

Appendix I

Preliminary Site Investigation - Contamination



Port Botany Quayline Equalisation Project

Technical Report: Preliminary Site Investigation -
Contamination

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Client: Port Botany Operations Pty Ltd as Trustee for Port Botany Unit Trust

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Executive summary

Overview

The Port Botany Operations Pty Ltd as Trustee for Port Botany Unit Trust (referred herein as NSW Ports) is seeking approval to undertake works to ensure equitable operational quayline length between the three container stevedore companies operating at Port Botany (the Project). The Project would involve two principal components:

- Construction of an extended quayline (BD12) on the southern side of Brotherson Dock, including dredging of the Brotherson Dock channel and berths to provide material for reclamation of land. This would provide:
 - Extension of the southern side of the Brotherson Dock quayline by around 314 metres to provide a combined quayline length on the southern side of Brotherson Dock of around 1,250 metres to accommodate up to three longer container vessels, commensurate with the quayline length available to stevedore operators in other parts of the port
 - An additional 5.3 hectares of wharf area (wharf hardstand)
- Consequential changes to the bulk liquids berths at the port, including demolition of the existing Bulk Liquids Berth 1 (BLB1), construction and operation of a new Bulk Liquids Berth (BLB3) in a more southerly location, and associated changes to pipework and bulk liquids handling infrastructure within the port. The types and volumes of bulk liquids would remain unchanged.

The assessment presented in this technical report, as part of the EIS, aims to address Secretary's Environmental Assessment Requirements (SEARs), in support of the application for the Project.

Existing environment

The Project Area is situated within a 'highly disturbed' heavily industrialised port setting at Port Botany, approximately one kilometre south-east of Sydney Kingsford Smith Airport and 12 kilometres from the Sydney CBD. It spans both the Bayside and Randwick Local Government Areas and is zoned SP1 – Special Activities. Topographically, the Project Area is located at sea level, with most of the Project Area over open water (Brotherson Dock).

The Project Area and Port Botany are reclaimed estuarine areas. Underlying soils include coastal podosolic sands and, in the areas of the Project over water (Brotherson Dock), shallow sediments ranging from coarse sands to fine silts. Geologically, Holocene coastal and anthropogenic fills overlay Hawkesbury Sandstone, and groundwater beneath the Project Area is described as a productive porous aquifer with varying salinity.

Historically, the area was open water until significant reclamation and dock construction began in the late 1970s and again in the 2000s. Surrounding developments now include bulk liquid storage, chemical handling, and container operations. Multiple Environment Protection Licences under the *Protection of the Environment Operations Act 1999* (NSW) (PEO Act) and contamination notices under the *Contaminated Land Management Act 1997* (NSW) (CLM Act) are associated with nearby industrial facilities.

Previous investigations indicate localised sediment contamination (e.g., metals, total petroleum hydrocarbons (TPH) and tributyltin (TBT)) in Brotherson Dock, with ongoing monitoring efforts to reduce broader risk to nearby receivers.

Assessment

This Preliminary Site Investigation (PSI) has involved a combination of a site inspection, review of previous investigations including AECOM (2024) sediment investigation, and desktop study to assess the presence and likelihood of contamination. The primary objective has been to identify any past or present activities (either on-site or nearby) that may have introduced contaminants into the soil, sediments or groundwater.

A review of available information indicates that there is low risk of complete source, pathway, receiver linkages from unknown existing, known existing and potential new contamination in soil, sediment, surface water and groundwater during construction and operation of the Project. The assessment findings ranked from highest pre-mitigation risk to lowest include those related to:

- Potential for activation of acid sulfate soils (ASS) in sediments during dredging works, necessitating management during excavations through the measures contained within a CEMP(s)
- Land that was previously reclaimed with material of unknown origin. Construction activities may result in exposure of historical contamination and impacts to human health and ecological receivers, requiring mitigation measures to be implemented as detailed within a Construction Environmental Management Plan(s) (CEMP(s))
- Presence of hazardous building materials in aged infrastructure such as BLB1 which would be demolished during the construction works. Demolition activities may result in exposure to these hazardous materials and potential impacts to human health and ecological receivers. Mitigation measures detailed within the CEMP(s) would mitigate this risk.
- Current and historical industrial land use off-site, adjacent and topographically upgradient in close proximity to the Project Area, such as Vopak remediation works as a result of pipeline leak in 2019, Orica groundwater remediation site under regulation, Ampol Banksmeadow Terminal under regulation, Opal site under assessment and Sydney Kingsford Smith Airport under PFAS investigation and management.
- Leaks and spills of chemicals, infrastructure and vehicles during historical industrial land use on-site, although the likelihood of ground contamination is low
- Known impacted (TBT, total TPH, arsenic, lead, mercury and zinc, organochlorine pesticides) sediments in Brotherson Dock where dredging is proposed. Although the risk to receivers from the in-situ impacted sediments is considered to be low, the proposed dredging activities may increase the likelihood of human health and ecological receivers being exposed to potentially impacted sediments. Employment of mitigation measures detailed within the CEMP(s) is proposed to manage potential contamination impacts during dredging activities
- Import of material comprising potentially contaminated material for placement in the reclamation area. Import of material of unknown origin may result in impacts to human health and ecological receivers, requiring mitigation measures such as material management plan as part of a CEMP(s).

Mitigation and management measures

Based on the findings of this PSI, no further investigations (such as a DSI) are considered necessary under the environmental risk management framework of the ASC NEPM (2013).

It is recommended that the CEMP(s) details appropriate contamination management measures and these are implemented for the Project. While the assessed risk is low, to inform and support tailoring of management measures to site conditions and construction activities, it is recommended that targeted sampling and analysis of sediments be carried out. This supplementary investigation work would comprise additional elutriate analysis to meet the NADG (DCCEEW, 2009) guidance and investigation into the presence of acid sulfate soils (ASS) and potential acid sulfate soils (PASS) to meet ASS Assessment Guidelines (ASSMAC, 1998).

Following adoption of this recommended approach through a CEMP(s) for the Project, the desired performance outcomes would be achieved, which is to:

- Help ensure that human and environmental health is protected from risks arising from the disturbance of potential contamination, and
- Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.

Glossary and abbreviations

Term	Description
AEI	Areas of environmental interest
AFFF	Aqueous Film Forming Foam
ANZG	Australian and New Zealand Governments and Australian States and Territory Governments
ASSMAC	Acid Sulfate Soils Management Advisory Committee
BLB	Bulk liquids berth
BTEXN	Benzene, toluene, ethylbenzene, xylenes and naphthalene
CEMP	Construction Environment Management Plan
CHC	Chlorinated hydrocarbons
CLM Act	<i>Contaminated Land Management Act 1997</i> (NSW)
CoPC	Contaminants of Potential Concern
CSM	Conceptual site model
DDE	Dichloro-diphenyl-dichloroethylene
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
facilitated development	The subsequent development facilitated by the Project, being construction and operation of infrastructure for the purposes of container operations, involving: • Installation of up to three new quay cranes • Installation of quay rail sidings • Crane power and control systems. Further details of the facilitated development are provided in Section 3.4 (Facilitated development) of the EIS.
GTP	Ground water treatment plant
HEPA	Heads of EPAs Australia and New Zealand
LEP	Local environmental plan
LOR	Laboratory limit of reporting
Lotsearch	Lotsearch Pty Ltd
LPG	Liquified petroleum gas
LSCC	Landside construction compound (refer to Figure 1-2)
mAHD	Metres Australian height datum
Mbgl	Metres below ground level
NAGD	National Assessment Guidelines for Dredging
NEPC	National Environment Protection Council
OCP	Organochlorine pesticides
PAH	Polycyclic aromatic hydrocarbons

Term	Description
PCB	Polychlorinated biphenyls
PFAS	Per- and poly-fluoroalkyl substances
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (NSW)
Project	The development for which approval is sought under Division 5.2, Part 5 of the EP&A Act, involving: • Construction of an extended quayline (BD12) on the southern side of Brotherson Dock, including dredging of the Brotherson Dock channel and berths to provide material for reclamation of land • Consequential changes to the bulk liquids berths at the port, including demolition of the existing Bulk Liquids Berth 1 (BLB1), construction and operation of a new Bulk Liquids Berth (BLB3) in a more southerly location, and associated changes to pipework and bulk liquids handling infrastructure within the port. Further details of the Project are provided in Chapter 3 (Project description) of the EIS.
SEARs	Secretary's Environmental Assessment Requirements issued under the EP&A Act
TBT	Tributyltin
TOC	Total organic carbon
TPH	Total petroleum hydrocarbons
UCL	Upper confidence limit
VHC	Volatile halogenated compounds
WSCC	Waterside construction compound

1.0 Introduction

1.1 Project context and overview

The Port Botany Operations Pty Ltd as Trustee for Port Botany Unit Trust (referred herein as NSW Ports) is seeking approval to undertake works to provide equitable operational quayline length between the three container stevedore companies operating at Port Botany (the Project). The Project would involve two principal components (refer to Figure 1-1):

- Construction of an extended quayline (BD12) on the southern side of Brotherson Dock, including dredging of the Brotherson Dock channel and berths to provide material for reclamation of land. This would provide:
 - Extension of the southern side of the Brotherson Dock quayline by around 314 metres to provide a combined quayline length on the southern side of Brotherson Dock of around 1,250 metres to accommodate up to three longer container vessels, commensurate with the quayline length available to stevedore operators in other parts of the port
 - An additional 5.3 hectares of wharf area (wharf hardstand)
- Consequential changes to the bulk liquids berths at the port, including demolition of the existing Bulk Liquids Berth 1 (BLB1), construction and operation of a new Bulk Liquids Berth (BLB3) in a more southerly location, and associated changes to pipework and bulk liquids handling infrastructure within the port. The types and volumes of bulk liquids would remain unchanged.

The extended quayline and associated wharf area would be constructed and made available for further development in future by a stevedore. NSW Ports does not seek approval for this further development, including construction and operation of infrastructure for the purposes of container.

A more detailed description of construction and operation of the Project are provided in Chapter 3 (Project description) of the EIS.



Figure 1-1 Project overview

1.2 The Project

Construction and operation of the Project is summarised in the following sections and described in detail in Chapter 3 (Project description) of the EIS.

1.2.1 Construction of the Project

A high level summary of the key construction activities for the Project are provided in Table 1-1. An indicative construction program for each construction phase is shown in Figure 1-3.

Table 1-1 Key construction activities

Construction phase	Key construction activities
Enabling works and establishment of construction compounds	Site establishment and enabling works would be required to establish four landside construction compounds (LSCCs) and one waterside construction compound (WSCC) (refer to Figure 1-2). Temporary environmental and safety controls, such as erosion and sediment controls would be implemented.
Construction of the new BLB3	Construction of BLB3 would involve: • Construction of a suspended deck structure, requiring approximately 119 piles • Installation of BLB3 infrastructure and mooring dolphins, new pipeline rack and exchange facility, and electrical services • Construction of a new operations/ control facility and new emergency egress at the existing BLB2.
Decommissioning and removal of BLB1 and tugboat jetty	Decommissioning and demolition activities would involve: • Demolition and removal of the tugboat jetty south of BLB3 • Cessation of operations associated with BLB1, and flushing and pigging (pipe clearing) of pipelines associated with BLB1 • Demolition and removal of BLB1 infrastructure and associated pipelines.
Construction of the extended quayline (BD12) and wharf area	Construction of the extended quayline (BD12) on the southern side of Brotherson Dock would involve two main activities: • Construction of a bund wall, dredging and reclamation works: - Construction of a bund wall including a core, geofabric textile layer, and outer rock armour layer - Progressive dredging of Brotherson Dock, filling behind the bund wall - Compaction of dredged materials within the reclamation area • Piling and wharf deck construction, requiring approximately 380 piles with anticipated lengths of up to 70 metres.
Site demobilisation	Construction sites and compounds would be removed. Disturbance areas would be reinstated to pre-construction conditions. Disturbance areas used for construction would be reinstated to conditions comparable to those existing prior to the commencement of construction.



Figure 1-2 Indicative construction compound locations

	Indicative timing																							
	2027				2028				2029				2030				2031				2032			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Enabling works																								
Establishment of construction compounds and laydown area works																								
Construction of the new BLB3 construction																								
Decommissioning and removal of BLB1 and tugboat jetty																								
Construction of bund wall, dredging and reclamation																								
Piling and wharf deck construction																								
Site demobilisation																								

Figure 1-3 Indicative construction phases and timing

1.2.2 Operation of the Project

The key operational components of the Project are shown in Figure 1-1 and summarised in Table 1-2. The extended Brotherson Dock and BLB3 would operate 24 hours a day, 7 days a week, consistent with existing operations at Port Botany managed by the stevedores.

Table 1-2 Project operation

Key operational component	Description
Extended quayline (BD12) and wharf area	The extended quayline would allow for the southern side of Brotherson Dock to accommodate longer ships, consistent with the longer quaylines available to other stevedores operating within the port. The key operational components would include: • An extended BD12 wharf area within the reclaimed area along and behind the extended quayline • A hardstand area around 5.3 hectares in area, composed of the reclaimed area (4 hectares) and suspended deck (1.3 hectares) • Forty-eight fenders along the BD12 quayline to absorb the impact of ships and provide secure points for vessels to tie up their mooring lines • Supporting services, including drainage and security.
BLB3 to replace BLB1 including associated pipeline infrastructure	The new BLB3 would operate similarly to the current BLBs, but would be located further south. BLB3 would be connected to the existing pipeline network or directly into the existing bulk liquids and gas tenancies that use this berth. The key operational components of the BLB3 would include: • A central working platform, including (but not limited to) three marine loading arms to transfer bulk liquids from ships to shore facilities, and provision for up to five additional arms • Access bridges connecting shore to the central working platform to the vessels, providing vehicle and pedestrian access, as well as a pipeline corridor • Additional emergency egress from BLB2 to shore • Pipeline infrastructure including: - Extension of the existing bulk liquids pipeline corridor along Fishburn Road from the BLB3 pipe manifold to existing Vopak and Elgas bulk liquids storage locations - An additional pipeline along Fishburn Road to the existing BLB2 exchange facility, replacing the existing BLB1 bitumen pipelines - An additional bulk liquids exchange facility located on Fishburn Road • Utilities including power, lighting, security, water, sewer, communications.

1.3 Purpose of this report

This report is one of a number of technical documents that forms part of the EIS. The purpose of this technical report is to assess the risks associated with contaminated land and the potential impact to human or environmental health, in response to the Secretary Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Housing and Infrastructure (DPHI) (refer to Section 1.3.1), and to engage with agencies (refer to Section 1.3.2).

1.3.1 Assessment requirements

The SEARs, issued by DPHI, relating to contamination and soils, and where these requirements are addressed in this technical report are outlined in Table 1-3.

Table 1-3 Secretary's environmental assessment requirements – Contamination and soils

Issue and desired performance outcome	Requirement	Section where addressed in report
Contamination Human and environmental health is protected by understanding the presence and risks associated with contaminated land, including impacts to soils, groundwater, surface water and sediments Contamination risks are independently considered consistent with the auditing regime established under the <i>Contaminated Land Management Act 1997</i>	Prepare a Preliminary Site Investigation which identifies past and present potentially contaminating activities and land uses, the likelihood of contamination (which includes soils, dredging, groundwater, ground gas, surface water and sediments, where applicable) the potential contamination types and need for further investigations. <i>Note: Preliminary sampling and analysis may be required to assess the need for a detailed investigation where contaminating activities are known to have occurred / are occurring or if the site history is incomplete</i>	Refer to Chapter 3.0. Based on the findings of this PSI, no further investigations (such as a DSI) are considered necessary under the environmental risk management framework of the ASC NEPM (2013).
	Where contamination is considered likely based on past or current land uses or other factors (such as offsite contamination migrating onto the site), and the Preliminary Site Investigation identifies the need for further investigation, a Detailed Site Investigation/s must be undertaken to determine the nature and extent of the contamination.	Based on the findings of this PSI, no further investigations (such as a DSI) are considered necessary under the environmental risk management framework of the ASC NEPM (2013).
	Where contamination exists, assess if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination.	Refer to Chapter 3.0 and Chapter 3.12. Based on the findings of this PSI, remediation of land is not required.

Issue and desired performance outcome	Requirement	Section where addressed in report
	Any Preliminary Site Investigation, Detailed Site Investigation, or other related reports on contamination (including but not limited to a Sampling Analysis Quality Plan), must be accompanied with an Interim Audit Advice or a Site Audit Statement from a NSW EPA accredited Site Auditor certifying the appropriateness of the assessments. Any risk rating of areas of environmental interest (or areas of environmental concerns or any other similar terminology) as well as the proposed mitigation measures must be also reviewed as appropriate by the accredited Site Auditor.	This Preliminary Site Investigation has been reviewed by an EPA accredited site auditor and Interim Audit Advice prepared (refer to Annexure B ¹).
	Document how the assessment of contaminated land has had regard to the relevant guidelines for contaminated land made or approved under s105 of the <i>Contaminated Land Management Act 1997</i> .	Refer to Chapter 2.0
	All reports on contamination must be prepared by a suitably qualified contaminated land consultant who may also be certified.	This report has been prepared by a suitably qualified contaminated land consultant who is a Certified Environmental Practitioner (Site Contamination) (CEnvP (SC)).
	Consideration must be given to the Orica site remediation Project and how the proposed Project interacts with the existing contamination from that site, including movement from the Orica site via groundwater or any other means. This must be documented within the EIS.	Refer to Section 3.11
Soils The environmental values of land, including soils, subsoils and landforms, are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.	Verify the risk of acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Risk Map) within, and in the area likely to be impacted by, the Project.	Refer to Section 3.5.3.
	The impact of the Project on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.	Refer to Chapter 3.12.
	Identify whether soil salinity is likely to be an issue and if so, determine the presence, extent and severity of soil salinity within the Project Area, and assess the impacts of the	Refer to Section 3.5.2.

¹ The Site Auditor's Interim Audit Advice is included as Annexure B. The advice is based on an earlier design of the Project, which included a northern waterside compound (WSCC02). The removal the northern waterside compound does not have any implications to the outcome of the Interim Audit Advice

Issue and desired performance outcome	Requirement	Section where addressed in report
	Project on soil salinity and how it may affect groundwater resources and hydrology.	
	The impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines.	Refer to Section 3.5.1.

1.3.2 Agency engagement

The NSW Environment Protection Authority (EPA) was consulted through a meeting held on 23 January 2025. The purpose of the meeting was to brief the EPA on the Project and the proposed contamination assessment methodology. The EPA was informed of the sediment investigations that had been conducted and how the potential contamination impacts of the Project were being assessed in accordance with the National Assessment Guidelines for Dredging (NAGD) (DCCEEW, 2009). The meeting with the EPA was also used to outline planned additional sediment investigations, and a preliminary outline of likely mitigation and management measures.

The findings of the PSI were presented to DPHI, EPA, and NSW Department of Climate Change, Energy the Environment and Water (DCCEEW) during a meeting on 16 April 2025. The purpose of the meeting was to inform the government agencies of the:

- Methodology used for the assessment
- Identification of areas of environmental interest (AEIs) and associated Contaminants of Potential Concern (CoPC)
- Mitigation and management measures to be implemented during the construction works
- Discussion of targeted supplementary sampling and analysis of sediments that would be carried out to inform the preparation of a Construction Environmental Management Plan(s) (CEMP(s) for the Project, including tailored contamination management measures.

The meeting also informed the government agencies that an NSW EPA accredited Site Auditor had been engaged by NSW Ports to review this Preliminary Site Investigation.

2.0 Assessment approach

2.1 Legislation, policy, guidelines and standards

The relevant legislation for contaminated land matters that have been considered during the preparation of this report include:

- *Contaminated Land Management Act 1997* (NSW) (CLM Act)
- *Protection of the Environment Operations Act 1997* (NSW) (POEO Act)
- *Environmentally Hazardous Chemicals Act 1985* (NSW).

The following policies and key guidelines, which are relevant to the assessment of potentially contaminated land in NSW, have been considered during the preparation of this report:

- *Protection of the Environment Operations (Waste) Regulation 2014* (NSW) (POEO Waste Regs)
- *State Environment Planning Policy (Resilience and Hazards) 2021*
- Australian and New Zealand Governments and Australian States and Territory Governments (ANZG), Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)
- Acid Sulfate Soils Management Advisory Committee (ASSMAC), Acid Sulfate Soils Assessment Guidelines (ASSMAC, 1998)
- Department of Planning and Infrastructure (DPI) Western Australia, Acid Sulfate Soils Planning Guidelines (DPI Western Australia , 2008)
- National Chemical Working Group of the Heads of EPAs Australia and New Zealand (HEPA), Per- and Poly-fluoro Alkyl Substances PFAS National Environmental Management Plan, Version 2.0 (HEPA, 2025) (Noting Version 3.0 issued March 2025)
- NSW EPA, Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (NSW EPA, 2015)
- NSW EPA, Waste Classification Part 1: Classifying Waste and Part 4: Acid Sulfate Soils (NSW EPA, 2014)
- NSW EPA, Environmental Guidelines: Solid Waste Landfills, Second (NSW EPA, 2016)
- NSW EPA, Contaminated Land Management – Guidelines for the NSW Site Auditor Scheme (3rd edition) (NSW EPA, 2017)
- NSW EPA, Assessment and Management of hazardous ground gases – Contaminated Land Guidelines (NSW EPA, 2020a)
- NSW EPA, Consultants reporting on contaminated land – Contaminated Land Guidelines (NSW EPA, 2020b)
- NSW EPA, Sampling design part 1 – application Contaminated Land Guidelines (NSW EPA, 2022a)
- NSW EPA 2022b. Sampling design part 2 – interpretation Contaminated Land Guidelines (NSW EPA, 2022b)
- NSW Department of Urban Affairs and Planning (DUAP) and NSW EPA, Managing Land Contamination (NSW EPA & DUAP, 1998)
- NSW Department of Environment and Conservation (DEC), Guidelines for the Assessment and Management of Groundwater Contamination (DEC , 2007)
- National Environment Protection Council (NEPC), National Environment Protection (Assessment of site Contamination) Measure as amended 2013 (NEPC, 2013)

- Western Australia Department of Health (WA DoH) (2021) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (WA DoH, 2021). Note that revised 2021 version of this guideline has yet to be endorsed by the NSW EPA.

2.2 Methodology

This section describes the framework used to assess potential contamination impacts associated with the Project. The assessment of potential contamination impacts has considered the findings of relevant previous assessments and additional investigations carried out for the Project (refer to Section 3.9).

This Preliminary Site Investigation (PSI) identifies past and present potentially contaminating activities to indicate the likelihood of encountering contamination or need for further investigation prior to construction of the Project. The methodology has broadly included the following steps:

- Definition of a study area (the Project Area) to assess potential contamination impacts associated with the Project
- Desktop review of available previous and relevant reports and a review Lotsearch Pty Ltd (Lotsearch) report for the Project Area
- A visual inspection of the Project Area on 31 October 2024 by the authors of this PSI
- Identification of potential AEIs and CoPC within the Project Area
- Development of a preliminary conceptual site model (CSM) for AEIs identified from the desktop review to assess potential human health and/or ecological risks in the context of the Project
- Qualitative evaluation of contamination risks posed by the Project (including the potential for soil vapour, ground gas, and soil, sediment, surface water and groundwater contamination)
- Assessment of whether the land is contaminated and whether remediation is required, or if there is the need for further investigation
- Identification of appropriate mitigation and management measures.

The following sections outline the detailed methodology applied to the preparation of this PSI. This methodology has been used for the construction assessment of the Project.

2.2.1 Study area

The study area for this PSI includes all locations that may be affected during construction and operation of the Project. The study area for the contamination assessment has been taken to be the Project Area (refer to Figure 1-1).

2.2.2 Desktop review

A desktop review of available information has been carried out, including:

- Available previous and relevant contamination reports for parts of Port Botany which included:
 - Port Botany Expansion Environmental Assessment (URS, 2003)
 - BLB2 Environmental Assessment (SKM, 2007)
 - Site Audit Report for QENOS Port Botany Hydrocarbon Storage Terminal (Environ Australia Pty Ltd, 2015)
 - Characterisation of Sediment Quality in Port Botany (Geochemical Assessments Pty Ltd, 2020a)
 - Characterisation of Sediment Quality in Brotherson Dock (Geochemical Assessments Pty Ltd, 2020b)
 - Sediment Contamination Assessment Maintenance Dredging Areas, Port Botany (AECOM, 2024a)
 - Orica Groundwater Treatment Plant – Annual Groundwater and Surface Monitoring Report (WSP, 2024)

- Joint User Hydrant Installation (JUHI) Pipeline Leak – Post Remediation Targeted Monitoring Program Oct 25/ Jan 25 (Ramboll Australia, 2025)
- Lotsearch reports for the Project Area which included:
 - NSW EPA records of:
 - Contaminated sites notified to the NSW EPA under section 60 of the CLM Act
 - Contaminated sites currently or formerly regulated by the NSW EPA (Record of Notices)
 - Former gasworks sites
 - EPA Per- and Poly-Fluoroalkyl Substances (PFAS) investigation program
 - Licensed premises, delicensed premises still regulated by NSW EPA, licences surrendered, clean up and penalty notices issued by NSW EPA
 - Sites listed on the National Waste Management site database
 - Historical business activities from Universal Business Directories, Business to Business Directory including dry cleaners, motor garages and service stations (for the years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 and 1950)
 - Historical aerial photographs (generally one per decade between 1930s and 2020s)
 - Historical topographic and parish survey maps
 - Hydrogeology and registered groundwater wells
 - Published geology, soils, acid sulfate soil risk, dryland salinity potential risk maps
 - Land use zonings under the applicable local environmental plans
 - Listed heritage items.

