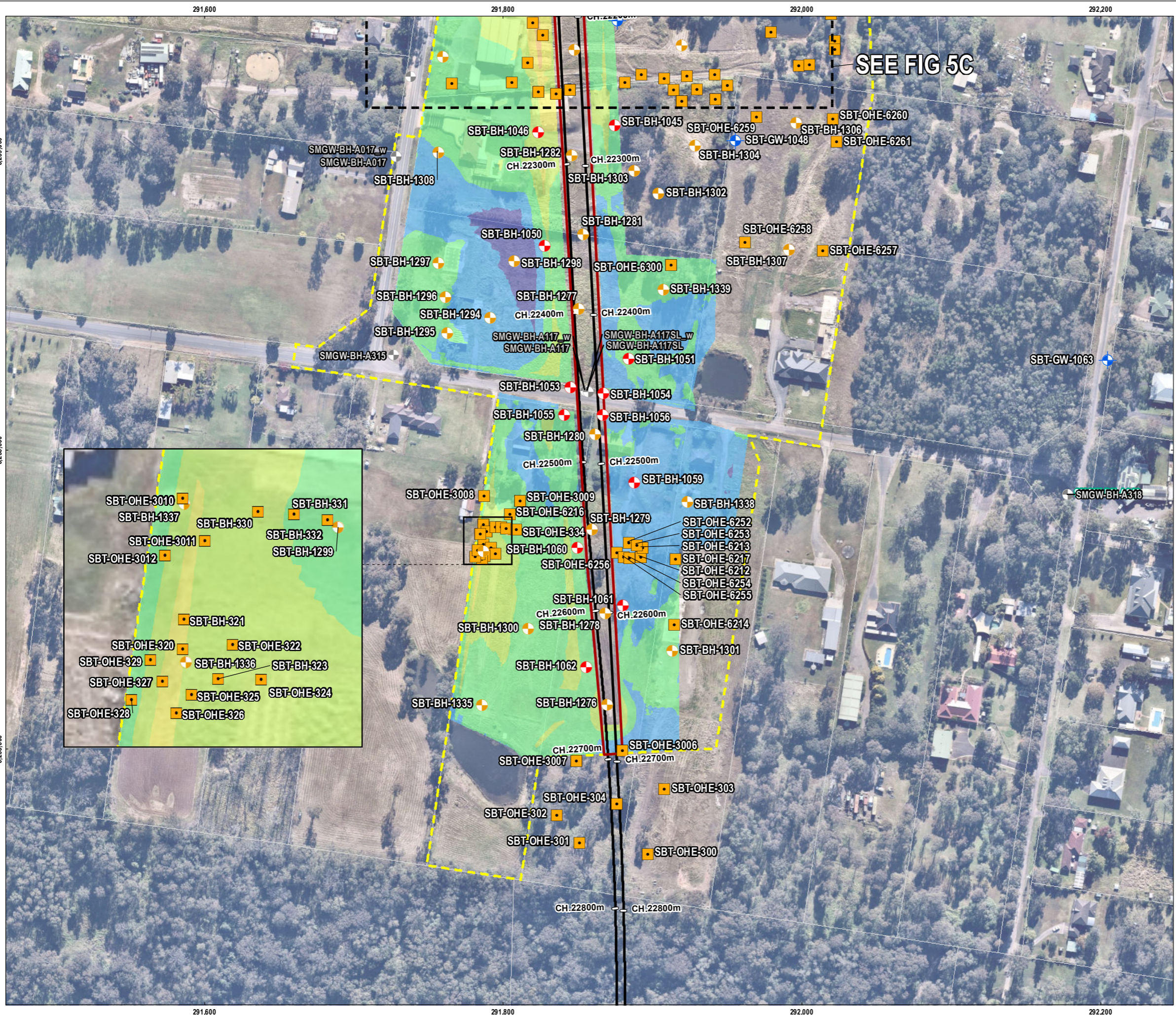
SOURCE
 Contaminated land locations, additional investigations, site boundary, and hand samples from Tetra Tech Coffey. Existing investigations, site layout, station box, cut/fill and alignment supplied by CPBG. Cadastre from DFSI. Aerial imagery from Nearmap (capture date 14-06-2022).



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 WESTERN SYDNEY AIRPORT
 STATION BOXES AND TUNNELLING WORKS

FIGURE 5
 Site Establishment Works - Orchard Hills Station and Portal Drive Structure





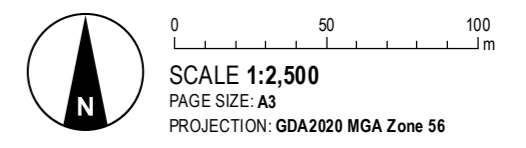
SEE FIG 5C



LEGEND

- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
- Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
- Existing Investigation Location
 - Borehole
- Tunnel Alignment
 - Tunnel Alignment
 - Tunnel Alignment - Chainage
- Cadastral Boundary
 - Cadastral Boundary
- OH Site Boundary
 - OH Site Boundary
- Station Box and Portal Dive Structure
 - Station Box and Portal Dive Structure
- Cut and Fill
 - 4 m to -3 m
 - 3 m to -2 m
 - 2 m to -1 m
 - 1 m to 0 m
 - 0 m to 1 m
 - 1 m to 2 m