2.2.3 Site inspection

A visual inspection of the Project Area from publicly accessible land was conducted on 31 October 2024 by the authors of this PSI to assist in the description of the existing environment.

2.2.4 Preliminary conceptual site model (CSM)

As detailed in the NEPC Assessment of Site Contamination Measure as amended 2013 (NEPC, 2013), the development of a CSM is a key component of contaminated site assessments and provides the framework for identifying how potential receivers may be exposed to contamination from previous or current sources.

A preliminary CSM have been developed for the AEIs identified from the desktop review to understand and help assess potential human health and/or ecological risks in the context of the Project. The CSM identifies potential contamination sources, receivers and exposure pathways. The sources, pathways and receivers have been identified through information obtained from the desktop review and Project Area site inspection. Preliminary contamination risks have been identified through the CSM risk taking into account relevant AEIs and associated CoPCs, and assuming no mitigation or management measures are implemented. This has provided a conservative assessment of contamination risks and potential exposure pathways, and formed a robust basis for identifying appropriate mitigation and management measures.

2.2.5 Risk evaluation

A qualitative risk evaluation has been completed based on the preliminary CSM developed for the Project, and has been used to inform the assessment of potential construction phase (refer to Section 3.12 (Assessment of construction impacts)) and operational phase (refer to Section 5.0 (Assessment of operational impacts)) contamination impacts. The CSM and the qualitative risk ranking have focused on construction and operation of the Project.

The qualitative risk evaluation has involved:

- Identifying whether a complete exposure pathway currently exists between a contamination source and a potential receiver
- Assessing the severity and extent of contamination likely to be present and the potential for it to be disturbed or affected by the Project
- Determining whether there is potential for a complete exposure pathway between a contamination source and a potential receiver to be formed as a result of construction and/or operation of the Project.

Contamination risks have been evaluated through a combination of exposure pathways and receivers, and contamination severity and extent, according to the evaluation matrix presented as Table 2-1.

2.2.6 Avoidance and minimisation

The Project would be located within an industrial port environment that is known to be contaminated from historical development and activities both within and around the port. Due to the nature of the Project as an extension of existing port infrastructure and the requirement to source reclamation material from within Brotherson Dock, it is not possible to entirely avoid interaction with existing contamination.

A key focus of the Project is therefore on minimisation and management of potential impacts arising from interacting with, handling and potentially reusing materials with known or suspected contamination. Mitigation and management measures are detailed in Chapter 7.0 (Mitigation and management measures).

Table 2-1 Risk evaluation matrix

		Contamination severity and extent		
		Low potential for contamination to be present in the media of concern at concentrations above the relevant assessment criteria and limited in extent	Contamination potentially present in the media of concern at concentrations above the relevant assessment criteria and limited in extent	Contamination confirmed present in the media of concern at concentrations above the relevant assessment criteria and potentially widespread
Exposure pathways and receivers	Media of concern is unlikely to coincide with or otherwise be affected by the Project AND/OR No or unlikely exposure pathway for human or ecological receivers during construction or operation	Low	Low	Medium
	Media of concern may coincide with or otherwise be affected by the Project AND Exposure pathway for human or ecological receivers could be present and complete during construction or operation	Low	Medium	Medium
	Media of concern would coincide with or otherwise be affected by the Project AND Exposure pathway for human or ecological receivers could be present and complete during construction or operation	Low	Medium	High

2.2.7 Cumulative impact assessment

Cumulative impacts have the potential to occur when benefits or impacts from a development overlap or interact with those of other developments, potentially resulting in a larger overall impact (positive or negative) on the environment or local communities. Cumulative impacts may occur when developments are constructed or operated concurrently or consecutively, within the same area.

The extent to which another development or activity could interact with the construction and/ or operation of the Project would depend on its location, scale, and/ or timing of construction or operation. A screening assessment was undertaken to identify projects that may contribute to potential cumulative impacts. Refer to Chapter 18 (Cumulative and facilitated impacts) of the EIS for details of the full cumulative impact assessment methodology adopted for the Project. Based on this screening, the following four developments were identified to have potential for cumulative impacts with the Project:

- CP Group and KLF Group Waste Management Facility, Botany
- Modification of Orica Chlor-Alkali Plant, Botany Industrial Park
- Orica Southlands Warehouse Estate Stage 3
- Stephen Road Multi-level Warehouse, Banksmeadow.

The location of these projects is shown on Figure 2-1.

An assessment of potential cumulative impacts between these screened developments and the Project relevant to contamination and soils during construction and operation is presented in Section 6.2.

2.2.8 Facilitated impact assessment

Although the Project would involve construction of an extended quayline (BD12) and wharf area, it would not include the subsequent construction or operation of infrastructure for the purposes of container operations. Any future development of such infrastructure would be separately progressed by the stevedore.

Although installation and operation of infrastructure for the purposes of container operations does not form part of the Project, this would only be possible once the Project is completed and therefore are considered to be reasonably foreseeable outcomes of the Project's development.

Construction and operation of infrastructure for the purposes of container operations on the extended quayline and wharf area has been considered, where relevant, as a facilitated development. Consideration of potential facilitated impacts relevant to contamination and soils associated with the facilitated development is presented in Section 6.3.

2.2.9 Limitations, uncertainties and assumptions

The following limitations, uncertainties and assumptions apply to this assessment:

- The assessment has been based on available contamination sampling and analytical data, which by its nature is not comprehensive and limited to the spatial extent and scope of testing. All contamination investigations have inherent uncertainties, and these have been minimised for assessment of the Project through review of soil, sediment and groundwater data from previous investigations (URS, 2003) (SKM, 2007) (Environ Australia Pty Ltd, 2015) (Geochemical Assessments Pty Ltd, 2020a)

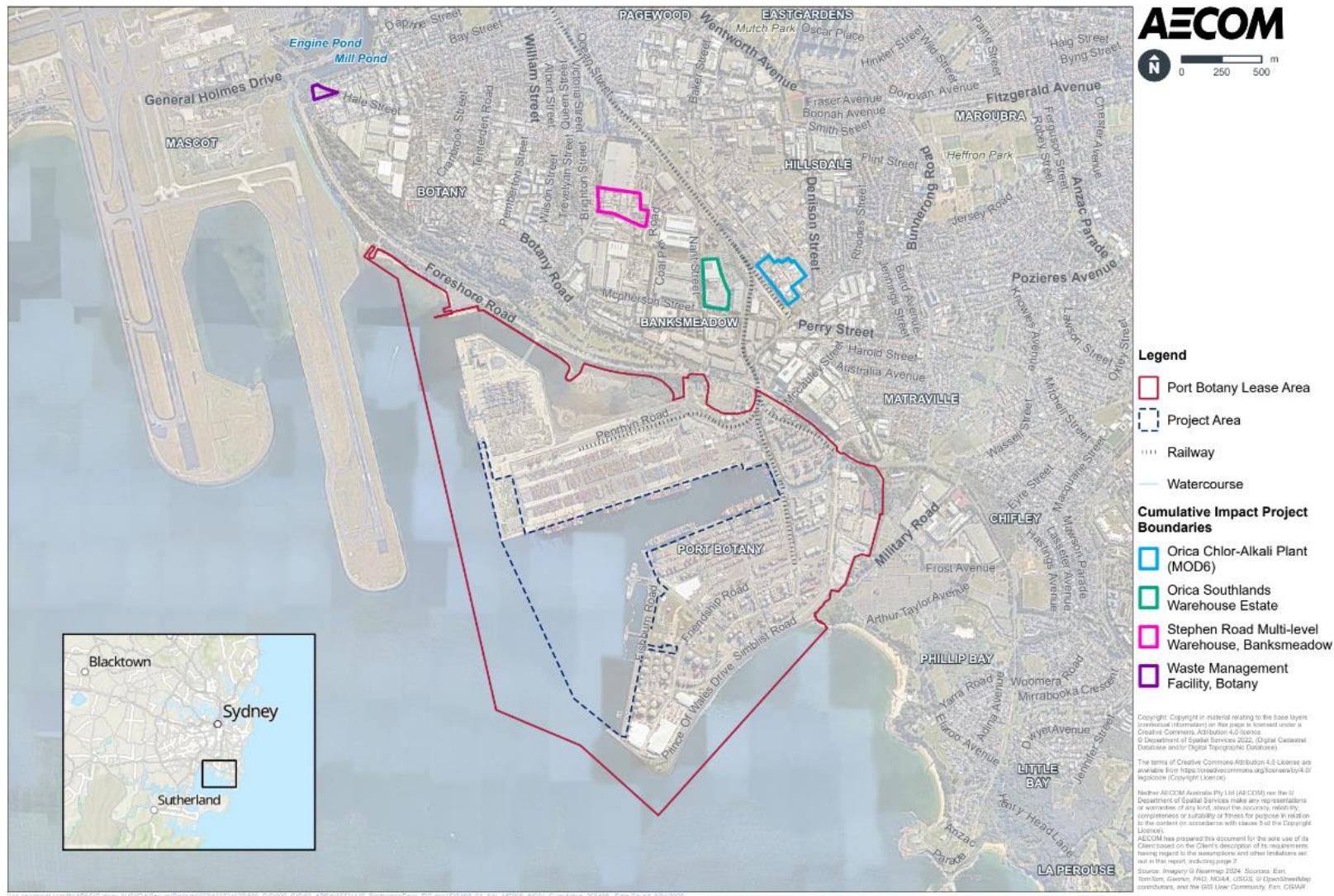


Figure 2-1 Developments considered as part of the cumulative impact assessment

3.0 Existing environment

3.1 Site context

The Project would be located in Port Botany around one kilometre south-east of Sydney Kingsford Smith Airport (refer to Figure 1-1). The suburb of Botany is predominantly industrial, including the port and airport, and it flanked to the north, south and east by pockets of residential, industrial and recreational land.

3.2 Land use

The Project Area is zoned as SP1 – Special Activities and is located within Port Botany, an existing seaport which mainly trades containerised products. It is flanked to the west by water zoned W3 Working Waterways and a portion of unzoned land within Botany Bay.

The non-industrial shoreline of Botany Bay includes strips of parkland, zoned RE1 Public Recreation and C1 National Parks and Nature Reserves. A large area of IN1 General Industrial is positioned to the north of the Project Area, with a patchwork of typically residential neighbourhoods (R2 Low Density Residential and R3 Medium Density Residential) located on the steeper topography rising to the east towards the ridgeline that extends between La Perouse and Kingsford.

3.3 Topography and hydrology

The Project Area is located at around sea level, reflective of its port-related land use. The topography around the study area broadly falls from a ridgeline to the east, extending north from La Perouse towards Kingsford. To the west, the ridgeline of Arncliffe to Rockdale falls towards the low-lying Brighton-Le-Sands and Sans Souci. South of the study area is Botany Bay which is bounded to the south by the Kurnell Peninsula. The Kurnell peninsula is largely low lying with a maximum 31-40 m elevated headland to the east.

3.4 Geology

The study area features a range of Holocene to present-day deposits, including coastal and anthropogenic sequences. Within the study area, there are bay sand sheet deposits (ID: QH_byw) consisting of well-sorted quartzose sand, and reclaimed estuarine areas raised by imported fill material (ID: QH_hr). Nearby, there are beach dune facies with aeolian-reworked sands (ID: QH_bd), estuarine interbarrier creek deposits containing clastic sediments (ID: QH_ei), and bedrock-mantling dune sands (ID: QH_bdr). The underlying Hawkesbury Sandstone (Triassic) shows cross-bedded quartz sandstone sequences (ID: Tuth). The regional geology, sourced from the Lotsearch Report (Annexure A), is presented in Figure 3-1.

3.5 Soils

The Atlas of Australia Soils describes areas north-east and east of the study area being underlain by coastal podosolic sandy dune deposits (refer to Figure 3-1). Coastal podosols are characterised by highly leached siliceous sands, which typically accumulate ferrous and organic content through the various layers of soil, meaning the soils accumulate iron and organic matter with depth.

The *Soil Landscapes of Central and Eastern NSW* dataset classifies soils within the study area as 'highly disturbed', which is a typical classification in a land reclamation area. The study area and Port Botany are reclaimed estuarine areas. The sea bed floor within the section of the study area over water (Brotherson Dock) is comprised of shallow marine sediments, ranging from coarse sand to fine silts that support benthic environments (lowest level of a body of water that supports biological activity) described further in Technical report: Marine ecology (Appendix F to the EIS). In these benthic areas, sediments are typically finer further from the shoreline and are finest in the deepest parts of the study area.

3.5.1 Soil erosion

Given the lack of exposure of surficial soils/ sediments, there is likely to be minimal surface erosion in the study area. Shallow marine sediments, particularly along the existing shoreline of the port near Foreshore Road and Fishburn Road are likely to be mobile due to both the natural entrainment of sediment with marine currents, as well as with the movement of ships throughout the port. Technical report: Coastal processes (Appendix D to the EIS) further discusses the existing and potential tidal movements within and around the study area.

There is limited erosion potential in terrestrial parts of the study area given that soils only exist beneath hardstand surfaces. In the marine parts of the study area, marine sediments are subject to maintenance dredging and therefore disturbed.

3.5.2 Salinity

Given the coastal/ marine setting of the study area, the existence of dryland salinity is highly unlikely. The *National Land and Water Resources Dryland Salinity* dataset does not list the study area as being susceptible to dryland salinity.

3.5.3 Potential acid sulfate soil/potential acid forming rock

The potential for acid sulfate soils with the study area is notable due to the coastal setting and the underlying geological conditions. According to the *Atlas of Australian Acid Sulfate Soils* dataset, the majority of the study area has a high probability (> 70 per cent) of acid sulfate soil occurrence. A small area of land within the study area that is situated beneath the existing dock structure is listed as having a low probability (6 – 70 per cent) of acid sulfate soils (ASS) occurring. The extent of potential acid sulfate soils (PASS) at, and in the immediate vicinity of the study area, is presented in Figure 3-2.

3.6 Hydrogeology

The aquifer beneath and around the study area is described as being porous, and of high productivity. Based on the available groundwater borehole data provided in the Lotsearch report (Annexure A), the nearest functional boreholes vary in total depth from 3 to 160 metres below ground level (mbgl). Salinity varies, reflecting a mix of freshwater and saline conditions, with borehole ID:10041552 (417 m south) showing high salinity at 30,000 mg/L and borehole ID:10018622 (418 m south) at a much lower salinity of 1.6 mg/L. The standing water levels are available for some bores, such as ID:10123486 at 1.9 mbgl (459 m northeast) and 10122471 at 4.82 mbgl (517 m northeast). Although there are three monitoring wells listed in the study area (ID:10131454, ID:10126611 and ID:10117195) there are no details available pertaining to the groundwater conditions at these specific locations. The approximate locations, as extracted from the Lotsearch Report (also showing the registered borehole ID) (Annexure A), is shown in Figure 3-3.

The terrestrial part of the study area on the southern side of Brotherson Dock is subject to Area 2 under the Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024 (refer to Figure 3-4). Groundwater in this area is known to be contaminated, including with chlorinated hydrocarbons and other solvents, petroleum hydrocarbons (such as petrol and diesel), and some heavy metals such as chromium, nickel, lead and arsenic. Groundwater abstraction is prohibited in Area 2. Waterside construction compound (WSCC01) on the northern side of Brotherson Dock is not similarly restricted. The Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024 does not place restrictions on the marine parts of the study area.



Figure 3-1 Regional geology

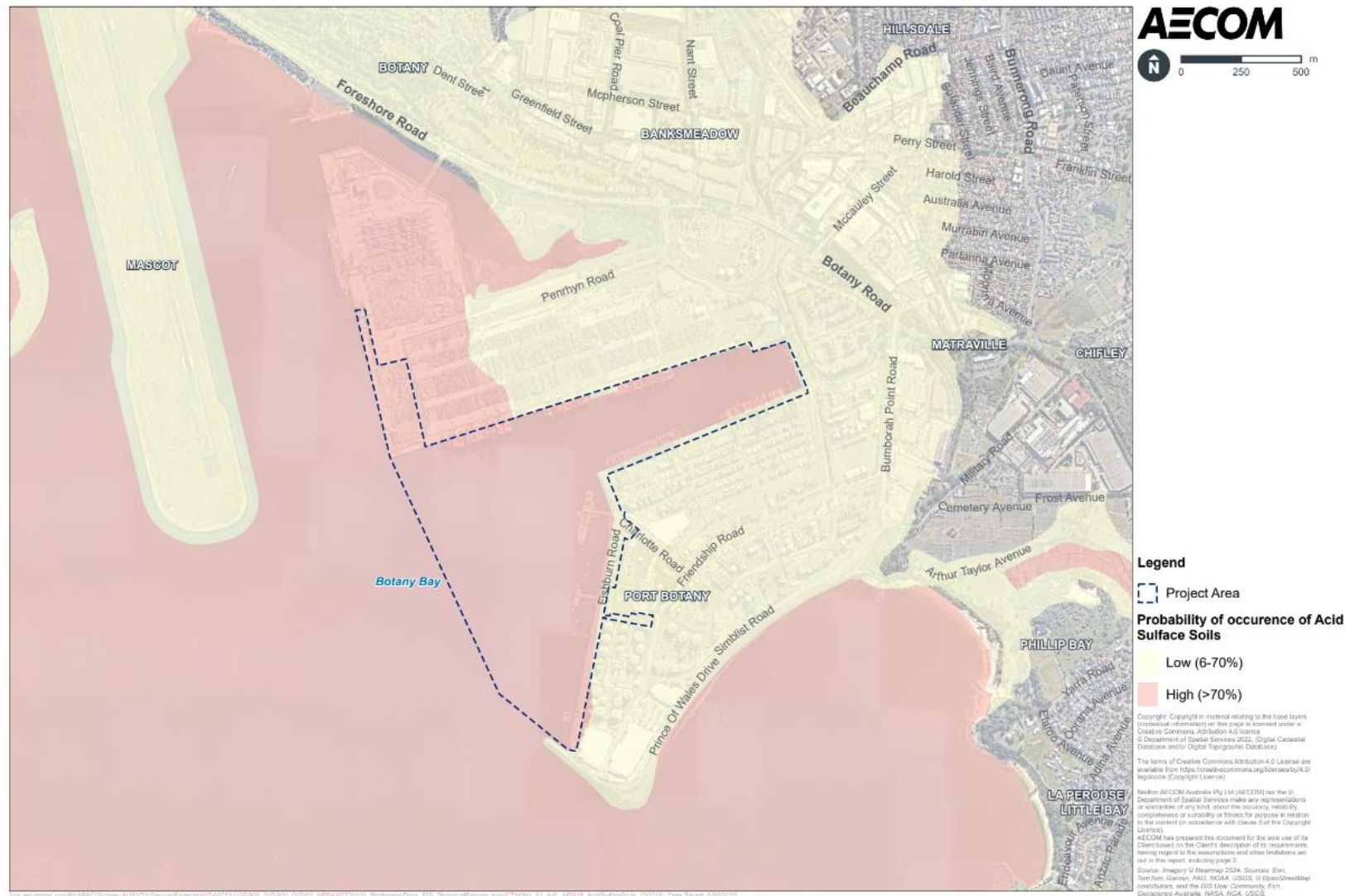


Figure 3-2 Potential acid sulfate soils



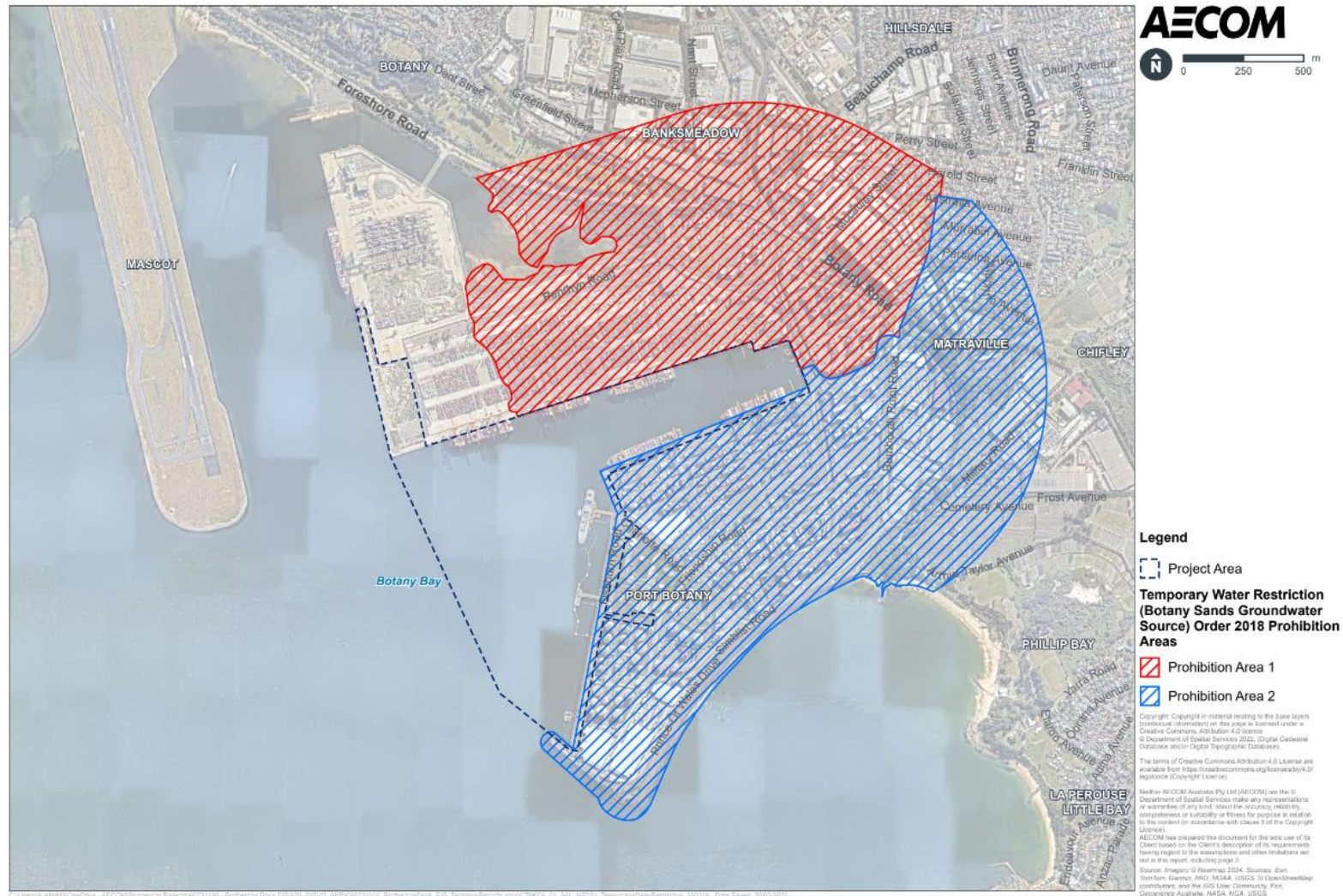


Figure 3-4 Restrictions on groundwater abstraction under the Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024

3.7

Historical land use

3.7.1

Historical aerial photographs

Table 3-1 summarises key features of the Project Area at points in time based on historical aerial photographs and maps.

From 1930 to 1970, the Project Area remained open water within Botany Bay, exhibiting no natural land surface features or man-made structures. According to historical maps from 1917 to 1935, the Project Area continued to be part of Botany Bay's open waters during this period. Significant changes began in 1975 when a small portion of the Project Area was depicted as being part of the Bunnerong Power Station site on historical maps. By 1978, aerial imagery showed that the south-eastern and north-eastern parts of the Project Area had been developed into Brotherson Dock in its current formation, featuring a dedicated ship dock at the centre. The Project Area remained largely unchanged in subsequent years until 2014, when an additional ship dock was constructed in the southern portion. As of 2024, the Project Area continues to function in largely the same configuration.

Initially, the surrounding area (around the Project Area) from 1930 to 1970 was predominantly open water, with minimal development noted in both aerial imagery and historical maps. By 1935, maps indicated the emergence of roads and demarcated land parcels to the north and east, with suburbs like Mascot, Botany and Matraville labelled. The 1975 maps showed substantial development: the area east of the Project Area was labelled as the Bunnerong Power Station, Sydney Kingsford Smith Airport had been established to the west, and there was a significant increase in roads and building structures north and east of the Project Area. Aerial imagery from 1978 revealed the development of Brotherson Dock to the north, northeast, and east, including associated shipping channel dredging, tank infrastructure and roads. Throughout the 1980s and 1990s, the dock area saw extensive development with the addition of large hardstand areas, above-ground storage tanks, warehouse buildings, cranes, and shipping container storage yards. By 2014, the tank farm south of the Project Area had expanded with six new large tanks. In 2024, further expansions included additional shipping container storage to the northwest and a significant growth in the tank farm to the southeast, marking the highest concentration of shipping containers in the area's history.

Table 3-1 Summary of historical aerial photographs and historical maps

Historical aerial imagery		
Date	Project Area	Surrounding area
1930	The Project Area is open water at Port Botany, with no natural surface features or man-made structures present.	The surrounding area is predominantly comprised of open water.
1955	The Project Area appears unchanged.	The surrounding area appears unchanged.
1961	The Project Area appears unchanged.	The surrounding area appears unchanged.
1965	The Project Area appears unchanged.	The surrounding area appears unchanged.
1970	The Project Area appears unchanged.	The surrounding area appears unchanged.
1978	The Project Area still predominantly comprised of open water. The south-eastern and north-eastern portions of the Project Area are now developed with Project Area in its current formation. There is a dedicated ship dock in the centre of the Project Area. The parcels of land in which the LSCC proposed construction laydown areas are now established. BLB1 is evident in the aerial image.	The areas to the north, northeast and east of the Project Area have been developed. The aerial imagery is of low resolution and some Project Area features are not discernible, however, the ground surface appears to be comprised of sand, with some small above ground tank infrastructure to the south and numerous roads to the north.

Historical aerial imagery		
1982	The Project Area appears unchanged.	Port Botany has undergone extensive development, with large hardstand areas now present, many above ground storage tanks to the south, and a number of warehouse buildings to the north. This is the first record of shipping containers being stored atop Brotherson Dock.
1991	The Project Area appears unchanged.	A number of large cranes are present along Brotherson Dock to the northeast of the Project Area. A shipping container storage yard is now present to the northeast of the Project Area. The remainder of the surrounding area is largely the same.
1994	The Project Area appears unchanged.	The surrounding area appears unchanged.
2005	The Project Area appears unchanged.	Although the number of shipping containers stored in the surrounding area appears to have increased, the remainder of the area surrounding the Project Area remains unchanged.
2014	An additional ship dock is present in the southern portion of the Project Area. The remainder of the Project Area appears unchanged. Hayes Dock has been extended in a westerly direction, establishing the land parcel where the waterside construction compounds/ laydown areas are proposed to be.	The tank farm to the south of the Project Area has expanded, with six new large tanks present. The remaining area surrounding the Project Area appears largely unchanged.
2024	The Project Area appears unchanged.	The land to the northwest of the Project Area is now utilised for additional shipping container storage. Additionally, the number of visible tanks in the tank farm to the east / southeast has notably increased. The number of shipping containers in the surrounding area is the greatest it has ever been.
Historical maps		
Date	Project Area	Surrounding area
1917	The Project Area is presented as open water within Botany Bay.	The area to the west and south-west of the Project Area is comprised of open water, forming part of Botany Bay. Kurnell beach and township is visible to the south of the Project Area, whilst the suburb of La Perouse is visible to the east. There are a small number of roads to the northeast of the Project Area, and a small 'coal pier' is visible due north.
1935	The Project Area appears unchanged.	The land to the south, and open water within Botany Bay to the west remain unchanged. The land to the north and east of the Project Area has an increasing number of roads, and land parcels demarcated. The suburbs of Mascot, Botany and Matraville are now all clearly labelled.

Historical aerial imagery		
1975	A small portion of the northeast corner of the Project Area (< 100 m ²) is covered by Bunnerong Power Station.	The area which currently comprises Brotherson Dock to the east of the Project Area is now visible and is labelled as 'Bunnerong Power Station'.
2015	The Project Area appears unchanged.	Brotherson Dock has expanded to the north of the Project Area, with the immediate suburb next to the dock labelled as 'Banksmeadow'. Numerous additional buildings, structures and roads are present immediately southeast of the Project Area. The general area around the Project Area also has an increasing number of streets, buildings, structures and roads demarked.

3.7.2 NSW EPA records of contaminated land

Based on the List of Contaminated Sites Notified to the EPA provided in the Lotsearch Report (Annexure A), the following records are relevant to the Project Area:

- **Vopak Terminals - Pipeline Corridor (21 Fishburn Road):** Located within the Project Area, classified as "Other Industry," with contamination regulation under the CLM Act not required
- **Bulk Liquids Berth UPSS, Port Botany (Charlotte Road):** Located within the Project Area, categorised as "Other Petroleum," with contamination regulation under the CLM Act not required
- **Sydney Ports Marine Services (Interterminal Access Road):** Located within the Project Area, formerly listed for "Other Petroleum," but no longer on the EPA Contaminated Land List
- **Vopak B (20 Friendship Road):** Located within the Project Area, related to "Chemical Industry," with regulation under the CLM Act not required
- **Port Operations Centre UPSS, Port Botany (Penrhyn Road):** Located within the Project Area, classified under "Other Petroleum," with regulation under the CLM Act not required
- **Ampol (formerly Caltex) Banksmeadow Terminal (1-3 Penrhyn Road):** located outside and 274 m north east of the Project Area, "Other Petroleum", contamination currently regulated under the POEO Act
- **Orica Botany Groundwater Project (16-20 Beauchamp Road):** located outside and 449 m north of the Project Area, "Chemical Industry," contamination currently regulated under the CLM Act
- **Discovery Cove, Former Ampol Rail Terminal (1801 Botany Road):** located outside and 633 m north of the Project Area, "Other Petroleum", regulation being finalised
- **Pacific National Rail Siding (1 Beauchamp Road):** located outside and 860 m north-east of the Project Area, listed for "Chemical Industry," with current regulation under the CLM Act
- **Opal Packaging Botany Mill (1891 Botany Road):** located outside and 473 m north-east of the Project Area, "Other Industry", with regulation under the CLM Act currently being assessed
- **Orica Former Chlor Alkali Plant (Botany Industrial Park, off Denison Street):** located outside and 995 m north-east of the Project Area, related to "Chemical Industry," with contamination regulated under the CLM Act
- **Orica Botany (Pre-2003 Regulation) (Denison Street):** located outside and 995 m north-east of the Project Area, "Chemical Industry," with ongoing regulation under the CLM Act.

Additionally, there are two properties within 500 metres of the Project Area with previous NSW EPA Records of Notice, including:

- **Bunnerong Power Station (Bumborah Point Road, Matraville):** Located 365 m east of the Project Area, the former power station has five former contamination notices. It is noted that this site is a former coal fired power station, which was decommissioned in 1975
- **Orica Botany Groundwater Project (16-20 Beauchamp Road, Banksmeadow):** Situated 449 m north of the Project Area, this site has six current and 28 former contamination notices. This site also operates under an Environment Protection Licence (EPL) No 2148 and is understood to have historically contaminated the underlying aquifer extensively. This site has been regulated under a Voluntary Management Plan (Approval Number: 20101714) since 2010. Given the extensive regulatory oversight and contaminated groundwater management at the Orica facility, it is unlikely to impact the Project Area, which is further discussed in Section 3.8. It is noted that part of the Project Area falls within Area 2 of the Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024. Groundwater abstraction is prohibited in Area 2.

3.7.3 NSW EPA licensed activities

There are 28 licensed activities under the POEO Act within one kilometre of the Project Area. The licensed activities most relevant to the Project Area include:

- **Terminals Pty Ltd (45 and 51 Friendship Road, Port Botany):** within the Project Area, engaged in chemical storage, petroleum products storage, and hazardous waste storage—including restricted solid, liquid, clinical, and asbestos waste (EPL 1048)
- **Vopak Terminals Australia (20, 37, and 49 Friendship Road, Port Botany):** adjacent facility to the south of the Project Area involved in chemical storage, petroleum products storage and fuel production, and bulk shipping operations (EPL 6007)
- **Patrick Port Botany Container Terminal (Penrhyn Road, Port Botany):** within the Project Area, general chemicals storage facility to the north (EPL 6962)
- **DP World Sydney Limited (36-42 Friendship Road, Port Botany):** within the Project Area, chemical storage facility to the east (EPL 20556)
- **Sydney Trains:** railway systems activities located 15m north-east of the Project Area (EPL 12208)
- **Elgas Limited Sydney LPG Cavern (30 Friendship Road, Port Botany):** petroleum products storage and bulk shipping facility 18m south of the Project Area (EPL 10698)
- **Ampol Australia Petroleum Pty Ltd – Caltex Sydney Terminal (Penrhyn Road, Banksmeadow):** petroleum products storage and bulk shipping facility located 274 m north-east (EPL 6950) of the Project Area
- **Orica Australia Pty Ltd (16-20 Beauchamp Road, Matraville):** facility for contaminated groundwater treatment, hazardous waste storage, and general chemicals storage, located 751m north of the Project Area (EPL 2148).

3.7.4 National waste management and liquid fuel facilities

There are five national waste management facilities located within one kilometre of the Project Area. The closest facility is operated by **Opal (formerly Orora Botany Mill) (1891 Botany Road, Matraville)**. This site is an operational paper and cardboard recycling facility, located 473m north-east of the Project Area.

There are numerous national liquid fuel facilities located within one kilometre of the Project Area, including:

- **Vopak Botany Site B (19-25 Friendship Road, Port Botany):** an operational fuel terminal (ID 4299) operated by Vopak, located within the Project Area
- **Caltex Banksmeadow (1886 Botany Road, Banksmeadow):** an operational fuel terminal (ID 4297) operated by Caltex, located 274m north-east of the Project Area

- **Caltex Ampol Banksmeadow Diesel Stop (1-3 Penrhyn Road, Banksmeadow):** an operational petrol station (ID 5252), located 274m north-east of the Project Area
- **Terminals Pty Ltd Botany (45 Friendship Road, Port Botany):** an operational fuel terminal (ID 4301) operated by Terminals Pty Ltd, located 340m south-east of the Project Area
- **Vopak Botany Site A (49 Friendship Road, Port Botany):** an operational fuel terminal (ID 4298) operated by Vopak, located 466m east of the Project Area.

3.7.5 Potential PFAS source sites

There are two sites that are part of the NSW EPA PFAS investigation program within one kilometre of the Project Area, comprising the Botany Bay area (within the Project Area) and the Botany Industrial Park (995 m north of the Project Area).

Airservices Australia National PFAS Management Program includes a site at Sydney Kingsford Smith Airport around 1,120 m west of the Project Area where PFAS has been confirmed at the fire station and fire training ground. There are no Department of Defence PFAS investigation or management sites within one kilometre of the Project Area.

3.7.6 Historical businesses (dry cleaners, motor garages and service stations)

There are no historical business records for dry cleaners, motor garages and/or service stations noted in the Lotsearch Report (Annexure A).

3.7.7 Other notable facilities

The Elgas liquified petroleum gas (LPG) cavern site (referred to as the Elgas Cavern) is operated under an Environment Protection Licence (EPL: 10698). The Elgas Cavern consists of four large tunnel galleries within the underlying Triassic Sandstone, at about 130 mbgl (Elgas, 2025). Given the depth and regulation of the Elgas facility, there are no considered sources of contamination to the Project Area.

3.8 Previous environmental investigations in Port Botany

3.8.1 Port Botany Expansion Environmental Assessment

URS prepared assessments for ecotoxicology and human health risk as well as groundwater for the Port Botany Expansion project (URS, 2003). This area is located north of the DP World container operations site, closer to Foreshore Road and Penrhyn Estuary (known for shorebird roosting and feeding habitat) located approximately 200 m northeast of the Project Area. Groundwater model findings suggested that active remediation measures have significantly reduced the risk of contaminant plumes impacting Port Botany or Penrhyn Estuary from historical chemical manufacturing to the north. Previously a major chemical manufacturing site operated formerly by Institute of Civil Infrastructure (ICI) Australia (now Orica), Botany Industrial Park (located around 500 m north from the Project Area) has been the focus of extensive remediation to address historical groundwater contamination (refer to Figure 3-5).

Three plumes were originally identified in the area including the Southern Plume, primarily containing 1,2-dichloroethane (or ethylene dichloride) and trichloroethene, which had reached Penrhyn Estuary with diluted concentrations of about 10 mg/L. The Northern Plume, initially advancing southwest at 120 m/year, and the Central Plume, with high endocrine-disrupting chemicals concentrations exceeding 5,000 mg/L, were projected to reach the shoreline for Botany Bay in the mid-2000s. However, these contaminated groundwater plumes are now effectively managed through ongoing remediation. The assessment found that the likelihood of contamination reaching Port Botany has been reduced due to the cessation of chemical manufacturing, strategic remediation efforts, including containment and treatment systems, and enhanced natural attenuation. While historical data projected plume impacts on the estuary, groundwater monitoring at the time of reporting confirmed that contamination levels were significantly curtailed, and the plumes were no longer likely to enter Port Botany.

The ecotoxicological and human health issues report assessed potential impacts associated with a change in hydrodynamics and contaminant concentrations. The report found the enlargement of Penrhyn Estuary as part of the Port Botany Expansion project may lead to increased concentrations of volatile halogenated compounds (VHCs) in surface waters and fine sediment accumulation, but no changes in contaminant levels were expected outside the confined area. Human health risks in areas with elevated VHCs, particularly in the upper estuary and along the constructed channel outlet, were identified though there is restricted public access in these locations. Recreational use west of the outlet and fish consumption risks were found to be minimal, with sediment-bound contaminants posing low risk due to limited exposure.

The enlargement of Penrhyn Estuary had the potential to expose more aquatic and terrestrial species to contaminants like VHCs but the report noted this was unlikely to alter the habitat's functionality. While the Port Botany Expansion project was found to not significantly affect the discharge of deep groundwater plumes, rising VHC concentrations were noted as a possible risk in the estuary due to ongoing groundwater contamination. Environmental controls during construction were implemented to minimise sediment disturbance and associated risks to human health and aquatic organisms such as bioaccumulation and contaminant dispersion. Overall, the Port Botany Expansion project's risks to human health and the environment were deemed to be manageable with the application of appropriate mitigation measures.

3.8.2 Bulk Liquids Berth No.2 Environmental Assessment

An Environmental Assessment was prepared by Sinclair Knight Merz (SKM) for the construction and operation of a second Bulk Liquid Berthing Facility ('BLB2') at Port Botany, located within the Project Area (SKM, 2007).

The assessment of potential contamination found that the known contamination plumes, plume paths and groundwater projection zone were located about 1.5 km north of the BLB2 site, and hence, the risk of contamination being encountered during the proposed works was low. However, there were two potential environmental impacts to groundwater and soils from the proposed works, including:

- Contaminated water generated during the BLB2 construction works infiltrating the shallow groundwater
- Leaks from pipes carrying petroleum hydrocarbons and other products, which were being upgraded during the works.

Numerous controls were imposed to ensure that the works minimised potential impacts to the environment. The report did not contain any analytical data.

3.8.3 Site Audit Report for Qenos Port Botany Hydrocarbon Storage Terminal

A site contamination audit was conducted in relation to part of the Qenos Hydrocarbon Storage Terminal, located about 100 m south-east of the Project Area, to determine whether the site was suitable for use as a commercial/industrial facility (Environ Australia Pty Ltd, 2015).

The audit involved a review of multiple previous environmental investigations, including investigations by Jacobs, Environmental Resources Management, and Pickford into the soil and groundwater conditions at the site. The soil investigation results revealed that contaminant concentrations were below the adopted criteria and practical quantification limits for metals, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylenes (BTEX), and VHCs. No significant soil contamination was identified across the site, with all tested parameters meeting applicable environmental standards. The Auditor concluded that site operations had not contributed to soil contamination, and no evidence of off-site contaminant migration was found. Based on the results, no further soil assessments or remediation actions were deemed necessary, confirming the site's suitability for its current and intended use.

Groundwater monitoring results from five wells in 2015 indicated that arsenic and nickel concentrations were marginally above ecological criteria for marine waters in two of the wells, with no organic contaminants detected. A Phase II investigation in 2000 comprised sampling of four existing groundwater monitoring wells, with only one of the four wells located on site. Analyses for metals, TPH, BTEX, and VHCs revealed concentrations below adopted criteria and generally below practical quantitation limits, consistent with findings from previous investigations. The Auditor concluded that there was no significant groundwater contamination, no evidence of contamination from site operations, and no migration of contaminants from upgradient sources. The marginal exceedances of arsenic and nickel were considered representative of background levels, as no on-site sources were identified. Consequently, no further groundwater monitoring was required.

The Auditor did not recommend any remediation and noted that, as there were no significant levels of contaminants detected in groundwater and soils, there was little or no potential for migration of contamination from the site or vertically to groundwater. The risks to human health and the environment were also classified as low.

3.8.4 Characterisation of Sediment Quality in Port Botany

This investigation focused on characterising sediment quality at two proposed dredging sites in Botany: Site A, located in the eastern section of Brotherson Dock, and Site B, situated in the shipping channel entrance at Botany Bay. Both of these investigation locations fall within the Project Area and are in the immediate vicinity to the west and south-west of the Project Area (Geochemical Assessments Pty Ltd, 2020a) (refer to sampling locations in Figure 3-5). Core samples were collected from 25 locations across the two sites (Sites A and B), and the study analysed a range of CoPCs, including metals, organotin compounds (e.g. TBT), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), total recoverable hydrocarbons (TRH), BTEX, polychlorinated biphenyls (PCBs), total nitrogen, phosphorus, and particle size distribution.

At Site A within Brotherson Dock:

- Elevated concentrations of trace metals, including copper, lead, mercury, and zinc, were identified in the muddy sediment layer, particularly in the eastern section of Brotherson Dock at several sample locations. Maximum recorded concentrations in the sediment were 55 mg/kg for copper, 82 mg/kg for lead, 0.39 mg/kg for mercury, and 260 mg/kg for zinc. In contrast, the underlying sands consistently exhibited low contaminant concentrations, with values near or below the laboratory limit of reporting (LOR)
- Organotin compounds, such as tributyltin (TBT), were also elevated in certain samples, with concentrations reaching up to 77 µg Sn/kg
- Pesticides, including chlordane and dichloro-diphenyl-dichloroethylene (DDE), were detected in isolated sediment samples but were not widespread
- PAHs were generally present at low levels, although one sample showed a significant outlier with total PAH concentrations of 19,000 mg/kg
- Concentrations of TBT, mercury, and some metals exceeded National Assessment Guidelines for Dredging (NAGD) (DCCEEW, 2009). Screening levels in individual samples, and the 95 per cent upper confidence limit (UCL) of mean concentrations for TBT and mercury also exceeded these levels.

At Site B, the sediments primarily consisted of gravelly sands composed of shells and shell fragments. Trace metal concentrations, including copper, lead, zinc, and mercury, were low and close to or below the detection limits. Organotin compounds, TRH, BTEX, PCBs, pesticides, and PAHs were either below detection limits or present in concentrations well below NAGD screening levels. Nitrogen and phosphorus concentrations in Site B sediments were low, and no contaminants exceeded the screening levels, indicating no significant contamination concerns at this site.

The investigation concluded that sediments at Site A in Brotherson Dock are characterised by elevated concentrations of TBT, mercury, chlordane, DDE, and some trace metals in the muddy sediment layer, warranting further phase three assessments to evaluate the bioavailability of contaminants and the potential for their release during dredging activities. In contrast, the well-sorted underlying sands showed minimal contamination concerns. Site B in the shipping channel displayed no significant contamination, with all analytes below screening levels, confirming that Site B in the shipping channel is suitable for dredging without further testing.

3.8.5 Characterisation of Sediment Quality in Brotherson Dock

This investigation focused on characterising sediment quality in the south-eastern corner of Brotherson Dock, Port Botany, including the ship lift area (Geochemical Assessments Pty Ltd, 2020b). The sediment samples from eight locations in the south-eastern corner of the dock were analysed for a suite of contaminants (organotins, PAHs, organochlorine pesticides (OCPs), TPHs, BTEX, PCBs, total nitrogen, total phosphorous, and total organic carbon (TOC)) and compared to NADG screening levels (DCCEEW, 2009). These sampling locations are presented in Figure 3-5. Sediment cores were collected using a piston coring technique.

Concentrations of lead, zinc, antimony and mercury exceeded their NAGD screening levels. The 95 per cent UCL of lead, mercury and zinc exceeded the NAGD screening levels. Concentrations of organics were normalised to one per cent TOC to allow comparison with the NAGD screening levels. Concentrations of normalised total TPH varied from 3,500 to 7,714 mg/kg and exceeded the NAGD screening level (550 mg/kg) in all samples. The 95 per cent UCL of the mean concentration of normalised, total TPH (7,698 mg/kg) also exceeded the screening level. Concentrations of normalised TBT varied from 1.0 to 16.2 micrograms (µg) Sn/kg and exceeded the screening level (9 µg Sn/kg) at two locations. The 95 per cent UCL of the mean concentration of normalised TBT (14.0 µg Sn/kg) also exceeded the screening level.

The investigation concluded that mean concentrations of zinc, total TPH, total chlordane, DDE, total nitrogen and total phosphorous were higher in the area of investigation in the south-east of Brotherson Dock compared to surficial sediment in the eastern section of the Dock.

3.8.6 Sediment Contamination Assessment Maintenance Dredging Areas, Port Botany

AECOM conducted a sediment assessment to support the Review of Environmental Factors for Port Botany Maintenance Dredging Areas (Hayes Dock and ship lift area) (AECOM, 2024a). The purpose of the sediment assessment was to characterise the sediments within the proposed dredging footprint of Brotherson Dock to a depth of 0.2 metres. The assessment was conducted to evaluate the potential contamination risks from the disturbance of sediments during maintenance dredging and to inform management strategies in accordance with the NADG.

The investigation comprised sediment sampling from two locations (west of Brotherson Dock and in the ship lift area) up to maximum depth of 0.2 metres and analysis of sediments for metals (arsenic, cadmium, chromium, copper, nickel, lead, mercury and zinc), PFAS, total nitrogen, total phosphorus and TOC from a NATA accredited laboratory. A plan of sampling locations is provided in Figure 3-5. Concentrations of CoPCs were all below the NADG screening levels and/or the laboratory LOR. Although 95 per cent UCL statistics for arsenic and mercury exceed the NADG for the full data set, subsequent elutriate analysis indicated that the concentrations of all reported metals were below the NADG for protection of species in marine waters. The assessment concluded that the low-level exceedances of metals in sediments and the non-exceedances of metals in elutriate analysis indicated effects on organisms in the water column would not be expected during maintenance dredging. Maintenance dredging across the proposed dredging footprint within Brotherson Dock was considered to pose little to no risk to human health and/or the environment, and no further investigations or remediation of sediments was required.

3.8.7 Orica Groundwater Treatment Plant – Annual Groundwater and Surface Monitoring Report

WSP assessed the effectiveness of the on-going groundwater remediation and monitoring in the vicinity, and downgradient of the Orica manufacturing facility (WSP, 2024). The report summarised the results of the August 2024 annual monitoring event conducted under the Groundwater Treatment Plant (GTP) Groundwater and Surface Water Monitoring Program.

The hydraulic monitoring generally indicated effective containment at the Botany Industrial Park and Primary Containment Area, with extraction rates and target elevations broadly aligned with those required for hydraulic containment. Although groundwater elevations significantly exceeded the target of 0.1 m AHD. Despite this exceedance, ongoing efforts were acknowledged to address operational disruptions that have intermittently affected extraction efficacy.

Long-term water level evaluations confirmed that drawdowns remained within modelled predictions and posed little risk to infrastructure or licensed users, with higher than average groundwater elevation likely attributed to elevated regional rainfall. Ongoing refinement of the GTP infrastructure and mitigation of well biofouling were noted in the report to enhance future containment performance.

Chemical monitoring focused on chlorinated hydrocarbons (CHCs) in groundwater and surface water across multiple locations. Data trends indicated that CHC concentrations continued to stabilise or decline overall, although a few monitoring points upgradient and downgradient of the Secondary Containment Area showed localised increases consistent with anticipated plume redistribution.

At Penrhyn Estuary, CHC levels generally decreased with lowering depths towards the discharge interface, with no exceedances of Australian and New Zealand Guidelines for Marine and Fresh Water Trigger Values at the discharge interface (ANZG, 2018). Some detections above trigger values were observed below the discharge interface, however these were well below historical maximum concentrations. Surface water sampling in Penrhyn Estuary, Springvale Drain, and Floodvale Drain similarly indicated concentrations consistent with previous data and were well below relevant trigger values.

A review of potential human health risks in accordance with the 2022 Consolidated Human Health Risk Assessment completed for the Orica facility indicated no concerns provided groundwater remained unused for potable or other purposes. Overall, the August 2024 findings confirmed ongoing effective containment and stable or declining CHC levels, supporting the continued validity of the GTP and associated risk mitigation measures.

Based on the recent Annual Groundwater and Surface Monitoring Report generated for the Orica Botany site the Orica site remediation project is unlikely to interact with the Project.

3.8.8 JUHI Pipeline Leak – Post Remediation Targeted Monitoring Program

Ramboll Australia was engaged by Vopak to conduct a series of targeted groundwater monitoring events at Port Botany. The monitoring was undertaken to evaluate the effectiveness of remediation works to address a Jet-A1 aviation fuel leak that released approximately 3,680 litres of fuel on 25 May 2019. The location of this investigation was along the eastern edge of the Project Area between the Vopak Terminal and BLB2. The monitoring was conducted between October 2024 and January 2025. This was followed by a September 2024 remedial steam-enhanced injection and extraction program, which aimed to assess short-term changes in groundwater quality and determine progress towards the clean-up to the extent practicable objective.

The primary objectives of the assessment included:

- Assessing LNAPL thickness and the extent of dissolved phase hydrocarbon plume
- Evaluating the need for further remediation
- Determining ongoing environmental risks to Botany Bay.

Results showed a significant reduction in LNAPL across the southern investigation zone (RTZ South), with residual sheen only detected in two of the monitoring wells, suggesting effective remediation in the southern area. In the northern investigation zone (RTZ North), although LNAPL thicknesses generally decreased, its presence in the newly installed extraction well indicated that the extent of the plume may extend further to the north than was previously understood.

Dissolved-phase TRH concentrations (>C10–C14) decreased in most wells over the investigation period, particularly in the southern investigation area, while levels remained variable in northern investigation area. Minor detections in western transect wells suggested limited interaction with the marine waters of Botany Bay. The linear wells in the western transect containing a carbon slurry mix, continued to act as an effective containment measure, preventing hydrocarbon contamination entering the adjacent waters of Botany Bay. Benzene, toluene, ethylbenzene, ethylbenzene and naphthalene (BTEXN) concentrations were stable, however naphthalene exceedances persisted. Elevated sulfate levels post-injection decreased over time, indicating enhanced bioremediation.