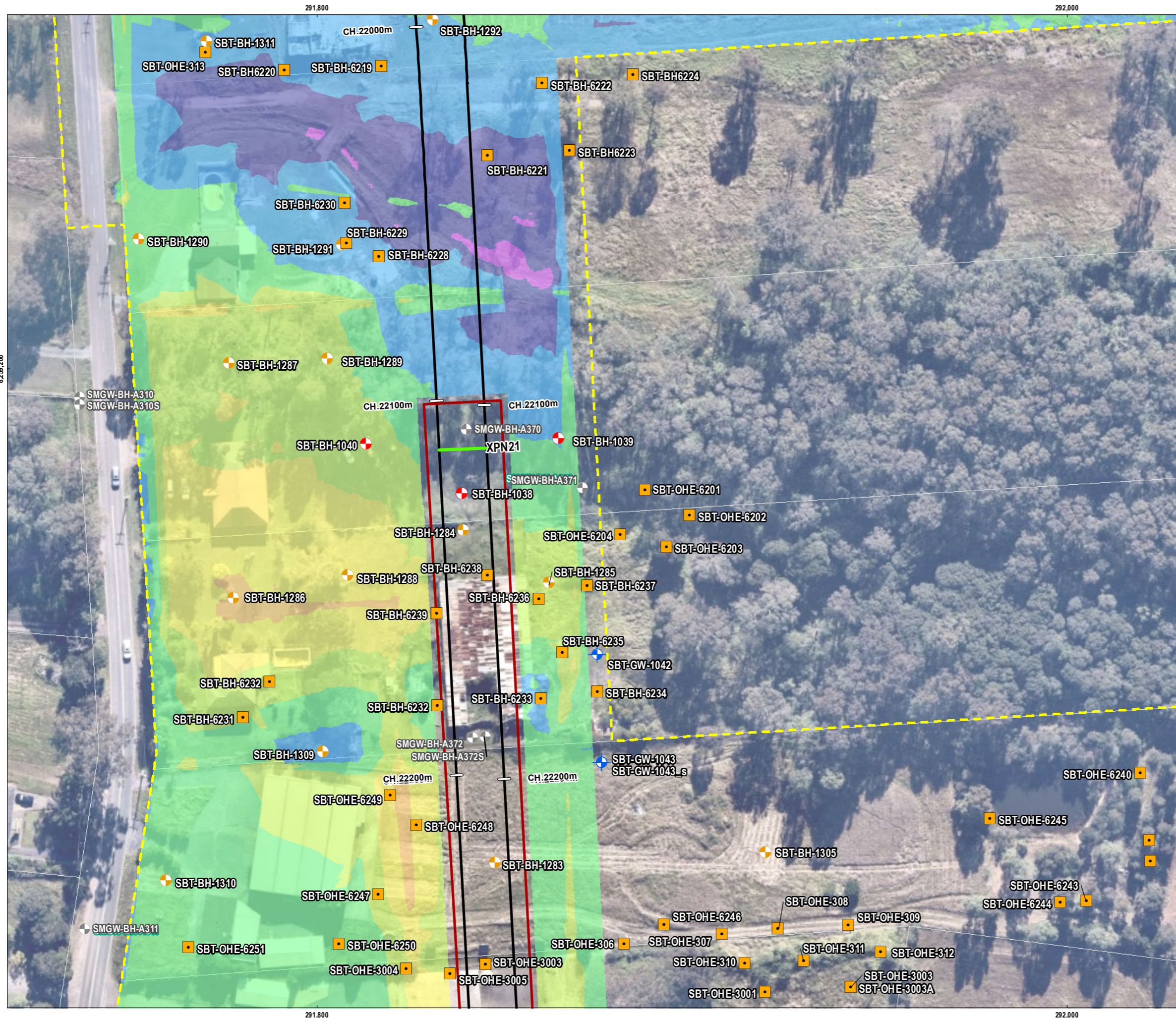
SOURCE
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 WESTERN SYDNEY AIRPORT
 STATION BOXES AND TUNNELLING WORKS

FIGURE 5B
 Site Establishment Works - Orchard Hills Station and Portal Dive Structure

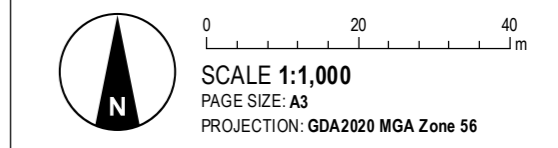




LEGEND

- Additional Contaminated Land Location
 - Borehole
 - Hand Sample
- Additional Geotechnical/Hydrogeological Location
 - Borehole
 - Monitoring Well
- Existing Investigation Location
 - Borehole
- Tunnel Alignment
 - Tunnel Alignment - Chainage
 - Tunnel Alignment - Cross Passage
- Cadastral Boundary
 - Cadastral Boundary
- OH Site Boundary
 - OH Site Boundary
- Station Box and Portal Drive Structure
 - Station Box and Portal Drive Structure
- Cut and Fill
 - 4 m to -3 m
 - 3 m to -2 m
 - 2 m to -1 m
 - 1 m to 0 m
 - 0 m to 1 m
 - 1 m to 2 m
 - 2 m to 3 m

SOURCE
 Contaminated land locations, additional investigations, site boundary, and hand samples from Tetra Tech Coffey. Existing investigations, site layout, station box, cut/fill and alignment supplied by CPBG. Cadastre from DFSI. Aerial imagery from Nearmap (capture date 14-06-2022).



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 STATION BOXES AND TUNNELLING WORKS

FIGURE 5C
 Site Establishment Works - Orchard Hills Station and Portal Dive Structure



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