The investigation concluded that the southern investigation area likely achieved the objective of clean-up to the extent practicable. The presence of LNAPL significantly reduced, corresponding with a decline in dissolved-phase hydrocarbons, which indicated there was a low and manageable risk to the adjacent marine environment. In contrast, the northern investigation area (closest to BLB2) continued to exhibit residual LNAPL impacts, including in newly identified wells suggesting an incomplete remediation outcome.

This northern area remains in closer proximity to sensitive marine receivers and, as such, poses a higher potential risk, particularly if site conditions change due to tidal influences or increased infiltration. Additional targeted remediation in the northern zone was recommended to complete the earlier steam-enhanced injection and extraction efforts and to proactively reduce the likelihood of future contaminant migration into Botany Bay.

3.9 Environmental investigations for the Project

3.9.1 Brotherson Dock Sediment Contamination Assessment, Port Botany

AECOM has conducted a sediment contamination assessment for the Project (AECOM, 2024b). The sediment contamination assessment component was completed concurrently with geotechnical investigations for the Project at selected locations within Port Botany (refer to Figure 3-5).

The purpose of the contamination assessment was to:

- Characterise the sediments in the general vicinity of the quayline extension and establish a pre-construction and operational baseline contamination dataset
- Evaluate the potential impacts of construction activities, particularly those over water, on the disturbance of sediments within the Project Area
- Inform the environmental assessment of the Project (including assessment of potential contamination impacts).

The assessment included a review of background information for the Project Area and collection and analysis of sediment samples from five predetermined sampling locations. Sampling locations were identified within and around the quayline extension and wharf area, the new BLB3 and reclamation activities. Samples were obtained using a piston core from surface to up to 4.0 m below surface sediments and materials were generally observed to comprise dark grey, soft, low-high plasticity silty clays from surface to between 0 m and 3.0 m, followed by grey to light brown, loose, medium grain sands between 1.0 to 4.0 m.

The analytical program for the assessment a suite of identified CoPCs, including metals, TRH/ TPH, phenols, pesticides, PCBs, PFAS, organotin compounds, dioxins and furans and total nitrogen, phosphorus and TOC. Concentrations of CoPCs were all below the adopted assessment criteria and/or the laboratory LOR, except for low-level arsenic and mercury exceedances at four of five sample locations between the sediment surface and 2.0 m below sediment surface.

The report concluded that low-level metal exceedances would pose little to no risk to human health or the environment and are likely attributed to background concentrations of metals in Port Botany/ Botany Bay.

3.9.2 Site inspection findings

A visual inspection of the Project Area was undertaken on 31 October 2024 by the authors of this PSI. The findings of the inspection are provided below:

- Current BLB operations at Port Botany comprise product being pushed from shipping vessels to the terminals using pumps within the vessels. All pipelines are fully welded with no flanges to minimise spills. Spills of product during the transport of product from the vessel to the terminal are managed through an Operation Environment Management Plan, including a spillage retrieval system, spill containments, trays and spill kits for small spills. In the event of a spill over water, the Port Authority deploys an emergency response via an emergency boat for control of the spills
- Current stormwater pits on the berth capture stormwater that drains to a pit and the water is taken off-site if potentially contaminated
- There was a historic spill of product in vicinity of BLB2 and the Vopak terminal in 2019. It is understood that Vopak is currently conducting remediation works
- Fires at the BLB and Port Botany are prevented by monitoring using cameras and visual observations. During fires, sea water is used to extinguish fires. Foam systems are added to the mix for extinguishment of fires. Aqueous Film Forming Foam (AFFF) with non-PFAS containing foams have been installed in the system on BLB1. Historically AFFF containing PFAS was used at the port. Personnel reported that no fire-fighting training was conducted using AFFF containing PFAS at the port
- All terminals within the port connect via pipelines within a pipeline corridor to the BLBs. The majority of the pipelines are above ground
- The Elgas facility was observed from Charlotte Road, to the east of the Project Area. The Elgas Cavern is understood to be cut into sandstone and located at 130 m depth and used for the storage of LPG for supply to the NSW market. The Elgas Cavern has a vibration limit and vibration monitor. Elgas is a licensed facility with the EPA under EPL 10698
- The Qenos pipeline is not operational as Qenos is no longer operating from its Botany complex
- Vopak Terminals comprising above ground storage tanks (ASTs) in a bunded area for storage of diesel is located to the east of the Project Area. Vopak is the largest bulk liquids storage at the port
- Smit Lamnalco, comprising office buildings, is located to the south-east of the new BLB3 site, along Fishburn Road. Smit Lamnalco provides marine support for port operations
- There is a facility on the corner of Friendship Road and Fishburn Road on the waterside that comprises a roofed storage facility for storage of 200 L drums within a bunded area. The ground cover across the facility is completely sealed and there was no evidence of spills or contamination impacts when observed from the boundary fence line.

3.9.3 Summary of environmental investigations findings relevant to the Project

Based on the previous sediment investigations conducted by Geochemical Assessment in 2020 and AECOM in 2024, contaminant impacts that exceeded the NADG screening levels (DCCEEW, 2009) have been identified for TBT, TPH, arsenic, mercury, lead and zinc. The sediment sample locations from previous sediment investigations and Project sediment investigations are shown in Figure 3-5.

The concentrations of CoPC observed in the previous and current Project sediment investigations are generally within the same order of magnitude, with exceedances identified for similar contaminants.

Limited elutriate sampling and testing has been conducted during the (AECOM, 2024a) investigation. The sampling and testing has indicated that relevant contaminants are unlikely to become bioavailable at concentrations that could significantly adversely affect marine organisms in the water column during dredging. On this basis it is expected that dredging across the Project Area would pose little to no risk to the environment.

Further targeted sampling and analysis of sediments would be conducted prior to construction to inform the development of management measures relevant to sediment disturbance on water quality during construction of the Project. This would comprise additional elutriate analysis consistent with NADG (DCCEEW, 2009) guidance and investigation into the presence of PASS and ASS to meet ASS Assessment Guidelines (ASSMAC, 1998).

In addition, the majority of parameters measured during the assessments conducted as part of the Technical report: Marine water quality (Appendix E to the EIS) (sampling from various locations in Brotherson Dock, Penrhyn Estuary, Port Botany and Greater Botany Bay) during two dry and one wet weather event were below the water quality guideline values with exception of slight exceedances for total nitrogen, phosphorous, nitric oxides (NO_x), oil and grease, perfluorooctanesulfonate (PFOS), and metals (copper and silver). For the dry weather event, the majority of parameters measured were below the water quality guideline values, with exception of slight exceedances for phosphorous, NO_x, and metals (copper and silver). PFOS was only detected exceeding the guideline value (0.0091 µg/L) at BD2 (0.012 µg/L), within central Brotherson Dock, during the dry weather event (refer to Technical report: Marine water quality (Appendix E to the EIS)). PFAS was not detected within the sediments to be dredged during the recent sediment investigations.



Figure 3-5 Previous sediment investigation locations at Brotherson Dock

3.10 Areas of environmental interest and contaminants of potential concern

Per the guidance in the ASC NEPM (2013), an Area of Environmental Interest (AEI) is an area where a potential source of contamination is known, suspected, or has been identified based on review of site history information, visual observation, or available analytical data. CoPCs are defined as chemical substances that are reasonably expected to be present based on known or suspected current and/or past activities, and that may pose a risk to human health or the environment if present at sufficient concentrations. AEIs and associated CoPCs have been assessed concurrently to understand the nature of potential contamination within the Project Area for the development of the preliminary Conceptual Site Model (CSM).

Based on the desktop review and site inspection, AEIs have been identified within and outside the Project Area, as summarised in Table 3-2. For each AEI, associated CoPCs have been identified based on the source of potential contamination. Only sources or activities that are within, adjacent or topographically up-gradient and within 500 metres of the Project Area have been considered as AEIs. The AEIs are shown in Figure 3-6. The potential of contamination severity and extent is noted below based on Table 2-1:

- Low – low potential for contamination to be present in the media of concern at concentrations above the relevant assessment criteria and limited in extent
- Moderate – contamination potentially present in the media of concern at concentrations above the relevant assessment criteria
- High – contamination confirmed present in the media of concern at concentrations above the relevant assessment criteria and potentially widespread.

Table 3-2 Areas of Environmental Interest and associated CoPCs

ID	AEI	CoPC and Media	Likelihood of risk of contamination
AEI1	Previous land reclamation (within the Project Area) Fill material of unknown origin has been placed in the Project Area during its development in the 1970s.	CoPC: heavy metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS. Media: soils, soil vapour, sediment, surface water and groundwater.	Moderate – based on the unknown nature of fill materials used for the reclamation during the development of Port Botany in the late 1970s.
AEI2	Industrial land use (within the Project Area) Leaks and spills from stored chemicals, infrastructure and vehicles used on-site.	Source: leaks and spills from stored chemicals, infrastructure and vehicles used on-site CoPC: heavy metals, PAH, TPH, TRH, BTEXN, VOCs, PCBs, PFAS Media: soil, soil vapour, sediment, surface water and groundwater.	Low – based on hardstand across the majority of the terrestrial component of the Project Area and no evidence of spills and leaks during the site inspection.

ID	AEI	CoPC and Media	Likelihood of risk of contamination
AEI3	Industrial land use (outside the Project Area) Uncontrolled fill, leaks and spills from industrial activities, infrastructure, vehicles, use of firefighting foams containing PFAS. AEIs comprise the adjacent Vopak remediation site as a result of pipeline leak in 2019; Orica site under regulation; Ampol Banksmeadow Terminal site under regulation; Opal site under assessment, and Sydney Kingsford Smith Airport under PFAS investigation and management.	CoPC: heavy metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS Media: sediment, surface water and groundwater migrating on and beneath the Project Area.	Low to moderate – based on the close proximity of upgradient off-site industrial land use that is currently being remediated/regulated and/or under assessment by the NSW EPA. Recent historical reports for the Orica site indicate the likelihood of risk of contamination to the Project Area is low.
AEI4	Known CoPC in sediments in Brotherson Dock (where dredging is proposed as part of the Project).	CoPC: TBT, total TPH, arsenic, lead, mercury and zinc, organochlorine pesticides. Media: Sediments	Low to moderate – based on analytical data from recent sediment investigations (AECOM, 2024).
AEI5	Unknown extent of PASS in sediments in Brotherson Dock (where dredging is proposed as part of the Project).	CoPC: acid sulfate soils. Media: sediments.	High – based on desktop information of high probability of ASS occurrence, the coastal setting and underlying geological conditions.
AEI6	Hazardous building materials in infrastructure requiring demolition.	CoPC: asbestos (bonded/friable), PCBs, lead. Media: Soils and surface water.	Moderate – based on BLB1 infrastructure potentially containing hazardous building materials given its age (evident in the 1978 aerial image). Demolition of infrastructure comprising hazardous building materials without controls in place may potentially impact underlying soils and surface water.
AEI7	Import of material to be used for reclamation purposes, comprising potentially contaminated material	CoPC: heavy metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS Media: soils.	Low – based on the unknown nature of imported material to be used for reclamation purposes.

3.11 Preliminary conceptual site model (CSM)

For a receiver to be exposed to a chemical contaminant, a complete exposure pathway must exist. An exposure pathway describes the course a chemical or physical agent takes from the source to the exposed individual or receiver.

A preliminary conceptual site model has been developed based on the seven AEIs identified within and in proximity to the Project Area (refer to Figure 3-6), and considering potential sources, receivers and exposure pathways. The risks posed to receivers from each AEI have been evaluated as outlined in Section 2.2.5, both without and with the application of mitigation and management measures. This risk evaluation is presented in Table 3-3.

Table 3-3 Source-pathway-receiver linkages and risk ratings (without mitigation)

ID	AEI	Source, CoPCs and media	Pathway	Receiver	Potentially complete exposure pathway	Risk rating (without mitigation) (refer to Table 2-1)
AEI1	Previous land reclamation (within the Project Area)	Source: Unknown contamination in reclaimed fill CoPC: Heavy metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, Phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS Media: Soil, soil vapour, sediment, surface water and groundwater	Direct contact, inhalation, dust, leaching of soil and sediment contaminants into groundwater and surface water through excavation and stockpiling activities	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium
AEI2	Industrial land use (within the Project Area)	Source: Leaks and spills from stored chemicals, infrastructure and vehicles used on-site CoPC: Heavy metals, PAH, TPH, TRH, BTEXN, VOCs, PCBs, PFAS Media: Soil, soil vapour, sediment, surface water and groundwater	Direct contact, inhalation, leaching of soil and sediment contaminants into groundwater and surface water through excavation, transport and stockpiling activities	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: Yes	Low

ID	AEI	Source, CoPCs and media	Pathway	Receiver	Potentially complete exposure pathway	Risk rating (without mitigation) (refer to Table 2-1)
AEI3	Industrial land use (outside the Project Area)	Source: Uncontrolled fill, leaks and spills from industrial activities, infrastructure, vehicles, use of firefighting foams containing PFAS. AEIs outside the Project Area comprise adjacent Vopak remediation site from 2019; Orica site under regulation; Ampol Banksmeadow Terminal site under regulation; Opal site under assessment, and Sydney Kingsford Smith Airport under PFAS investigation and management. CoPC: Heavy metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, Phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS Media: Sediment, surface water and groundwater migrating on and beneath the Project Area	Direct contact, inhalation, leaching of soil and sediment contaminants into groundwater and surface water through excavation and/or dredging	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium

ID	AEI	Source, CoPCs and media	Pathway	Receiver	Potentially complete exposure pathway	Risk rating (without mitigation) (refer to Table 2-1)
AEI4	Known CoPC in sediments in Brotherson Dock (where dredging is proposed)	Source: Contaminated Brotherson Dock sediments have been identified in seabed sediments¹ of Port Botany within the proposed dredging footprint (AECOM, 2024a) (AECOM, 2024b) (Geochemical Assessments Pty Ltd, 2020a) (Geochemical Assessments Pty Ltd, 2020b)) CoPC: TBT, Total TPH, arsenic, lead, mercury and zinc, total chlordane, DDE Media: Sediments	Direct contact during dredging and dewatering, leaching of sediment contaminants into surface water	Workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium
AEI5	Unknown nature of PASS in sediments in Brotherson Dock (where dredging is proposed)	Source: Potential acid sulfide bearing materials in seabed sediment CoPC: Sulfuric acid, metals, nutrients Media: Sediments	Oxidation of acid sulfide bearing minerals and organic material in seabed sediments during dredging and onshore handling. Release of sulfuric acid (H ₂ SO ₄) followed by lateral and vertical migration of trace metals and nutrients to the groundwater/marine water interface.	Workers, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	High

ID	AEI	Source, CoPCs and media	Pathway	Receiver	Potentially complete exposure pathway	Risk rating (without mitigation) (refer to Table 2-1)
			Direct exposure via consumption and/or uptake by aquatic flora and fauna. Direct contact and leaching of acid into surface water			
AEI6	Hazardous building materials in infrastructure requiring demolition	CoPC: Asbestos (bonded/friable), PCBs, lead Media: Soils and surface water	Direct contact, inhalation, leaching of soil contaminants into groundwater and run-off into surface water through demolition and transport activities	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium
AEI7	Import of material for reclamation purposes, comprising potentially contaminated material	CoPC: Heavy metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, Phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS Media: Soils	Direct contact, inhalation, leaching of soil contaminants into groundwater and surface water from impacted materials been used for reclamation	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: Yes	Low

Note 1: Although contaminated sediments have been identified in seabed sediments of Port Botany within the proposed dredging footprint (AEI4, AE16, AE17), concentrations of these sediments are below the adopted investigation levels (ILs) (DCCEEW, 2009). Receivers would still have the potential to be directly exposed to elevated concentrations of metals, TPH and TBT during dredging activities.

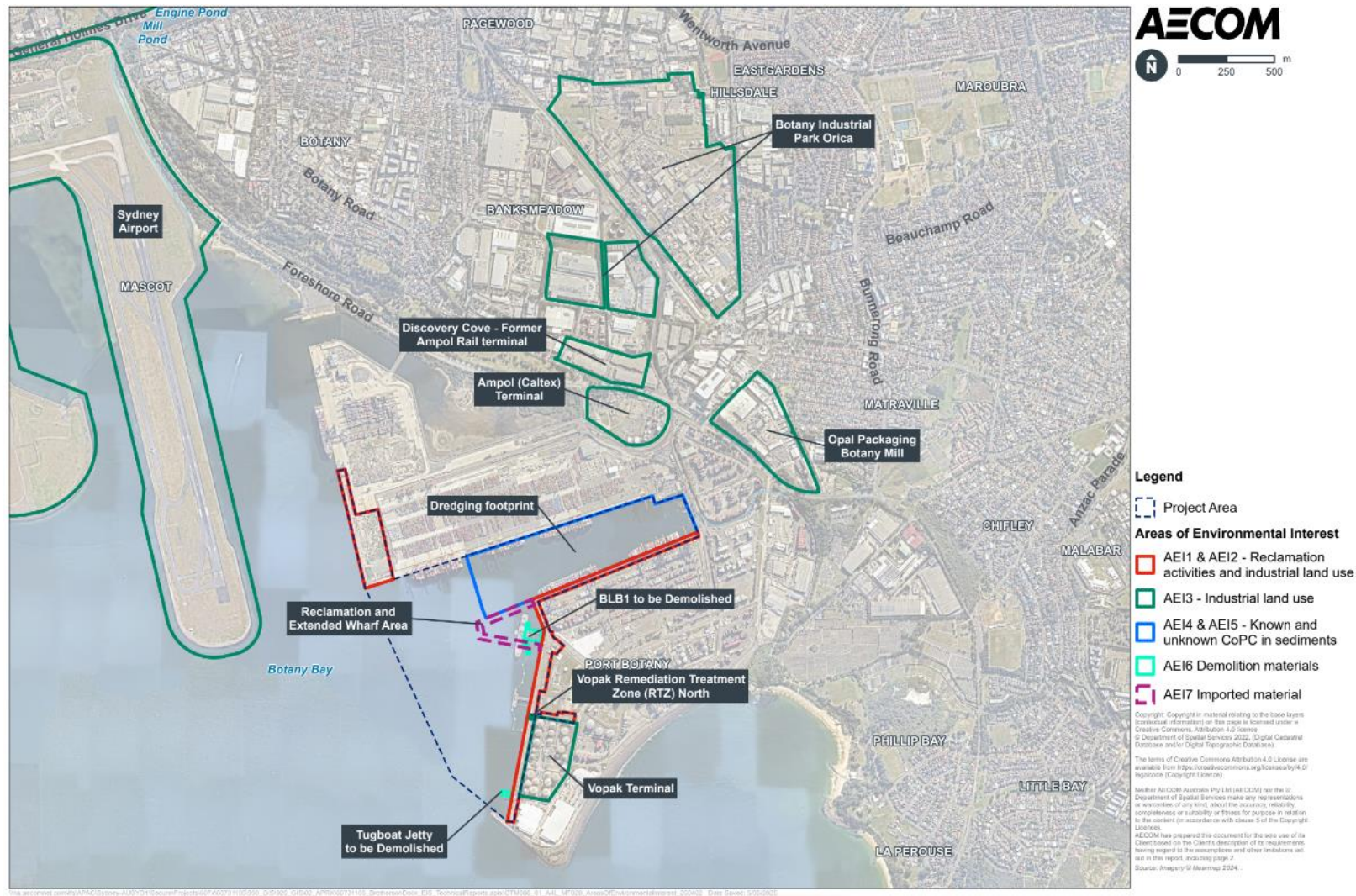


Figure 3-6 Identified Areas of Environmental Interest (AEI)

3.12 Data gaps

Based on the findings of this PSI, no further investigations (such as a DSI) are considered necessary under the environmental risk management framework of the ASC NEPM (2013).

Based on the preliminary CSM, data gaps have been identified as follows:

- Sampling and analysis of sediments for PASS and ASS has not been carried for the full extent and depth of proposed dredging works. The potential presence of acid sulfate materials has been conservatively assumed and mitigation and management measures developed on that basis.
- The nature of contaminants within the sediment has been assessed from the investigations completed and from a review of previous investigations.

Strategies and measures have been recommended to address the data gap listed above and potential uncertainties (refer to Chapter 7.0).

4.0 Assessment of construction impacts

The following sections outline the anticipated contamination impacts of constructing the Project including:

- Enabling works and establishment of construction compounds
- Consequential changes in bulk liquids operations at the port, including:
 - Construction of the new BLB3
 - Decommissioning and removal of the existing BLB1 and tugboat jetty
- Construction of an extended quayline (BD12) on the southern side of Brotherson Dock, including:
 - Construction of the bund wall, dredging and reclamation
 - Piling and wharf construction
- Site demobilisation.

The assessment of each construction phase and risk ratings (both without and with mitigation) are presented in Table 4-1. The main potential contamination impacts from construction activities that can possibly interact with the identified AEIs (those with risk ratings higher than medium without mitigation) include:

- Dredged sediments and soils may contain sulfide bearing minerals and organic matter (detritus) that can generate sulfuric acid when exposed to air (AEI5). If saturated seabed sediments are disturbed, oxidation of sulfide bearing minerals can lead to the generation of latent soil acidity and the release of metals, nutrients and salts into the surrounding surface, surface waters and local aquifer.

Other potential impacts generated by construction activities of the Project may include:

- Leaks and spills from plant and machinery on-site during site establishment works
- Surface soil disturbance for laydown areas, although excavation would be minimal (AEI1)
- Generation of waste materials during demolition and decommissioning works, that are not handled appropriately
- Leaks and spills of residual product in pipelines being flushed and cleared during decommissioning of BLB1 pipeline, as well as some pipelines along Fishburn Road and Charlotte Road, potentially leaking into surrounding soils and groundwater (AEI2)
- Handling of potentially impacted media during demolition and decommissioning works at BLB1 and piling/excavation works at BLB3, resulting in exposure to workers and/or discharge/leaching to the receiving environment (AEI1)
- Cross-contamination associated with the incorrect handling or disposal of spoil/unexpected finds and discharge/leaching to the receiving environment (AEI4, AEI5)
- Demolition of BLB1 infrastructure that may contain hazardous building materials given its age (AEI6)
- Import of material of unknown origin, used in extension of the quayline (AEI7).

The risk of contamination impacts from the above construction activities would be medium if there are no mitigation measures in place. Proposed mitigation and management measures are detailed in Chapter 7.0 (Mitigation and management of impacts).

Measures to minimise impacts from the disturbance of PASS and ASS during dredging of sediments from Brotherson Dock, and subsequent placement in the reclamation area, would be included in the CEMP(s). An unexpected finds procedure would be prepared to provide guidance on how to handle unexpected contamination or hazardous materials during construction works.

The CEMP(s) and associated sub-plans would be produced to document and communicate the mitigation and management measures required to manage potential construction impacts. These documents and measures are further detailed in Chapter 19 (Mitigation and management) of the EIS. The subplans would include provisions for erosion and sediment control to minimise impacts on water quality, for reducing and reuse of waste materials, where possible, and the management and disposal of waste to appropriately licensed landfills if required.

Following the implementation of mitigation measures outlined in Chapter 7.0, it is anticipated that the identified medium risk ratings for the construction of the Project would be ultimately reduced to a low risk.

Table 4-1 Assessment of construction impacts

Project component	Potential contamination impacts associated with construction phase	Likelihood of soil or groundwater contamination to be present	Consequence	Risk rating
Enabling works and the establishment of construction compounds	AEI2 – Leaks and spills from plant and machinery on-site during site establishment works	Unlikely to be present, no intrusive works during site establishment, hardstand across the majority of the Project Area limiting infiltration to soil and groundwater. Management of stormwater required to limit migration to sediment and surface water.	Exposure pathway for human or ecological receivers likely to be present and complete during construction (without implementation of appropriate controls).	Low (without mitigation) Low (with mitigation)
Removal of the tugboat jetty and construction of the new BLB (BLB3)	Potential contamination from all AEIs (AEI1, AEI2, AEI3, AEI4, AEI5) impacting human health (construction workers) and ecological receivers (Botany Bay) with potential to encounter soil, sediment, dust, vapours and groundwater and surface was during demolition, piling/excavation and construction works. Temporary stockpiling may also occur on-site. Cross contamination associated with the incorrect handling or disposal of spoil/unexpected finds and discharge/leaching to the receiving environment are potential impacts during construction if appropriate controls and handling procedures are not implemented.	Potentially present at concentrations above the relevant assessment criteria and widespread.	Exposure pathway for human or ecological receivers likely to be present and complete during construction (without implementation of appropriate controls).	Medium (without mitigation) Low (with mitigation)

Project component	Potential contamination impacts associated with construction phase	Likelihood of soil or groundwater contamination to be present	Consequence	Risk rating
Decommissioning and demolition of BLB1	Potential contamination from all AEIs (AEI1, AEI2, AEI3, AEI4, AEI5, AEI6) impacting human health (construction workers) and ecological receivers (Botany Bay) with potential to encounter soil, sediment, dust, vapours and groundwater and surface was during demolition, flushing/ pipe clearing/disposal of product and extension construction. Temporary stockpiling may also occur on-site, as well as laydown of demolished materials. Cross contamination associated with the incorrect handling or disposal of infrastructure/excess product/unexpected finds and discharge/leaching to the receiving environment are potential impacts during construction if appropriate controls and handling procedures are not implemented. Potential for generation of hazardous building materials in dust particles impacting human health (construction workers) and ecological receivers (Botany Bay) during demolition activities of the BLB1 infrastructure. Discharge/leaching to the receiving environment are potential impacts during construction if appropriate controls and handling procedures are not implemented.	Potentially present at concentrations above the relevant assessment criteria and widespread.	Exposure pathway for human or ecological receivers likely to be present and complete during construction (without implementation of appropriate controls).	Medium (without mitigation) Low (with mitigation)
Decommissioning and removal of bulk liquids transfer pipelines				

Project component	Potential contamination impacts associated with construction phase	Likelihood of soil or groundwater contamination to be present	Consequence	Risk rating
Construction of the extended quayline (BD12) and wharf area	Potential contamination from AEIs (AEI1, AEI2, AEI3, AEI4, AEI5 and AEI7) impacting human health (construction workers) and ecological receivers (Botany Bay) with potential to encounter soil, sediment, dust, vapours and groundwater and acid sulfate soils during import of material, construction, dredging, piling, and excavation. Dredging of seabed sediments within the existing berths may result in exposure of sulfide bearing minerals to air and the generation/release of sulfuric acid to surface waters and groundwater, potentially leading to the generation of latent soil acidity and the release of metals, nutrients, and salts into the surrounding surface, surface waters, and local aquifer. As such, measures to minimise impacts from the disturbance of PASS and ASS during dredging of sediments from Brotherson Dock, and subsequent placement in the reclaimed area, would be included in the CEMP(s). Restrictive measures on stockpiling of dredged materials would be required for the Project. Cross contamination associated with the incorrect handling or disposal of excavated material/unexpected finds and discharge/leaching to the receiving environment are potential impacts during construction if appropriate controls and handling procedures are not implemented. It is also important that any imported materials are tested to confirm Project Area suitability.	Potentially present at concentrations above the relevant assessment criteria and widespread.	Exposure pathway for human or ecological receivers likely to be present and complete during construction (without implementation of appropriate controls).	Medium (without mitigation) Low (with mitigation)

5.0 Assessment of operational impacts

At the completion of construction, remaining operational elements of the Project would include:

- An extended quayline and around 5.3 hectares of new wharf area (hardstand)
- A new bulk liquids berth (BLB3) and associated pipelines and bulk liquids handling infrastructure.

For the extended quayline and wharf area, there are unlikely to be potential operational contamination impacts, given this area would not be actively used until the development of the future container operations on the site. Impacts associated with operation of the facilitated development are considered in Section 6.3. Prior to the facilitated container operations, the extended quayline and wharf area would be managed in line with existing procedures at DP World.

For BLB3, potential contamination impacts that would be associated with the operation of the Project would be similar to those currently experienced at the two BLBs, in a slightly more southern location. Potential contamination impacts associated with the operation of the new BLB3 is presented in Table 5-1 noting that many of these impacts already exist at the port.

Table 5-1 Assessment of operational impacts

Project component	Potential contamination impacts associated with operation	Risk rating
BLB3 to replace BLB1 including associated pipeline infrastructure	The potential operational impacts with regard to this project element would be relevant during the operation of the Project. Potential impacts include those similar to the operations of the current BLBs including: • Potential sources of contamination would be fuel within the pipeline • Potential contamination pathways associated with the operation of the new BLB3 could include leaks and spills from the new pipeline • Potential receivers during operation of the Project including workers and visitors, intrusive maintenance workers and aquatic biota (Botany Bay) • Minimal soil and groundwater contamination impacts from operation of the new BLB3 due to age of new pipeline infrastructure and connection to existing infrastructure.	Medium (without mitigation) Low (with mitigation)

6.0 Assessment of cumulative impacts

6.1 Overview

In addition to impacts that are wholly and directly related to its construction and operation, the Project has the potential to:

- Directly contribute to **cumulative impacts** with other developments or activities that coincide spatially or temporally with the Project
- Indirectly contributed to **facilitated impacts** as a consequence of enabling or encouraging subsequent development or activities.

As described in Section 2.2, this chapter considers these two scenarios to help form a view on the acceptability of the Project and its contributions to cumulative potential impacts. Where relevant, it also identifies mitigation and management measures within the control and responsibility of the applicant to address the Project's contributions to cumulative and facilitated impacts.

6.2 Cumulative impacts

Following the adoption of the proposed mitigation and management measures, effective and compliant management of potential contamination risks would be achieved. As such, residual impacts to human or environmental health associated with contaminated land are not anticipated during construction or operation of the Project. Subsequently, an assessment of cumulative impacts associated with construction of the Project and the developments listed in Section 2.2.7 is not required.

6.3 Facilitated impacts

The Project would facilitate container operations within the extended quayline and wharf area. The facilitated development is anticipated to include:

- Installation of up to three new quay cranes
- Installation of quay rail sidings
- Crane power and control systems
- Supporting services, including drainage, power supply, lighting, firefighting systems, security, water supply and sewerage, and telecommunications.

The nature of construction activities required to subsequently develop container operations on the extended quayline and wharf area would be determined by the stevedore as part of a separate project (the facilitated development). The construction phase contamination impacts for the facilitated development are likely to be limited given major construction activities such as dredging and excavations would be completed beforehand, during construction of the Project.

As part of the facilitated development, the operational contamination impacts would primarily relate to the potential contamination of soil, sediment, surface water and groundwater arising from leaks and spills of chemicals/ fuel during storage, maintenance and use of plant, machinery and vehicles. Operation of the facilitated development would be consistent with existing operations at Port Botany and the existing container operations.

Table 6-1 Consideration of facilitated impacts

Project component	Potential contamination impacts associated with operation	Risk rating
Facilitated development	The potential operational impacts with regard to this project element would only be relevant during the future facilitated development. Potential impacts during the facilitated development include those similar to the current container operations including: • Small volumes of oil, fuels, solvents, and other chemicals used for operation and maintenance if not stored and handled in accordance with regulations • Leaks and spills from vehicles, plant and machinery, during storage of various chemicals/substances, and during operation and maintenance activities • Workers and visitors, intrusive maintenance workers and aquatic biota (Botany Bay) • Minimal soil and groundwater contamination impacts would be expected from the operation of the extended quayline and dock area due to age of infrastructure and the presence of hardstand across the Project Area minimising infiltration.	Medium (without mitigation) Low (with mitigation)

7.0 Mitigation and management of impacts

7.1 Overview

This section outlines how potential contamination impacts associated with the Project would be mitigated and managed. These mitigation and management measures relate specifically to the Project and include consideration of the facilitated development to the extent necessary to minimise potential inconsistency between the approach taken for the Project and the facilitated development.

The facilitated development would be separately progressed by the stevedore, including development of mitigation and management measures specific to that development, as required.

7.2 Mitigation and management of impacts

Mitigation and management measures for potential contamination and soils impacts during construction and operation of the Project are outlined in Table 7-1.

The potential for leaks and spills of fuel from new pipelines and connections to existing pipelines during operation of the BLB3 are considered as part of operational hazards and risk. These are assessed in detail in Technical report: Preliminary hazard analysis (Appendix G to the EIS), including identification of mitigation and management measures. These measures include:

- Fully welded pipelines along transfer route
- Marine loading arm movements outside safe operating envelopes triggering alarms/shutdown
- Full bunding of the wharf
- Installation of a containment pit around the pipe isolation valve
- Hydrostatic testing of pipes periodically
- Operators monitoring bulk liquids transfers.

In addition, existing operational environmental management systems would be updated post construction to specify the management and mitigation measures for known and potential contamination including but not limited to leak and spill management process/procedures, waste management, monitoring, inspection and reporting requirements, intrusive works, hazardous materials registers, periodic inspections, maintenance requirements, unexpected finds procedures and safety controls. These measures are likely to be similar to those currently applied to operation of the existing BLB1.

Table 7-1 Mitigation and management measures – contamination and soils

ID	Issue	Mitigation measure	Timing
SC1	Unknown existing contamination in soil, groundwater, seepage water, sediment and surface water	An unexpected finds procedure will be developed and implemented as part of the Construction Environmental Management Plan(s) (CEMP(s)) for the Project. The procedure will include a process for addressing unexpected contamination and provisions for: • Cessation of works within the affected area until inspection of the suspected contamination by a qualified contamination specialist (verification by a certified contaminated land practitioner) • Collection of soil, sediment, water samples for analysis based on observations • Assessment of results against applicable land use or waste classification criteria in accordance with statutory guidelines	Construction

ID	Issue	Mitigation measure	Timing
		Management of the contamination in accordance with applicable statutory guidelines.	
SC2	Known existing contamination in sediments in Brotherson Dock material within dredging footprint	The Construction Environmental Management Plan(s) (CEMP(s)) will include task-specific measures including: - Managing dredging and / or excavation to reduce exposure of potentially contaminated sediments to workers and surrounding environment - Sediment and erosion controls in place and monitoring for dredged material - Staff involved in dredging to wear suitable PPE and follow applicable management procedures to reduce exposure to potentially contaminated sediments - Sediment incident response plan to be developed and implemented in response to accidental leakages or spills of potentially contaminated sediments.	Construction
SC3	Known existing contamination in sediments in Brotherson Dock material within dredging footprint	Sampling and elutriate analysis of sediments will be carried out prior to construction to confirm existing findings and further inform handling of dredge spoil and management procedures to be implemented during construction. The sampling and analysis will consider whether contaminants are bound to particles and their bioavailability. A Sampling Analytical Quality Plan (SAQP) will be prepared for the sampling and analysis.	Prior to construction
SC4	Extent of PASS and ASS in sediment to be dredged	Sampling and analysis of sediments will be carried out prior to construction to inform the development of PASS/ ASS management as part of an CEMP(s) (refer to mitigation and management measure SC5). A sampling and analysis quality plan (SAQP) will be prepared as part of the CEMP(s).	Prior to construction and construction
SC5	Management of PASS and ASS	The CEMP(s) will include measures to manage risks associated with acid sulfide materials during construction, including but not limited to: - Sediment investigations across the dredge area footprint (refer to mitigation and management measure SC4) - Minimising the disturbance of ASS where possible - Use of appropriate dredging methods to limit exposure of seabed sediments to air which can trigger acid formation - Application of neutralising agents such as lime to the materials exposed to minimise impact to surface waters	Construction

ID	Issue	Mitigation measure	Timing
		- Management and monitoring of water systems including reclamation area pond, groundwater beneath the reclamation area and marine waters within the harbour. - Processes to slow and/or stop work if monitoring indicates that acidity of receiving water systems is or has the potential to be unacceptable.	
SC6	Demolition of potentially contaminated structures	A hazardous material building survey of BLB1 will be conducted prior to the demolition works to identify the presence of asbestos, lead based paints, PCBs etc. If detected, then an appropriately licensed contractor will be engaged to conduct the demolition works with appropriate controls in place to manage risks associated with handling these materials.	Construction
SC7	Import of material for reclamation purposes, comprising potentially contaminated material	Materials imported for the construction of the reclaimed area will comprise excavated natural material (ENM) or virgin excavated natural material (VENM), or other material assessed and approved for used under the <i>Protection of the Environment (Waste) Regulation 2014</i> (NSW).	Construction

8.0 Conclusion

The Project Area is situated within a heavily industrialised port setting at Port Botany, approximately one kilometre south-east of Sydney Kingsford Smith Airport and 12 kilometres from the Sydney CBD. Underlying soils include coastal podosolic sands and, in the areas of the Project over water (Brotherson Dock), shallow sediments range from coarse sands to fine silts. Geologically, Holocene coastal and anthropogenic fills overlay Hawkesbury Sandstone, and groundwater beneath the Project Area is described as a productive porous aquifer with varying salinity.

Historically, the area was open water until significant reclamation and dock construction began in the late 1970s and again in the 2000s. Surrounding developments now include bulk liquid storage, chemical handling, and container operations. Multiple environmental licences and contamination notices are associated with nearby industrial facilities, including Orica's regulated groundwater remediation. Previous investigations indicate localised sediment contamination (e.g., metals, TPH and tributyltin) in Brotherson Dock, but ongoing monitoring efforts reduce broader risk to nearby receivers. Overall, the Project is surrounded by industrial land uses, with ongoing mitigation measures to mitigate contamination and maintain operational safety implemented.

A review of available information indicates that there is potential for complete source, pathway, receiver linkages from unknown existing, known existing and potential new contamination in soil, sediment, surface water and groundwater during construction and operation of the Project. The assessment findings ranked from highest pre-mitigation risk to lowest include those related to:

- Potential for activation of acid sulfate soils (ASS) in sediments during dredging works, necessitating management during any excavations as part of a CEMP(s)
- Land that was previously reclaimed with material of unknown origin. Construction activities may result in exposure of historical contamination and impacts to human health and ecological receivers, requiring mitigation measures to be implemented as part of a CEMP(s)
- Presence of hazardous building materials in aged infrastructure such as BLB1 which would be demolished during the construction works. Demolition activities may result in exposure of potential impacts to human health and ecological receivers, requiring mitigation measures to be implemented as part of a CEMP(s)
- Current and historical industrial land use off-site, adjacent and topographically upgradient in close proximity to the Project Area, such as Vopak remediation works as a result of pipeline leak in 2019, Orica groundwater remediation site under regulation, Ampol Banksmeadow Terminal under regulation, Opal site under assessment and Sydney Kingsford Smith Airport under PFAS investigation and management. The risk from the Orica remediation works is considered low given recent August 2024 groundwater and surface water monitoring (WSP, 2024)
- Leaks and spills of chemicals, infrastructure and vehicles during historical industrial land use on-site, although the likelihood of contamination is low
- Known impacted (TBT, total TPH, arsenic, lead, mercury and zinc, organochlorine pesticides) sediments in Brotherson Dock where dredging is proposed. Although the risk to receivers from the in-situ impacted sediments is considered to be low, the proposed dredging activities may increase the likelihood of human health and ecological receivers being exposed to potentially impacted sediments. Employment of mitigation measures as part of the CEMP(s) is proposed to manage contamination impacts during dredging activities
- Import of material comprising potentially contaminated material for placement in the reclamation area. Import of material of unknown origin may result in impacts to human health and ecological receivers, requiring mitigation measures such as material management plan as part of a CEMP(s).

Based on the findings of this PSI, no further investigations (such as a DSI) are considered necessary under the environmental risk management framework of the ASC NEPM (2013).

It is recommended that contamination management measures are developed and implemented through a CEMP(s) for the Project. While the assessed risk is low, to inform and support tailoring of management measures to site conditions and construction activities, further targeted sampling and analysis of sediments would be completed prior to construction. This supplementary investigation work would include additional elutriate analysis in line with the NADG (DCCEEW, 2009) guidance and further investigation into the presence of PASS and ASS in line with ASS Assessment Guidelines (ASSMAC, 1998).

Following adoption of this recommended approach through a CEMP(s) for the Project, the desired performance outcomes would be achieved, which is to:

- Help ensure that human and environmental health is protected from risks arising from the disturbance of potential contamination
- Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.

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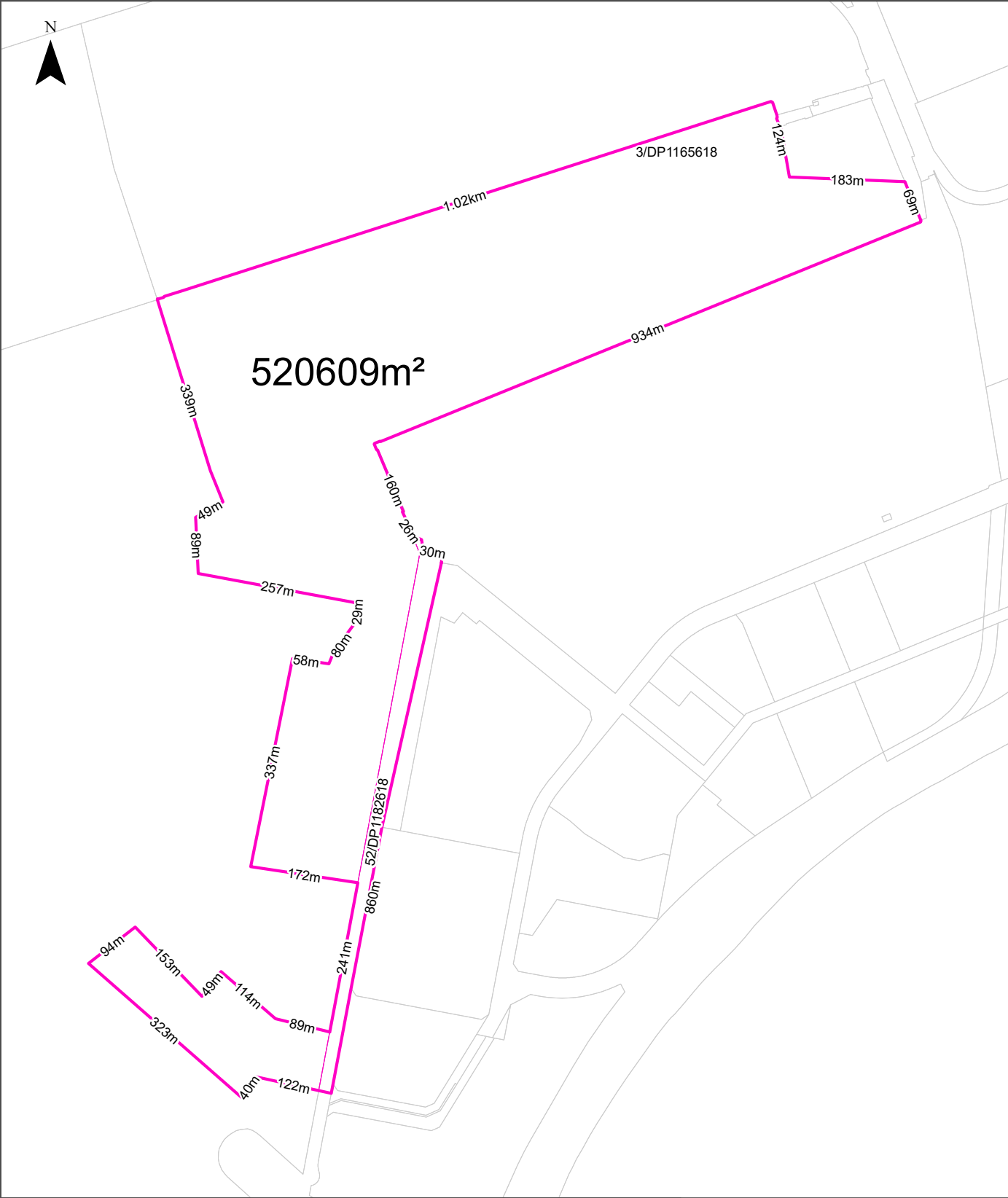
Annexure A

Lotsearch report

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	28/05/2024	28/05/2024	Annually	1000m	0	0	0
NSW BioNet Species Sightings	NSW Department of Climate Change, Energy, the Environment and Water	10/09/2024	10/09/2024	Monthly	10000m	-	-	-

Site Diagram

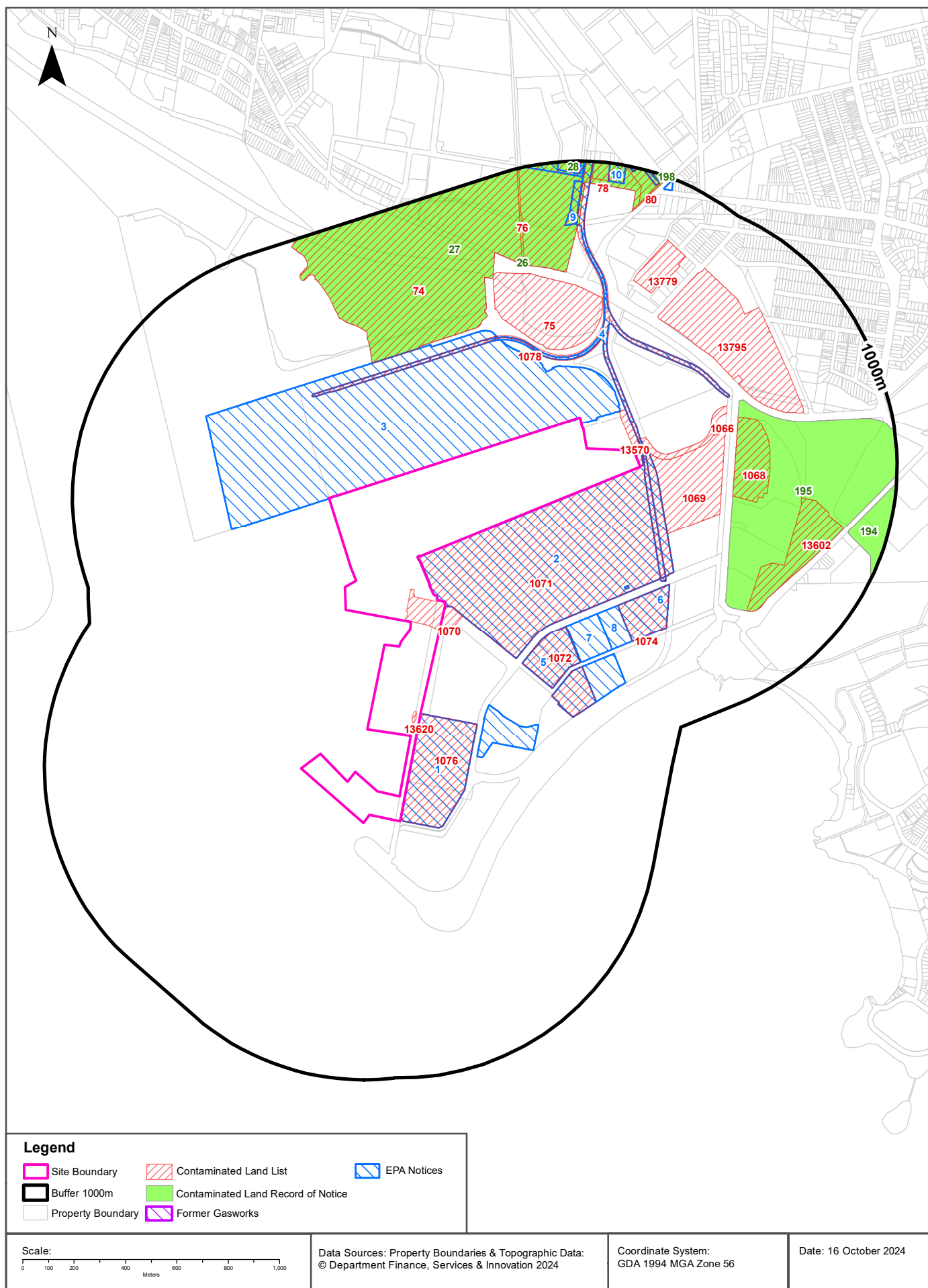
Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Legend Site Boundary Internal Parcel Boundaries	Total Area: 520609m ² Total Perimeter: 6.07km Disclaimers: Measurements are approximate only and may have been simplified or smaller lengths removed for readability. Parcels that make up a small percentage of the total site area have not been labelled for increased legibility.	Scale: 0 25 50 100 150 200 250 Meters Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2024 Coordinate System: GDA 1994 MGA Zone 56 Date: 16 October 2024
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Contaminated Land

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Contaminated Land

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
13620	Vopak Terminals - Pipeline Corridor	21 Fishburn ROAD	PORT BOTANY	Other Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	0m	On-site
1070	Bulk Liquids Berth UPSS, Port Botany	Charlotte Road	Port Botany	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	0m	On-site
1071	Sydney Ports Marine Services	Interterminal Access Road	Port Botany	Other Petroleum	N/A - Site no longer on EPA Contaminated Land List	Previous EPA List	Premise Match	0m	East
1076	Vopak B	20 Friendship Road	Port Botany	Chemical Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	0m	South
13570	Port Operations Centre UPSS, Port Botany	Penrhyn ROAD	PORT BOTANY	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	0m	North East
1078	Port Botany Railway Corridors	Friendship Road	Port Botany	Other Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	15m	North East
1066	Bunnerong Canal	Between Brotherson Dock and Bumborah Point Road	Port Botany	Unclassified	Regulation under CLM Act not required	Current EPA List	Premise Match	24m	East
1069	Smith Bros	4 Bumborah Point Road	Port Botany	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	48m	East
75	Caltex Terminal	1-3 Penrhyn Road	Banksmeadow	Other Petroleum	Contamination currently regulated under POEO Act	Current EPA List	Premise Match	274m	North East
1072	Terminals	45 Friendship Road	Port Botany	Chemical Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	340m	South East
1068	Port Botany Bus Depot	7 Bumborah Point Road	Matraville	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	365m	East
74	Orica Botany Groundwater Project	16-20 Beauchamp Road	Banksmeadow	Chemical Industry	Contamination currently regulated under CLM Act	Current EPA List	Premise Match	449m	North
1074	Vopak A	49 Friendship Road	Port Botany	Chemical Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	466m	East
13795	Opal Packaging Botany Mill	1891 Botany ROAD	MATRAVILLE	Other Industry	Under assessment	Current EPA List	Premise Match	473m	North East
13779	42-52 Raymond Avenue, Matraville NSW	42-52 Raymond AVENUE	MATRAVILLE	Other Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	561m	North East

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
13602	Eastern Suburbs Memorial Park	12 Military ROAD	MATRAVILLE	Chemical Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	610m	East
76	Discovery Cove, Former Ampol Rail Terminal	1801 Botany Road	Banksmeadow	Other Petroleum	Regulation being finalised	Current EPA List	Premise Match	633m	North
80	Pacific National Rail Siding	1 Beauchamp Road	Banksmeadow	Chemical Industry	Contamination currently regulated under CLM Act	Current EPA List	Premise Match	860m	North East
78	Veolia Waste Transfer Terminal (former Keith Engineering site)	34-36 McPherson Street	Banksmeadow	Other Industry	Regulation under CLM Act not required	Current EPA List	Premise Match	931m	North East
79	Orica Former Chlor Alkali Plant (same site as Orica Botany Groundwater Project)	Botany Industrial Park, off Denison STREET	Banksmeadow	Chemical Industry	Contamination currently regulated under CLM Act	Current EPA List	Premise Match	995m	North East
13417	Orica Botany (Pre-2003 Regulation)	Denison STREET	Banksmeadow	Chemical Industry	Contamination currently regulated under CLM Act	Current EPA List	Premise Match	995m	North East

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.

EPA site management class	Explanation
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Contaminated Land

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Contaminated Land: Records of Notice

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
195	Bunnerong Power Station	Bumbarah Point Road	Matraville	5 former	3046	Premise Match	365m	East
27	Orica Botany Groundwater Project	16-20 Beauchamp Road	Banksmeadow	6 current and 28 former	3203	Premise Match	449m	North
26	Discovery Cove, Former Ampol Rail Terminal	1801 Botany Road	Banksmeadow	1 current	3049	Premise Match	633m	North
194	Ampol Matraville Refinery	Bunnerong/Military Roads	Matraville	9 former	3044	Premise Match	848m	East
28	Section of ICI Southlands	McPherson Street and Nant Street	Banksmeadow	4 former	3045	Premise Match	937m	North
198	Orica Botany (Pre-2003 Regulation)	Denison STREET	Banksmeadow	12 former	3048	Premise Match	995m	North East

Contaminated Land Records of Notice Data Source: Environment Protection Authority

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Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit

<http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm>

Former Gasworks

Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
N/A	No records in buffer					

Former Gasworks Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Contaminated Land

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

EPA Notices

Penalty Notices, s.91 & s.92 Clean up Notices and s.96 Prevention Notices within the dataset buffer:

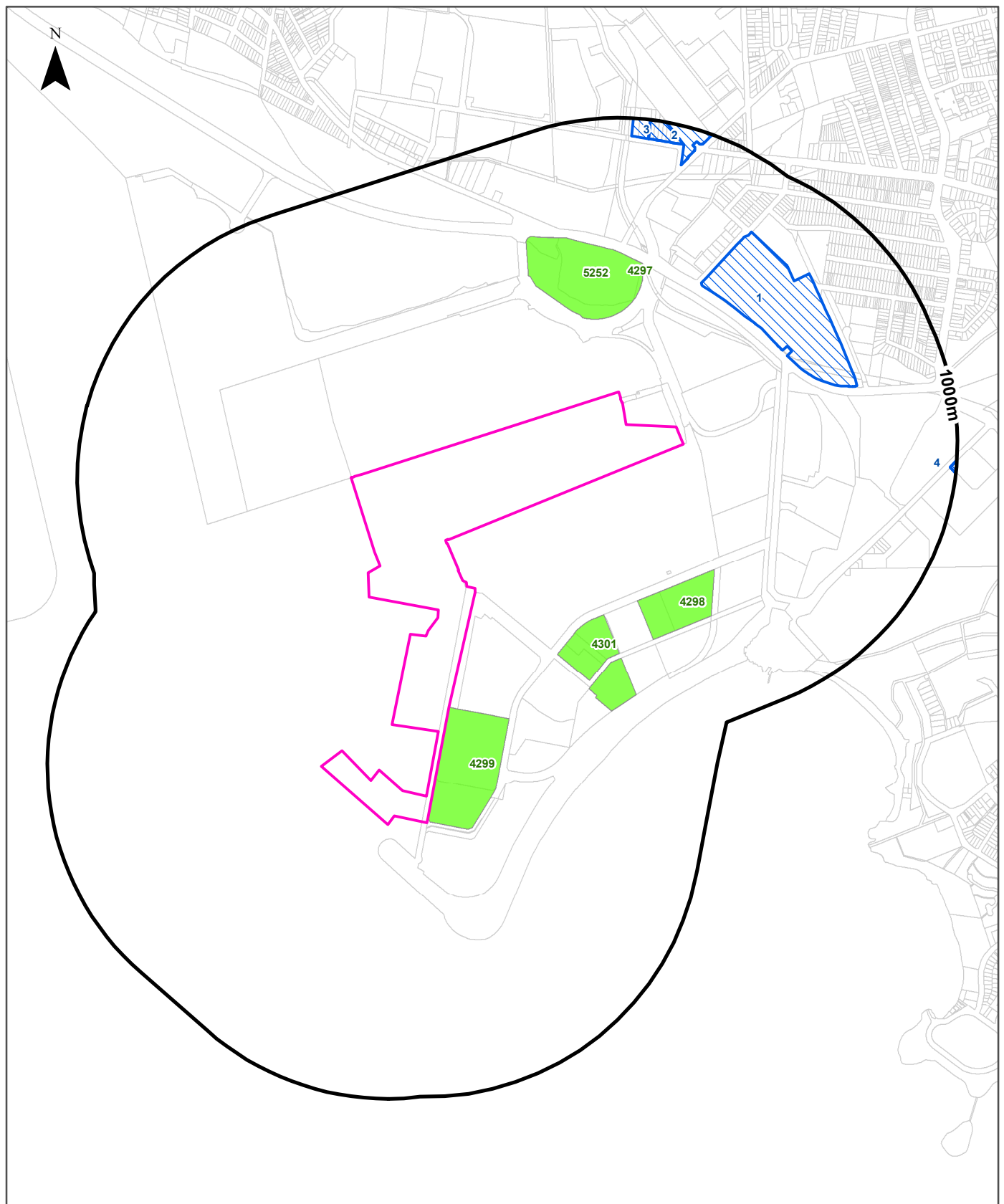
Map ID	Number	Type	Name	Address	Status	Issued Date	Act	Offence	Offence Date	Loc Conf	Dist	Dir
1	3085766943	Penalty Notice	VOPAK TERMINAL S SYDNEY PTY LIMITED	20 AND 37 AND 49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	22/11/2012	Protection of the Environment Operations (Clean Air) Regulation 2010 - 60 (2)	Not comply with specifications for operation/maintenance - Corporation	02/09/2012	Premise Match	0m	South
	1502117	s.96 Prevention Notice	VOPAK TERMINAL S SYDNEY PTY LIMITED	20 AND 37 AND 49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	28/10/2011				Premise Match	0m	South
	1531474	s.96 Prevention Notice	VOPAK TERMINAL S SYDNEY PTY LIMITED		Issued	17/07/2015				Premise Match	0m	South
2	3508201	s.91 Clean Up Notice	TERMINAL S PTY LTD	45 AND 51 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	19/02/2024				Premise Match	0m	East
3	3085765495	Penalty Notice	PATRICK STEVEDORES OPERATIONS PTY LIMITED	PENRHYN ROAD, BANKSMEADOW, NSW 2019	Issued	05/09/2012	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	27/10/2011	Premise Match	0m	North
	3085765486	Penalty Notice	PATRICK STEVEDORES OPERATIONS PTY LIMITED	PENRHYN ROAD, BANKSMEADOW, NSW 2019	Issued	05/09/2012	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	30/03/2012	Premise Match	0m	North
4	3173530755	Penalty Notice	SYDNEY TRAINS	SYDNEY TRAINS, HAYMARKET, NSW 1238	Issued	10/11/2021	Protection of the Environment Operations Act 1997 - 64(1)	Contravene condition of licence - Corporation	31/05/2021	Network of Features	15m	North East
5	3085782050	Penalty Notice	TERMINAL S PTY LTD	45 AND 51 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	20/04/2017	Protection of the Environment Operations Act 1997 - 64(1)	Contravene condition of licence - Corporation	16/06/2016	Premise Match	340m	South East
	1541862	s.96 Prevention Notice	TERMINAL S PTY LTD	45 AND 51 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	24/06/2016				Premise Match	340m	South East
6	3085766045	Penalty Notice	VOPAK TERMINAL S SYDNEY PTY LIMITED	49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	28/09/2012	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	01/03/2012	Premise Match	466m	East

Map ID	Number	Type	Name	Address	Status	Issued Date	Act	Offence	Offence Date	Loc Conf	Dist	Dir
6	1521883	s.96 Prevention Notice	VOPAK TERMINAL S SYDNEY PTY LIMITED	49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	14/05/2014				Premise Match	466m	East
7	3085771316	Penalty Notice	ORIGIN ENERGY LPG LIMITED	47 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	14/06/2013	Protection of the Environment Operations Act 1997 - 126(1)	Occupier deal with materials and thus cause air pollution - Corporation	04/05/2013	Premise Match	466m	South East
	3085772517	Penalty Notice	ORIGIN ENERGY LPG LIMITED	47 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	07/11/2013	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	31/08/2013	Premise Match	466m	South East
	1502131	s.96 Prevention Notice	ORIGIN ENERGY LPG LIMITED	47 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	28/10/2011				Premise Match	466m	South East
8	1502285	s.96 Prevention Notice	VOPAK TERMINAL S SYDNEY PTY LIMITED	49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	Issued	10/11/2011				Premise Match	466m	South East
9	3085768988	Penalty Notice	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD, MATRAVILLE, NSW 2036	Issued	05/03/2013	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	08/02/2013	Premise Match	751m	North
	1030236	s.91 Clean Up Notice	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD, MATRAVILLE, NSW 2036	Issued	26/09/2003				Premise Match	751m	North
	1501866	s.91 Clean Up Notice	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD, MATRAVILLE, NSW 2036	Issued	27/09/2011				Premise Match	751m	North
	1501896	s.91 Clean Up Notice	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD, MATRAVILLE, NSW 2036	Issued	30/09/2011				Premise Match	751m	North
10	3085772443	Penalty Notice	BOTANY BUILDING RECYCLERS PTY. LIMITED	38 McPherson Street, BANKSMEADOW, NSW 2019	Issued	17/10/2013	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	01/07/2013	Premise Match	930m	North East
	3085772389	Penalty Notice	BOTANY BUILDING RECYCLERS PTY. LIMITED	38 McPherson Street, BANKSMEADOW, NSW 2019	Issued	17/10/2013	Protection of the Environment Operations Act 1997 - 64(1)	Contravene any condition of licence - not noise - corporation	01/07/2013	Premise Match	930m	North East

NSW EPA Notice Data Source: Environment Protection Authority
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Waste Management & Liquid Fuel Facilities

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Legend

-  Site Boundary
-  Waste Management Facilities
-  Buffer 1000m
-  National Liquid Fuel Facilities
-  Property Boundary

Scale:
0 100 200 400 600 800 1,000
Meters

Data Sources: Property Boundaries & Topographic Data:
© Department Finance, Services & Innovation 2024

Coordinate System:
GDA 1994 MGA Zone 56

Date: 16 October 2024

Waste Management & Liquid Fuel Facilities

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

National Waste Management Facilities Database

Sites on the National Waste Management Facilities Database within the dataset buffer:

Map ID	Owner	Name	Address	Management Type	Facility Type	Status	Loc Conf	Dist	Dir
1	ORORA LTD	ORORA BOTANY MILL	1891 BOTANY ROAD, MATRAVILLE	RECYCLING	PAPER AND CARDBOARD RECYCLING FACILITY	OPERATIONAL	Premise Match	473m	North East
2	VEOLIA	BANKSMEADOW TRANSFER STATION	34 MCPHERSON STREET, BANKSMEADOW	DROP-OFF	TRANSFER STATION	OPERATIONAL	Premise Match	860m	North East
3	MCPHERSON RECYCLING PTY LTD	MCPHERSON RECYCLING PTY LTD	38 MCPHERSON STREET, BANKSMEADOW	DROP-OFF	TRANSFER STATION	OPERATIONAL	Premise Match	930m	North East
	Botany Building Recyclers Pty Ltd	Building Waste Resource Recovery Facility	38 Mcpherson Street, Banksmeadow		Multi-Purpose		Premise Match	930m	North East
4	VEOLIA	PORT BOTANY RESOURCE RECOVERY CENTRE	3-19 MILITARY ROAD, MATRAVILLE	DROP-OFF	TRANSFER STATION	OPERATIONAL	Premise Match	977m	East
	Veolia Environmental Services (Australia) Pty Ltd	Port Botany Transfer Station	3 Military Road, Matraville		Multi-Purpose		Premise Match	977m	East

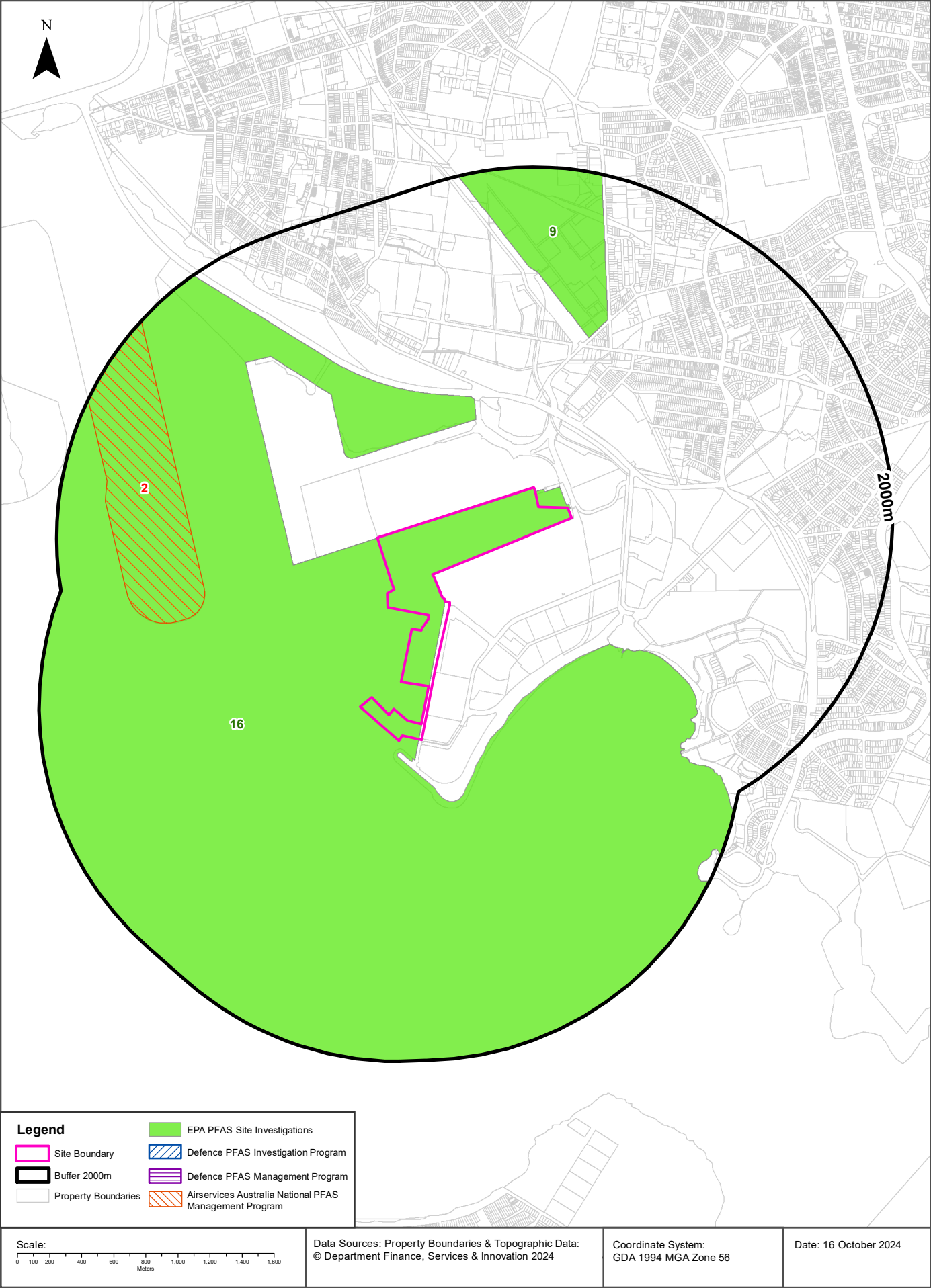
Source: Waste Management Facilities Database
Creative Commons 4.0 © Commonwealth of Australia (Geoscience Australia) 2022

National Liquid Fuel Facilities

National Liquid Fuel Facilities within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
4299	Vopak	Botany Site B	19-25 Friendship Road	Port Botany	Fuel Terminal	Operational	Vopak	11/06/2012	Premise Match	0m	South
4297	Caltex	Banksmeadow	1886 Botany Road	Banksmeadow	Fuel Terminal	Operational	Caltex	21/08/2020	Premise Match	274m	North East
5252	CALTEX	AMPOL BANKSMEADOW DIESEL STOP	1-3 PENRHYN ROAD	BANKSMEADOW	PETROL STATION	OPERATIONAL			Premise Match	274m	North East
4301	Terminals Pty Ltd	Botany	45 Friendship Road	Port Botany	Fuel Terminal	Operational	Terminals Pty Ltd	11/06/2012	Premise Match	340m	South East
4298	Vopak	Botany Site A	49 Friendship Road	Port Botany	Fuel Terminal	Operational	Vopak	11/06/2012	Premise Match	466m	East

National Liquid Fuel Facilities Data Source: Geoscience Australia
Creative Commons 4.0 © Commonwealth of Australia



PFAS Investigation & Management Programs

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

EPA PFAS Investigation Program

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Map ID	Site	Address	Loc Conf	Dist	Dir
16	Botany Bay area	Botany Bay area & Georges River	Area Match	0m	On-site
9	Botany Industrial Park	Dent Street, Botany, 2019	Premise Match	995m	North

EPA PFAS Investigation Program: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Defence PFAS Investigation Program

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

Defence PFAS Management Program

Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

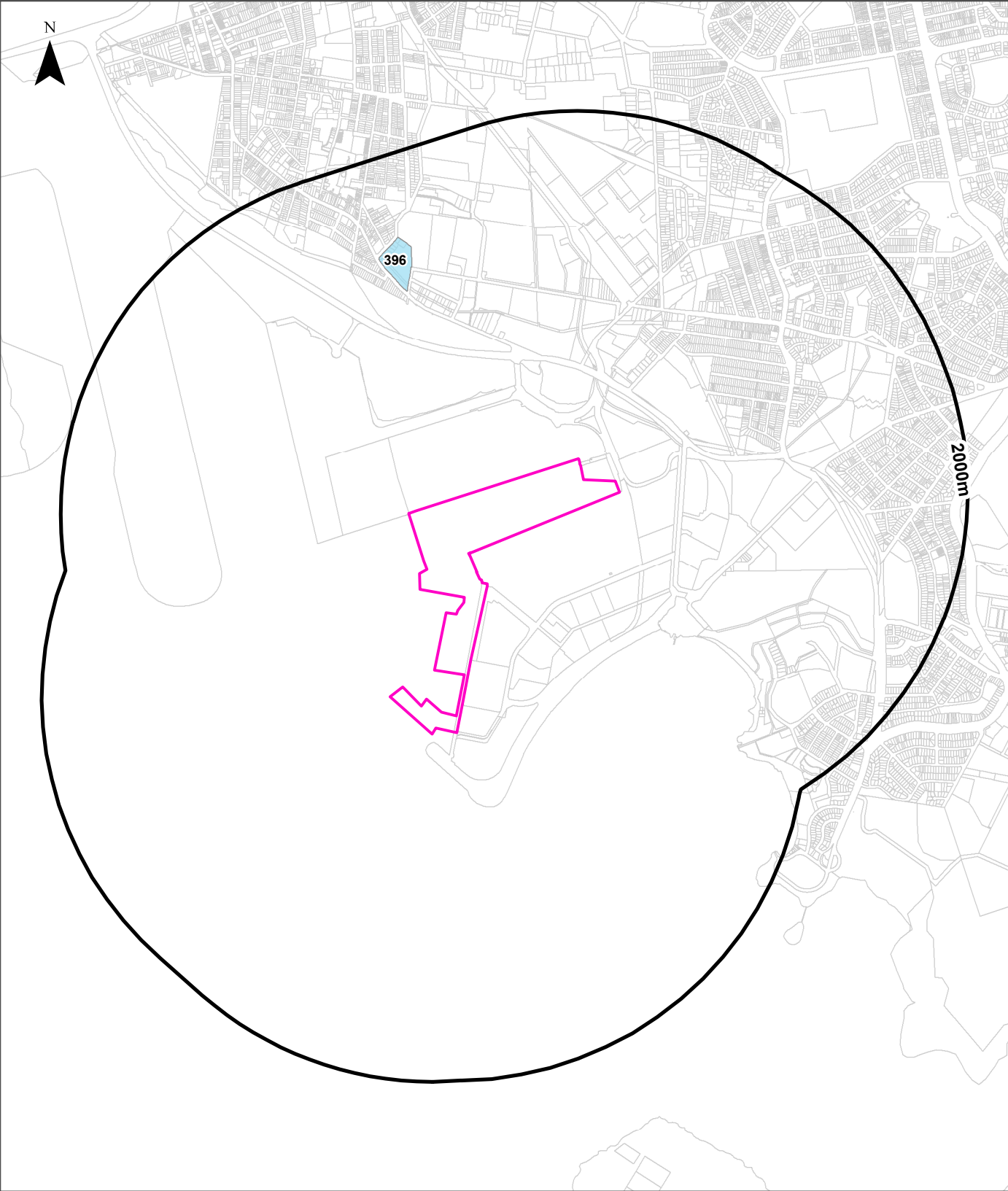
Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

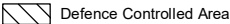
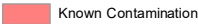
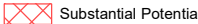
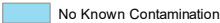
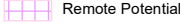
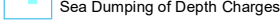
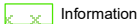
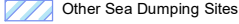
Airservices Australia National PFAS Management Program

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
2	Sydney Airport (NSW)	Confirmed at fire station and fire training ground.	Premise Match	1123m	West

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia



Legend			
 Site Boundary	 DCA	 Defence 3 Year RCIP	 UXO
 Buffer 2000m	 Defence Controlled Area	 Known Contamination	 Substantial Potential
 Property Boundaries		 No Known Contamination	 Slight Potential
			 Remote Potential
			 Sea Dumping of Depth Charges
			 Information
			 Other
			 Other Sea Dumping Sites

Scale: 0 200 400 800 1,200 1,600 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2024	Coordinate System: GDA 1994 MGA Zone 56	Date: 16 October 2024
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Defence Sites and Unexploded Ordnance

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Defence Controlled Areas (DCA)

Defence Controlled Areas provided by the Department of Defence within the dataset buffer:

Site ID	Location Name	Loc Conf	Dist	Dir
N/A	No records in buffer			

Defence Controlled Areas, Data Custodian: Department of Defence, Australian Government

Defence 3 Year Regional Contamination Investigation Program (RCIP)

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
396	Banksmeadow Depot	Banksmeadow, New South Wales	NO	Premise Match	1221m	North

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government

National Unexploded Ordnance (UXO)

Sites which have been assessed by the Department of Defence for the potential presence of unexploded ordnance within the dataset buffer:

Site ID	Location Name	Category	Area Description	Additional Information	Commonwealth	Loc Conf	Dist	Dir
N/A	No records in buffer							

National Unexploded Ordnance (UXO), Data Custodian: Department of Defence, Australian Government

EPA Other Sites with Contamination Issues

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

EPA Other Sites with Contamination Issues

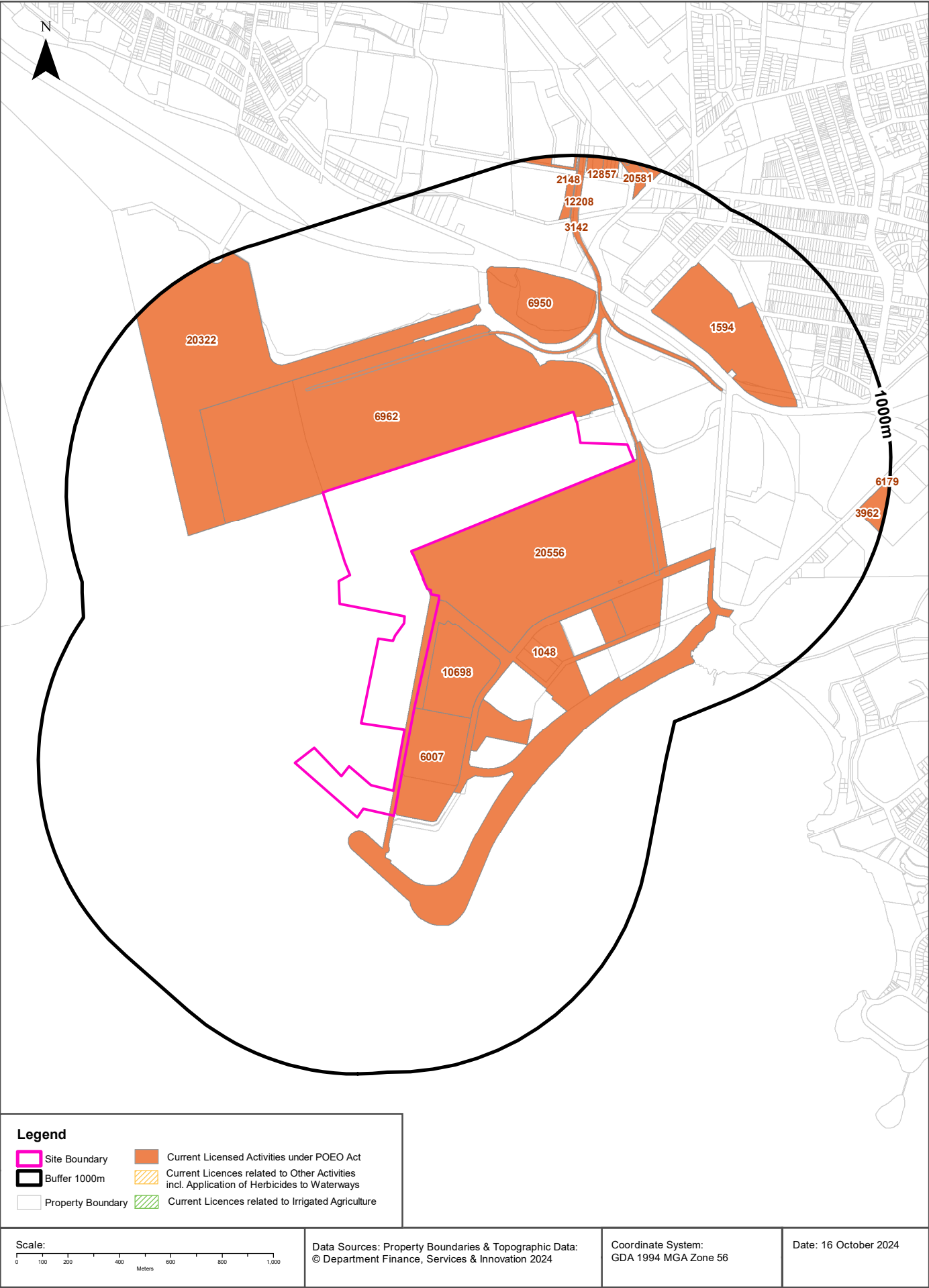
This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority
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EPA Activities

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Licensed Activities under the POEO Act 1997

Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

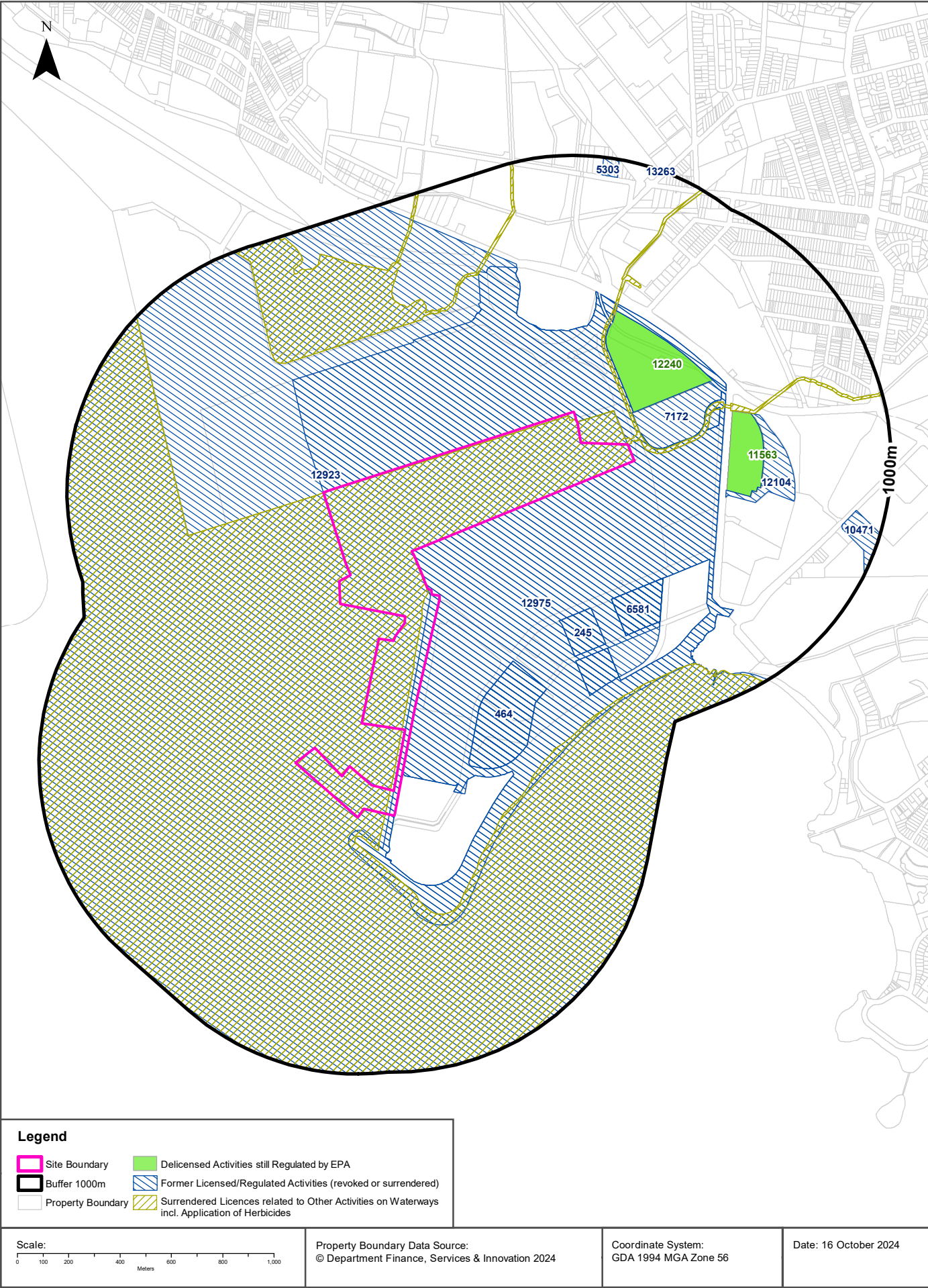
EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
1048	TERMINALS PTY LTD	TERMINALS PTY LTD	45 and 51 FRIENDSHIP ROAD	PORT BOTANY	Chemical storage waste generation	Premise Match	0m	On-site
1048	TERMINALS PTY LTD	TERMINALS PTY LTD	45 and 51 FRIENDSHIP ROAD	PORT BOTANY	Petroleum products storage	Premise Match	0m	On-site
1048	TERMINALS PTY LTD	TERMINALS PTY LTD	45 and 51 FRIENDSHIP ROAD	PORT BOTANY	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	Premise Match	0m	On-site
6007	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA	20 AND 37 AND 49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	PORT BOTANY	Chemical storage waste generation	Premise Match	0m	South
6007	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA	20 AND 37 AND 49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	PORT BOTANY	Petroleum products storage	Premise Match	0m	South
6007	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA	20 AND 37 AND 49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	PORT BOTANY	Petroleum products and fuel production	Premise Match	0m	South
6007	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA	20 AND 37 AND 49 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036	PORT BOTANY	Shipping in bulk	Premise Match	0m	South
6962	PATRICK STEVEDORES OPERATIONS PTY LIMITED	PATRICK PORT BOTANY CONTAINER TERMINAL	PENRHYN ROAD	PORT BOTANY	General chemicals storage	Premise Match	0m	North
20556	DP WORLD SYDNEY LIMITED		36-42 FRIENDSHIP ROAD, PORT BOTANY, NSW 2036		Chemical Storage	Premise Match	0m	East
12208	SYDNEY TRAINS		SYDNEY TRAINS, HAYMARKET, NSW 1238		Railway systems activities	Network of Features	15m	North East
10698	ELGAS LTD	ELGAS LIMITED, SYDNEY LPG CAVERN	30 FRIENDSHIP ROAD	PORT BOTANY	Shipping in bulk	Premise Match	18m	South
10698	ELGAS LTD	ELGAS LIMITED, SYDNEY LPG CAVERN	30 FRIENDSHIP ROAD	PORT BOTANY	Petroleum products storage	Premise Match	18m	South
6950	AMPOL AUSTRALIA PETROLEUM PTY LTD	CALTEX SYDNEY TERMINAL	PENRHYN RD	BANKSMEADOW	Shipping in bulk	Premise Match	274m	North East
6950	AMPOL AUSTRALIA PETROLEUM PTY LTD	CALTEX SYDNEY TERMINAL	PENRHYN RD	BANKSMEADOW	Petroleum products storage	Premise Match	274m	North East

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
20322	Sydney International Container Terminals Pty Ltd	Sydney International Container Terminals Pty Ltd	Port Botany Gate, B150-153, Sirius Road, off Foreshore Road, BOTANY, NSW 2019	BANKSMEADOW	General chemicals storage	Premise Match	398m	North West
3142	AUSTRALIAN RAIL TRACK CORPORATION LIMITED		AUSTRALIAN RAIL TRACK CORPORATION (ARTC) NETWORK, SYDNEY, NSW 2001		Railway systems activities	Network of Features	446m	North East
1594	OPAL PACKAGING AUSTRALIA PTY LTD	AMCOR PACKAGING (AUSTRALIA) - BOTANY MILL	1891 BOTANY ROAD	MATRAVILLE	Paper or pulp production	Premise Match	473m	North East
1594	OPAL PACKAGING AUSTRALIA PTY LTD	AMCOR PACKAGING (AUSTRALIA) - BOTANY MILL	1891 BOTANY ROAD	MATRAVILLE	Paper or pulp waste generation	Premise Match	473m	North East
2148	ORICA AUSTRALIA PTY LTD	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD	MATRAVILLE	Contaminated groundwater treatment	Premise Match	751m	North
2148	ORICA AUSTRALIA PTY LTD	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD	MATRAVILLE	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	Premise Match	751m	North
2148	ORICA AUSTRALIA PTY LTD	ORICA AUSTRALIA PTY LTD	16-20 BEAUCHAMP ROAD	MATRAVILLE	General chemicals storage	Premise Match	751m	North
20581	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD	Banksmeadow Transfer Terminal	34-36 McPherson Street	BANKSMEADOW	Waste storage - other types of waste	Premise Match	860m	North East
20581	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD	Banksmeadow Transfer Terminal	34-36 McPherson Street	BANKSMEADOW	Non-thermal treatment of general waste	Premise Match	860m	North East
3962	ETEX AUSTRALIA PTY LTD	KNAUF PLASTERBOARD	31 MILITARY ROAD	MATRAVILLE	Crushing, grinding or separating	Premise Match	887m	East
12857	BM RECYCLING PTY LTD	Building Waste Resource Recovery Facility	38 McPherson Street	BANKSMEADOW	Non-thermal treatment of general waste	Premise Match	930m	North East
12857	BM RECYCLING PTY LTD	Building Waste Resource Recovery Facility	38 McPherson Street	BANKSMEADOW	Waste storage - other types of waste	Premise Match	930m	North East
6179	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD	Port Botany Resource Recovery Facility	LOT 21 MILITARY ROAD	MATRAVILLE	Waste storage - other types of waste	Premise Match	977m	East
6179	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD	Port Botany Resource Recovery Facility	LOT 21 MILITARY ROAD	MATRAVILLE	Non-thermal treatment of general waste	Premise Match	977m	East

POEO Licence Data Source: Environment Protection Authority
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Delicensed & Former Licensed EPA Activities

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



EPA Activities

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Delicensed Activities still regulated by the EPA

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
12240	POTA NSW PTY LIMITED	Port Botany Container Park	1890 Botany Road	PORT BOTANY	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	128m	North East
11563	STATE TRANSIT AUTHORITY OF NSW	PORT BOTANY DEPOT	1 Bumborah Point Road	PORT BOTANY	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	365m	East

Delicensed Activities Data Source: Environment Protection Authority
© State of New South Wales through the Environment Protection Authority

Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
12923	JAN DE NUL NV	Penrhyn Road, BOTANY, NSW 2019	Surrendered	07/08/2008	Water-based extractive activity	Premise Match	0m	On-site
12975	BORAL RESOURCES (COUNTRY) PTY. LIMITED	Port Botany Container Terminal, Penrhyn Road, BANKSMEADOW	Surrendered	07/11/2008	Concrete works	Premise Match	0m	On-site
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	On-site
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	On-site
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	0m	On-site
7172	ALCATEL SUBMARINE NETWORKS PTY LIMITED	2 BUMBORAH POINT ROAD, PORT BOTANY, NSW 2036	Surrendered	21/06/2000	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	66m	North East
464	QENOS PTY LTD	HYDROCARBON STORAGE TERMINAL, FRIENDSHIP ROAD, PORT BOTANY	Surrendered	08/11/2000	Petroleum products storage	Premise Match	244m	South East
464	QENOS PTY LTD	HYDROCARBON STORAGE TERMINAL, FRIENDSHIP ROAD, PORT BOTANY	Surrendered	08/11/2000	Shipping in bulk	Premise Match	244m	South East
12104	RANDWICK CITY COUNCIL	9 Bumborah Point Road, MATRAVILLE, NSW 2036	Surrendered	04/06/2004	Non-thermal treatment of general waste; Waste storage - other types of waste; Composting	Premise Match	376m	East
245	ORIGIN ENERGY LPG LIMITED	ORIGIN ENERGY LPG LIMITED, 47 FRIENDSHIP ROAD, PORT BOTANY	Surrendered	03/11/1999	Shipping in bulk	Premise Match	466m	South East

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
245	ORIGIN ENERGY LPG LIMITED	ORIGIN ENERGY LPG LIMITED, 47 FRIENDSHIP ROAD, PORT BOTANY	Surrendered	03/11/1999	Petroleum products storage	Premise Match	466m	South East
6581	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA, 49 FRIENDSHIP ROAD, PORT BOTANY	Surrendered	28/11/2000	Waste storage - hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	Premise Match	466m	East
6581	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA, 49 FRIENDSHIP ROAD, PORT BOTANY	Surrendered	28/11/2000	Chemical storage waste generation	Premise Match	466m	East
6581	VOPAK TERMINALS SYDNEY PTY LIMITED	VOPAK TERMINALS AUSTRALIA, 49 FRIENDSHIP ROAD, PORT BOTANY	Surrendered	28/11/2000	General chemicals storage	Premise Match	466m	East
10471	DHL GLOBAL FORWARDING (AUSTRALIA) PTY LTD	2 Millenium Court (off Military Rd), MATRAVILLE, NSW 2036	Surrendered	23/02/2000	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	848m	East
5303	VEOLIA ENVIRONMENTAL SERVICES (AUSTRALIA) PTY LTD	38 McPHERSON STREET, BANKSMEADOW, NSW 2019	Surrendered	30/05/2000	Crushing, grinding or separating & Waste Storage, Transfer, Separating or Processing	Premise Match	930m	North East
13263	ORICA AUSTRALIA PTY LTD	Corish Circle, BANKSMEADOW, NSW 2019	Surrendered	27/05/2010	Contaminated soil treatment	Premise Match	995m	North East

Former Licensed Activities Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

Historical Business Directories

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Business Directory Records 1950-1991 Premise or Road Intersection Matches

Potentially contaminative business activities extracted from Universal Business Directories from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

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Business Directory Records 1950-1991 Road or Area Matches

Potentially contaminative business activities extracted from Universal Business Directories from years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

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Historical Business Directories

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Dry Cleaners, Motor Garages & Service Stations 1948-1993 Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
N/A	No records in buffer						

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Dry Cleaners, Motor Garages & Service Stations 1948-1993

Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Note: The Universal Business Directories were published between 1948 and 1993. Dry Cleaners, Motor Garages & Service Stations have been extracted from all of these directories except the following years 1951, 1955, 1957, 1960, 1963, 1973, 1974, 1977, 1987.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
N/A	No records in buffer					

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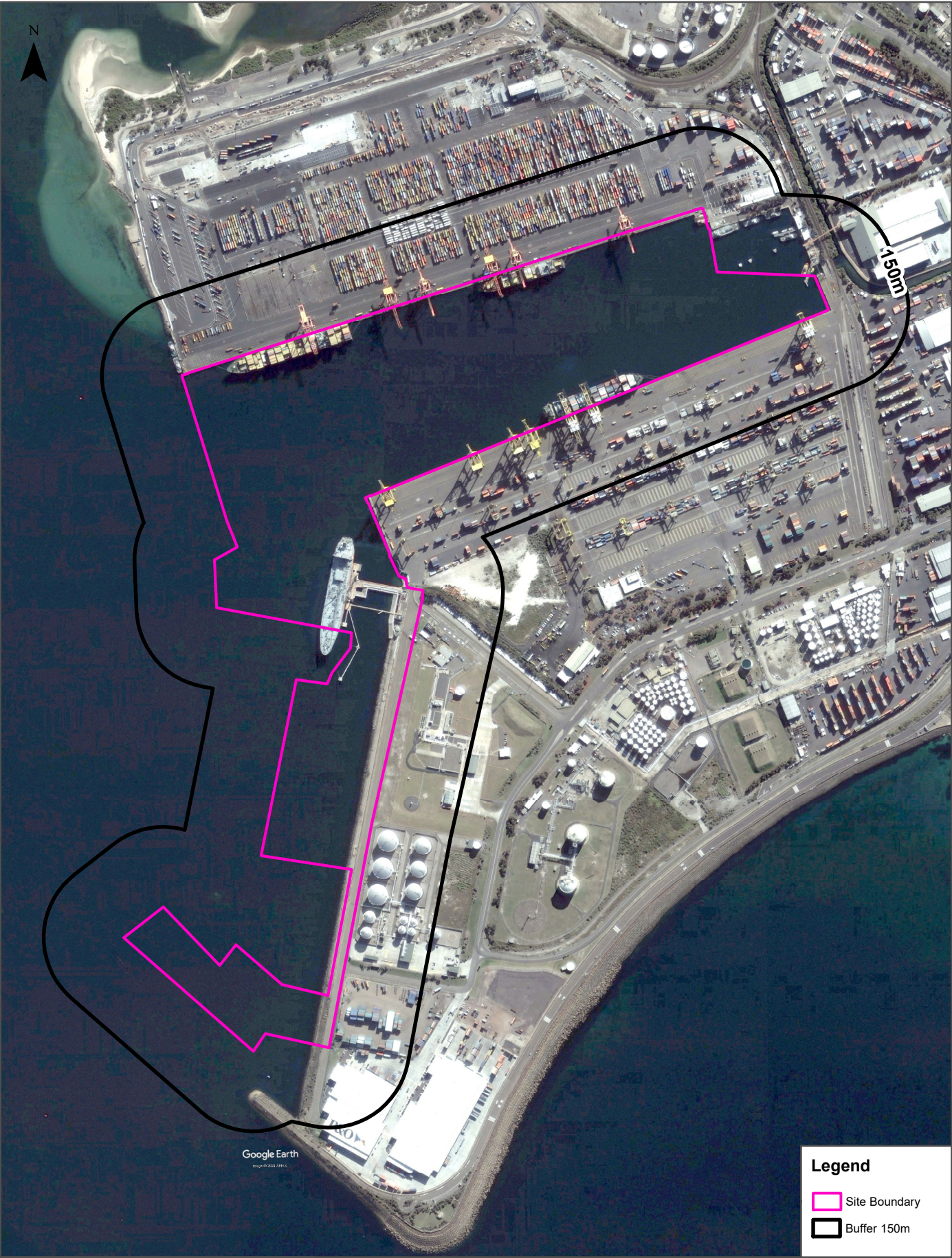
Scale: 0 110 220 330 440 Meters	Data Source Aerial Imagery: © 2024 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Legend Site Boundary Buffer 150m Date: 15 October 2024
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Scale: 0 110 220 330 440 Meters	Data Source Aerial Imagery: © 2024 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 October 2024
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Aerial Imagery 2005

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Scale: 0 110 220 330 440 Meters	Data Source Aerial Imagery: © 2024 Google Inc, used with permission. Google and the Google logo are registered trademarks of Google Inc.	Coordinate System: GDA 1994 MGA Zone 56	Legend Site Boundary Buffer 150m Date: 15 October 2024
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Aerial Imagery 1994

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Scale: 0 110 220 330 440 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 October 2024
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Aerial Imagery 1991

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Scale: 0 110 220 330 440 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 October 2024
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Aerial Imagery 1982

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Scale: 0 110 220 330 440 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 October 2024
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Aerial Imagery 1978

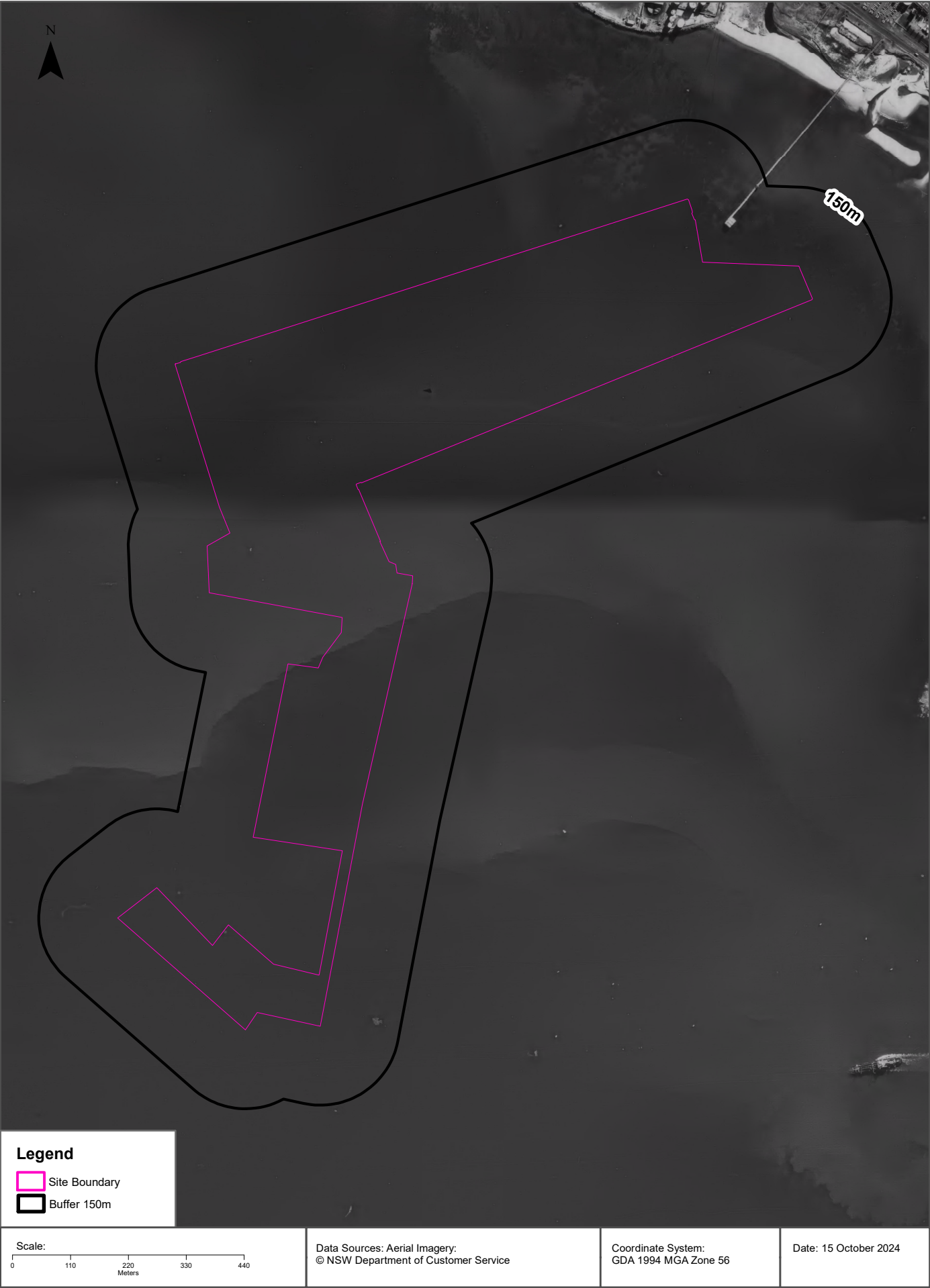
Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Scale: 0 110 220 330 440 Meters	Data Sources: Aerial Imagery: © NSW Department of Customer Service	Coordinate System: GDA 1994 MGA Zone 56	Date: 15 October 2024
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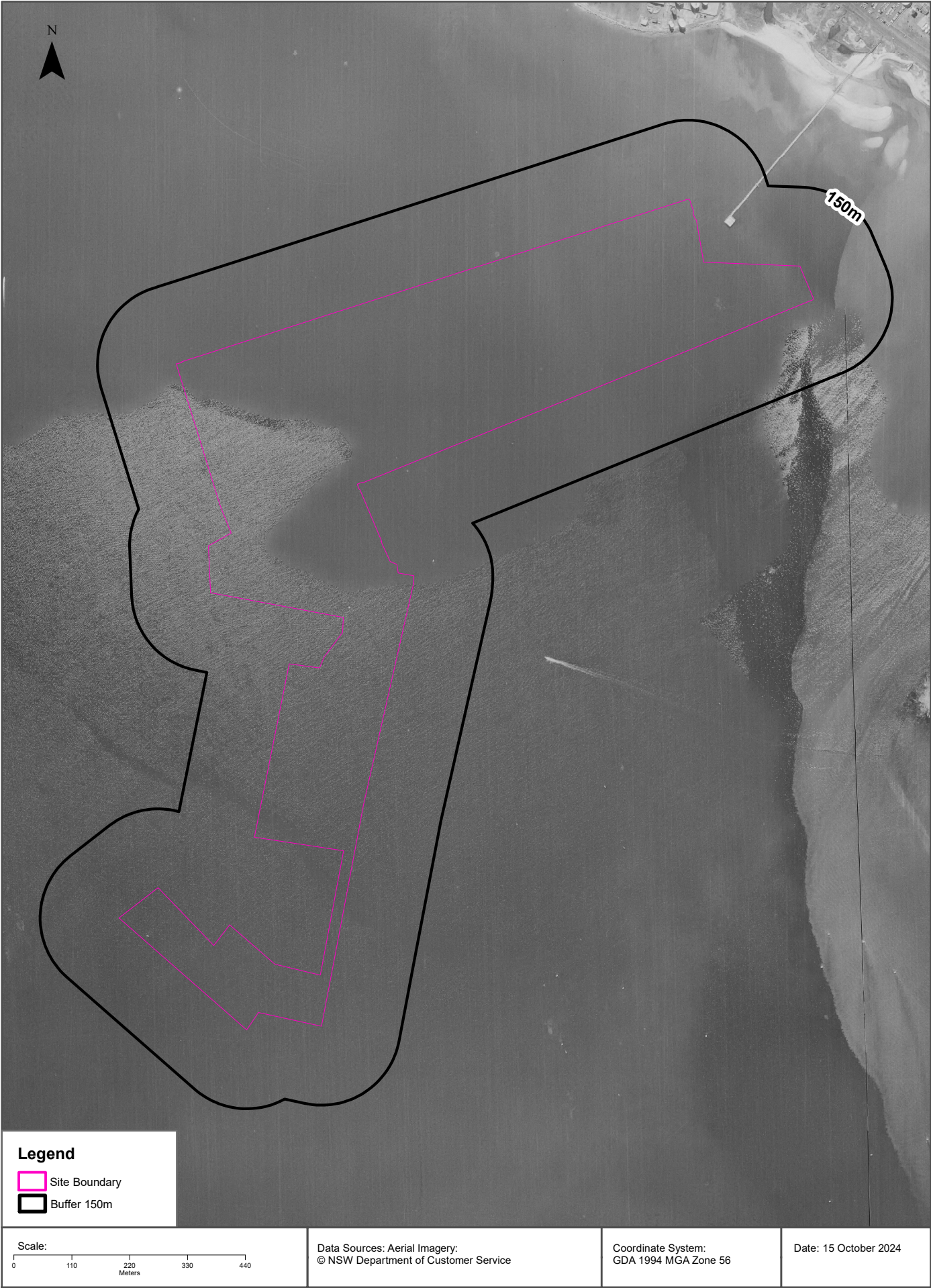
Aerial Imagery 1970

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Aerial Imagery 1965

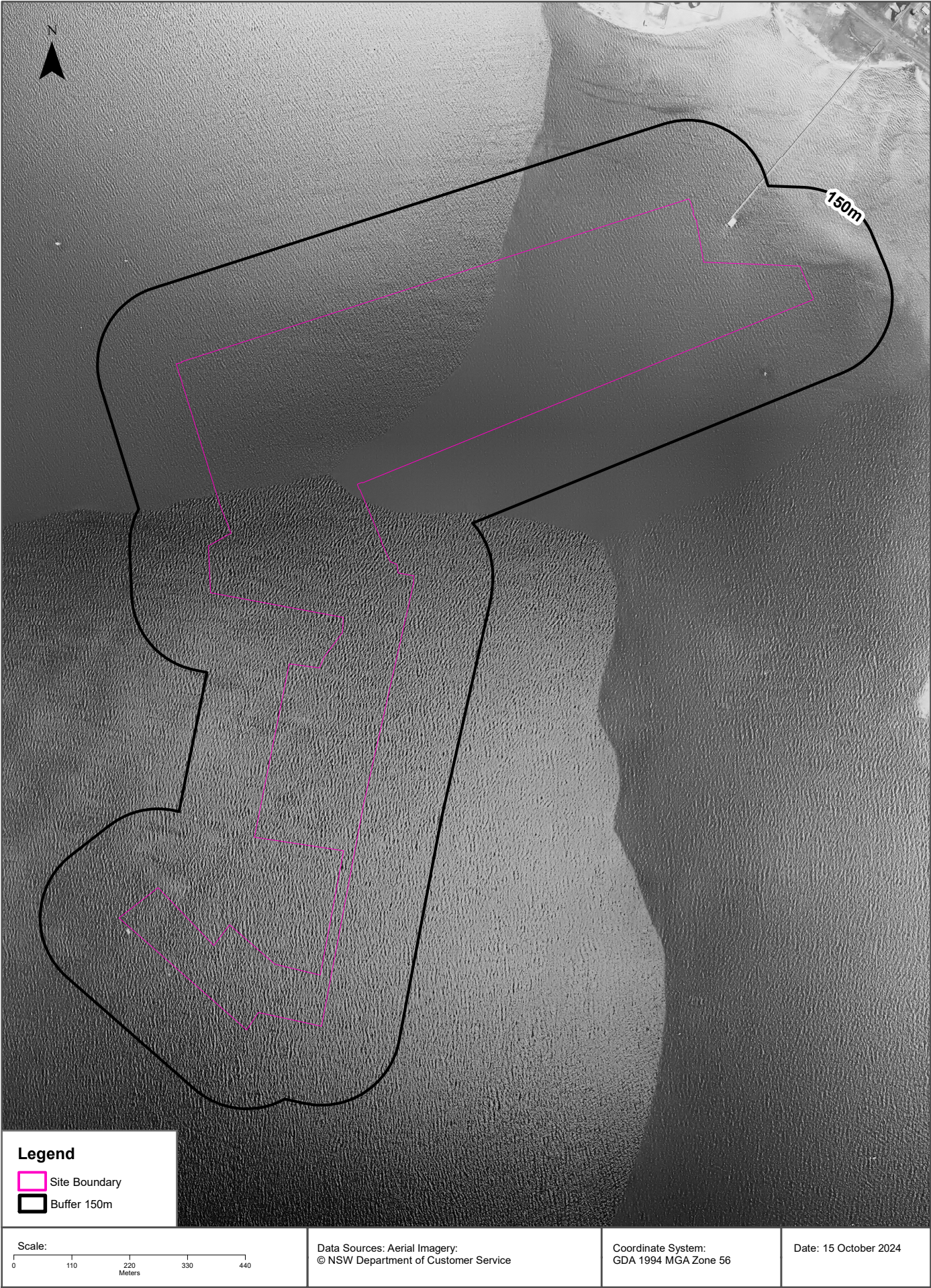
Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Aerial Imagery 1961

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036





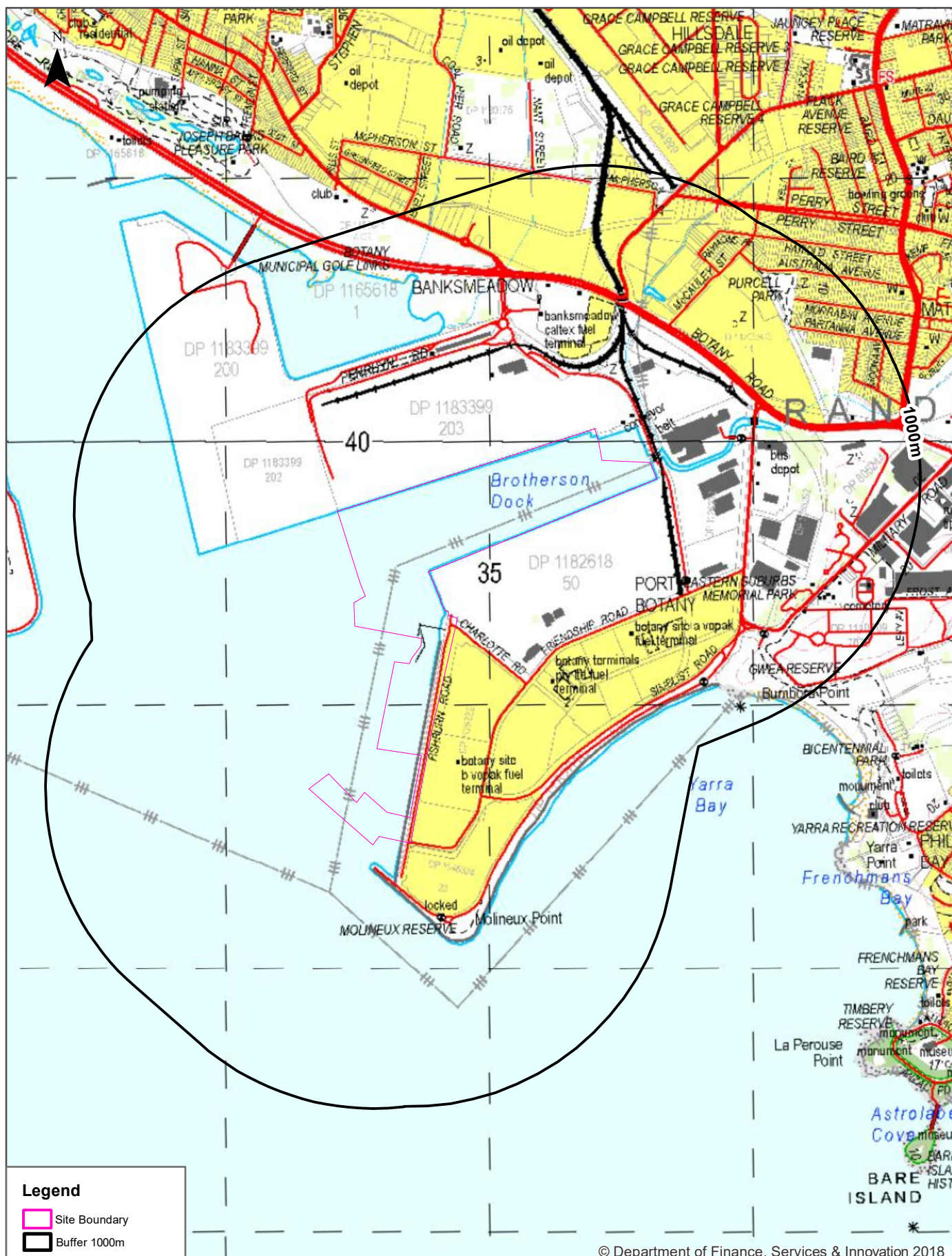
Aerial Imagery 1930

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Topographic Map 2015

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Historical Map 1975 - 1976

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

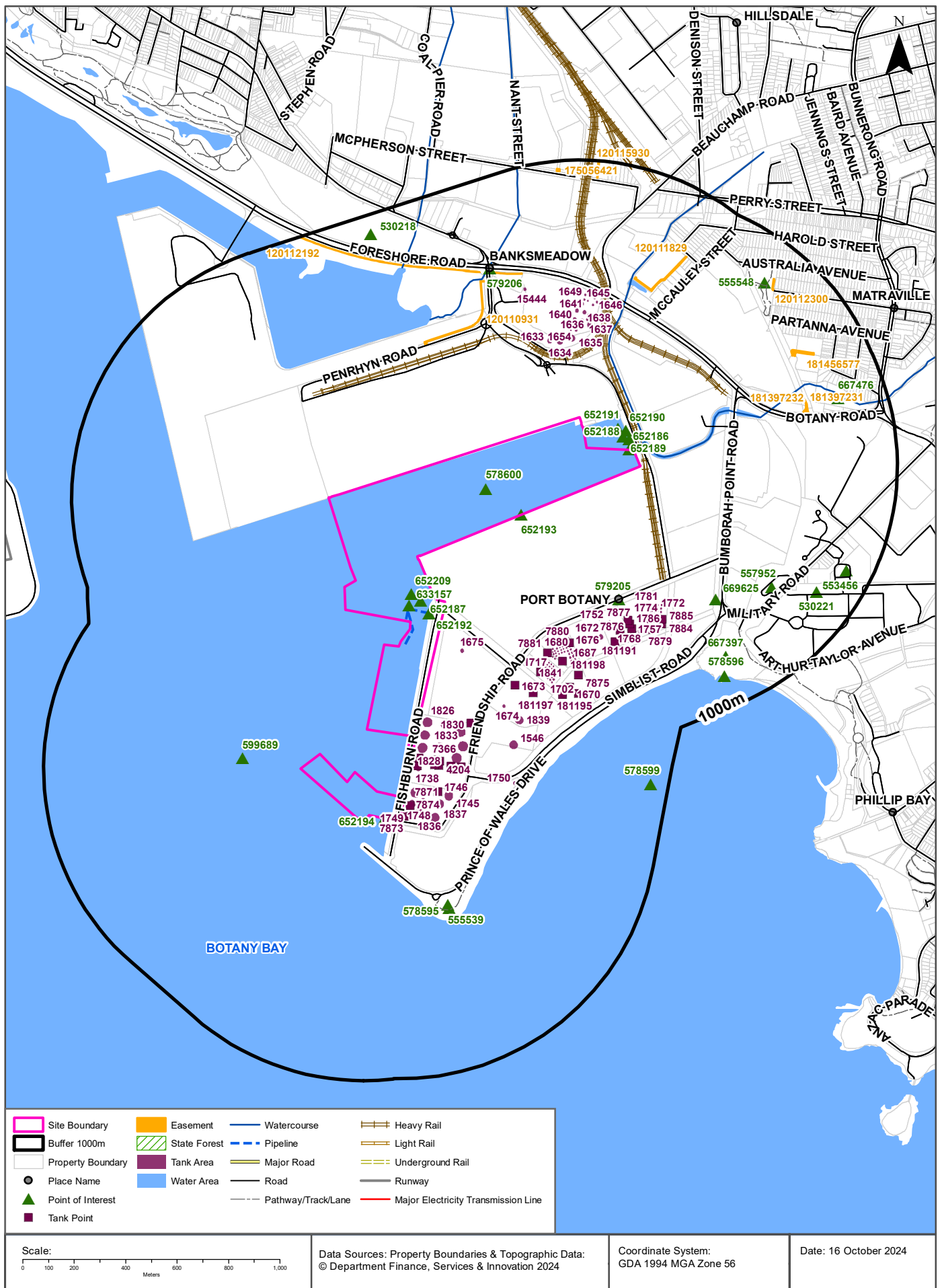






Topographic Features

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Topographic Features

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Points of Interest

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
633157	Wharf	Wharf	0m	On-site
652192	Wharf	Wharf	0m	On-site
652193	Wharf	Wharf	0m	On-site
652187	Wharf	Wharf	0m	On-site
652209	Wharf	Wharf	0m	On-site
578600	Bay / Inlet / Basin	BROTHERSON DOCK	0m	On-site
652194	Wharf	Wharf	1m	South
652186	Wharf	Wharf	2m	North East
652188	Wharf	Wharf	40m	North East
652189	Wharf	Wharf	50m	North East
652190	Wharf	Wharf	73m	North East
652191	Wharf	Wharf	81m	North East
599689	Bay / Inlet / Basin	PORT BOTANY	230m	South West
555539	Park	MOLINEUX RESERVE	373m	South
578595	Headland	MOLINEUX POINT	385m	South
579205	Suburb	PORT BOTANY	449m	East
669625	Park	WOMEAI RESERVE	595m	East
579206	Suburb	BANKSMEADOW	658m	North
557952	Park	EASTERN SUBURBS MEMORIAL PARK	695m	East
667397	Park	BUMBORAH POINT RESERVE	811m	East
667476	Park	BOTANY ROAD RESERVE	812m	East
555548	Park	PURCELL PARK	827m	North East
530221	Cemetery	BOTANY CEMETERY	842m	East
578596	Headland	BUMBORA POINT	878m	South East
553456	Crematorium	EASTERN SUBURBS CREMATORIUM	898m	East
530218	Golf Course	BOTANY MUNICIPAL GOLF LINKS	926m	North
578599	Bay / Inlet / Basin	YARRA BAY	932m	South East

Topographic Data Source: © Land and Property Information (2015)

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Topographic Features

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Tanks (Areas)

What are the Tank Areas located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
1826	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	15m	South
1827	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	15m	South
1828	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	15m	South
1835	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	19m	South
1737	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	22m	South
1738	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	22m	South
1748	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	22m	South
1749	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	22m	South
1836	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	50m	South
1747	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	63m	South
1830	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	85m	South
1831	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	86m	South
1829	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	86m	South
1739	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	89m	South
1740	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	90m	South
1675	Undefined	Feature on Previous LPI Tank Area Supply		01/11/2012	99m	South
1741	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	108m	South
1742	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	108m	South
1838	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	113m	South
1746	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	118m	South
1837	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	119m	South
1832	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	148m	South
1834	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	152m	South
1745	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	152m	South
1743	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	152m	South
1833	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	168m	South
1744	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	191m	South

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
1751	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	195m	South
1634	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	290m	North East
1635	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	293m	North East
1674	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	305m	South East
1633	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	306m	North East
1654	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	331m	North East
1653	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	333m	North East
1673	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	335m	South East
1636	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	349m	North East
1546	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/01/2009	363m	South
1839	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/01/2009	365m	South East
1638	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	367m	North East
1637	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	373m	North East
1639	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	374m	North East
1643	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	374m	North East
1642	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	394m	North East
1641	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	401m	North East
1840	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	402m	South East
1750	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	405m	South
1640	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	407m	North East
1689	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	421m	South East
1717	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	429m	South East
1690	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	432m	South East
1691	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	432m	South East
1698	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	436m	South East
1718	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	436m	South East
1644	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	436m	North East
1651	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	437m	North East
1692	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	437m	South East
1693	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	442m	South East
1696	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	442m	South East
1697	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	442m	South East
1734	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	442m	South East
1719	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	445m	South East

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
1695	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	447m	South East
1732	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	448m	South East
1699	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	449m	South East
1645	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	449m	North East
1650	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	450m	North East
1705	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	451m	South East
1694	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	452m	South East
1733	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	452m	South East
1735	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	452m	South East
1704	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	453m	South East
1649	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	454m	North East
1731	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	454m	South East
1716	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	458m	South East
1730	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	460m	South East
1720	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	460m	South East
1700	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	461m	South East
1736	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	461m	South East
1715	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	462m	South East
1706	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	462m	South East
1703	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	464m	South East
1646	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	464m	North East
1729	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	464m	South East
1727	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	467m	South East
1713	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	467m	South East
1721	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	470m	South East
1701	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	470m	South East
1648	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	472m	North East
1714	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	472m	South East
1728	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	473m	South East
1702	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	473m	South East
1707	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	473m	South East
1647	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	477m	North East
1712	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	478m	South East
1726	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	478m	South East

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
1722	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	479m	South East
1725	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	482m	South East
1711	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	483m	South East
1708	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	483m	South East
1841	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	484m	South East
1723	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	486m	South East
1709	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	487m	South East
1677	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	489m	South East
1710	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	492m	South East
1724	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	492m	South East
1682	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	496m	South East
1679	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	496m	South East
1676	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	502m	South East
1681	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	503m	South East
1678	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	507m	South East
1752	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	508m	South East
1753	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	508m	East
1683	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	510m	South East
1680	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	513m	South East
1671	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	516m	South East
1686	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	517m	South East
1684	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	521m	South East
1781	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	521m	East
1787	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	522m	East
1805	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	522m	East
1806	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	522m	East
1687	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	525m	South East
1774	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	526m	East
1754	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	526m	East
1685	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	527m	South East
1807	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	528m	East
1804	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	529m	East
1786	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	531m	East
1780	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	532m	East

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
15444	Water	Operational		01/11/2012	532m	North
1808	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	536m	East
1803	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	536m	East
1773	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	537m	East
1688	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	537m	South East
1670	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	538m	South East
1759	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	539m	East
1800	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	539m	East
1809	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	542m	East
1779	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	542m	East
1785	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	542m	East
1798	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	543m	East
1802	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	544m	East
1755	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	546m	East
1799	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	547m	East
1797	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	548m	East
1672	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	548m	South East
1772	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	550m	East
1801	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	551m	East
1795	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	551m	East
1758	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	552m	East
1784	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	552m	East
1778	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	552m	East
1796	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	555m	East
1794	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	555m	East
1793	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	559m	East
1771	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	562m	East
1669	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	562m	South East
1783	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	563m	East
1777	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	564m	East
1756	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	564m	East
1757	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	565m	East
1791	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	567m	East
1792	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	568m	East

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
1776	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	574m	East
1782	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	576m	East
1770	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	576m	East
1789	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	579m	East
1790	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	579m	East
1762	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	586m	East
1763	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	587m	East
1761	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	587m	South East
1768	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	587m	East
1775	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	587m	East
1760	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	588m	South East
1769	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	590m	East
1788	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	590m	East
1767	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	597m	East
1764	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	598m	South East
1765	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	598m	South East
1766	Tank-Gas	Feature on Previous LPI Tank Area Supply		01/11/2012	598m	South East

Tanks (Points)

What are the Tank Points located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
7873	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2009	22m	South
7872	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2009	27m	South
4203	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	27m	South
7365	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	27m	South
7871	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2009	68m	South
7366	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	91m	South
7367	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	91m	South
7368	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	109m	South
4204	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	109m	South
7874	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2009	124m	South
4205	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	155m	South
5773	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	194m	South

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
2584	Tank-Gas	Feature on Previous LPI Tank Point Supply		01/01/2007	199m	South
7883	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	336m	South East
181197	Water	Operational		05/05/2018	410m	South East
7882	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	421m	South East
7881	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	430m	South East
181198	Water	Operational		05/05/2018	495m	South East
7880	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	505m	South East
181196	Water	Operational		05/05/2018	523m	South East
7878	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	536m	East
181194	Water	Operational		05/05/2018	544m	South East
7877	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	553m	East
181193	Water	Operational		05/05/2018	562m	South East
7875	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	567m	South East
7876	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	574m	East
7885	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	582m	East
181195	Water	Operational		05/05/2018	583m	South East
181192	Water	Operational		05/05/2018	594m	South East
181191	Water	Operational		05/05/2018	596m	South East
7879	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	597m	East
7884	Tank-RuralWater	Feature on Previous LPI Tank Point Supply		01/01/2009	599m	East

Tanks Data Source: © Land and Property Information (2015)

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Major Easements

What Major Easements exist within the dataset buffer?

Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
120110931	Primary	Undefined		450m	North
120111829	Primary	Undefined		565m	North East
120112192	Primary	Undefined		599m	North
181397232	Primary	Right of way	Variable	667m	East
181397231	Primary	Right of way	Variable	686m	East
181456577	Primary	Right of way	8.5m	716m	North East
120112300	Primary	Undefined		825m	North East
120115930	Primary	Undefined		933m	North East

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
175056421	Primary	Right of way	12	958m	North

Easements Data Source: © Land and Property Information (2015)

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Topographic Features

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

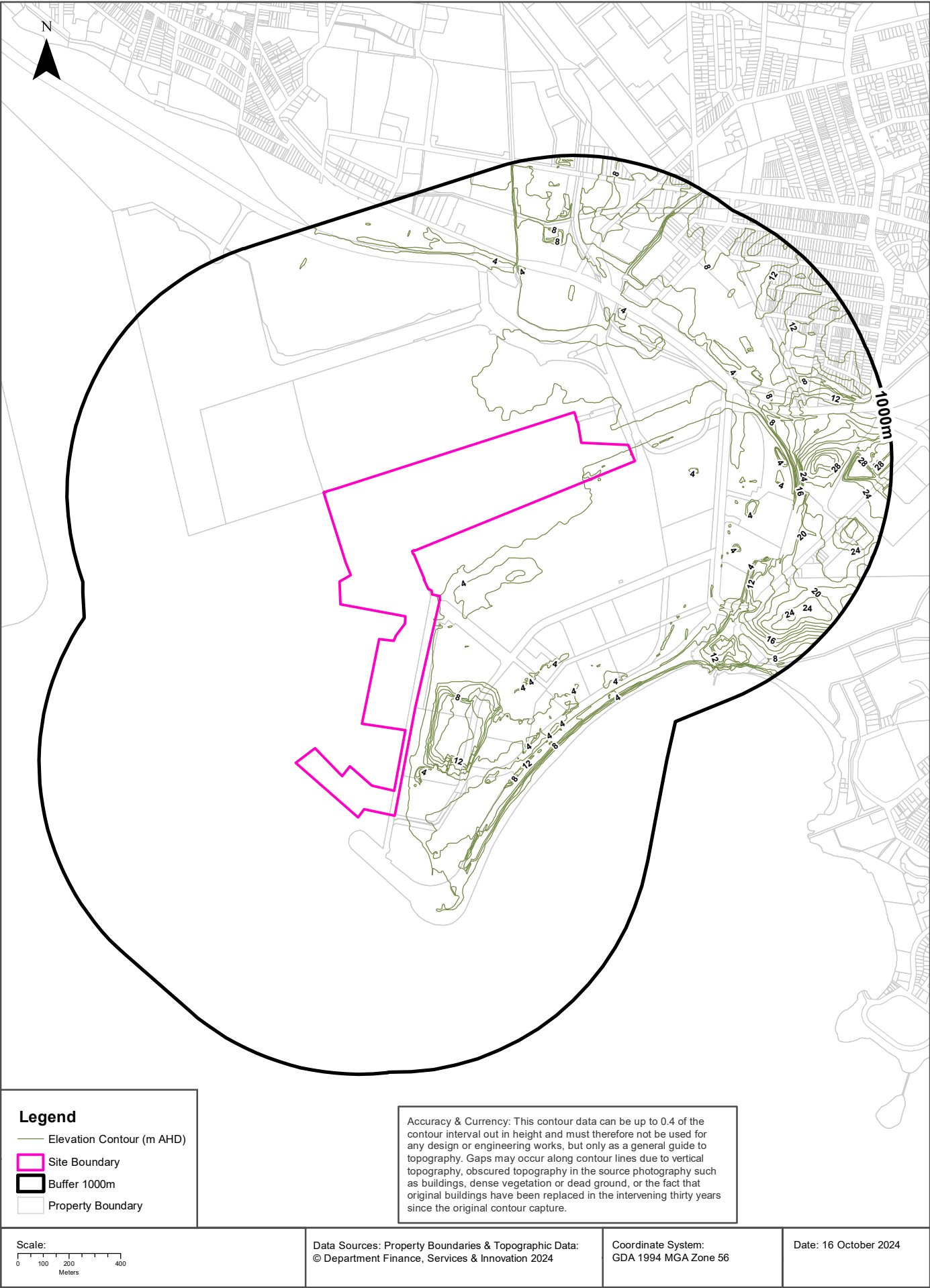
State Forest

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

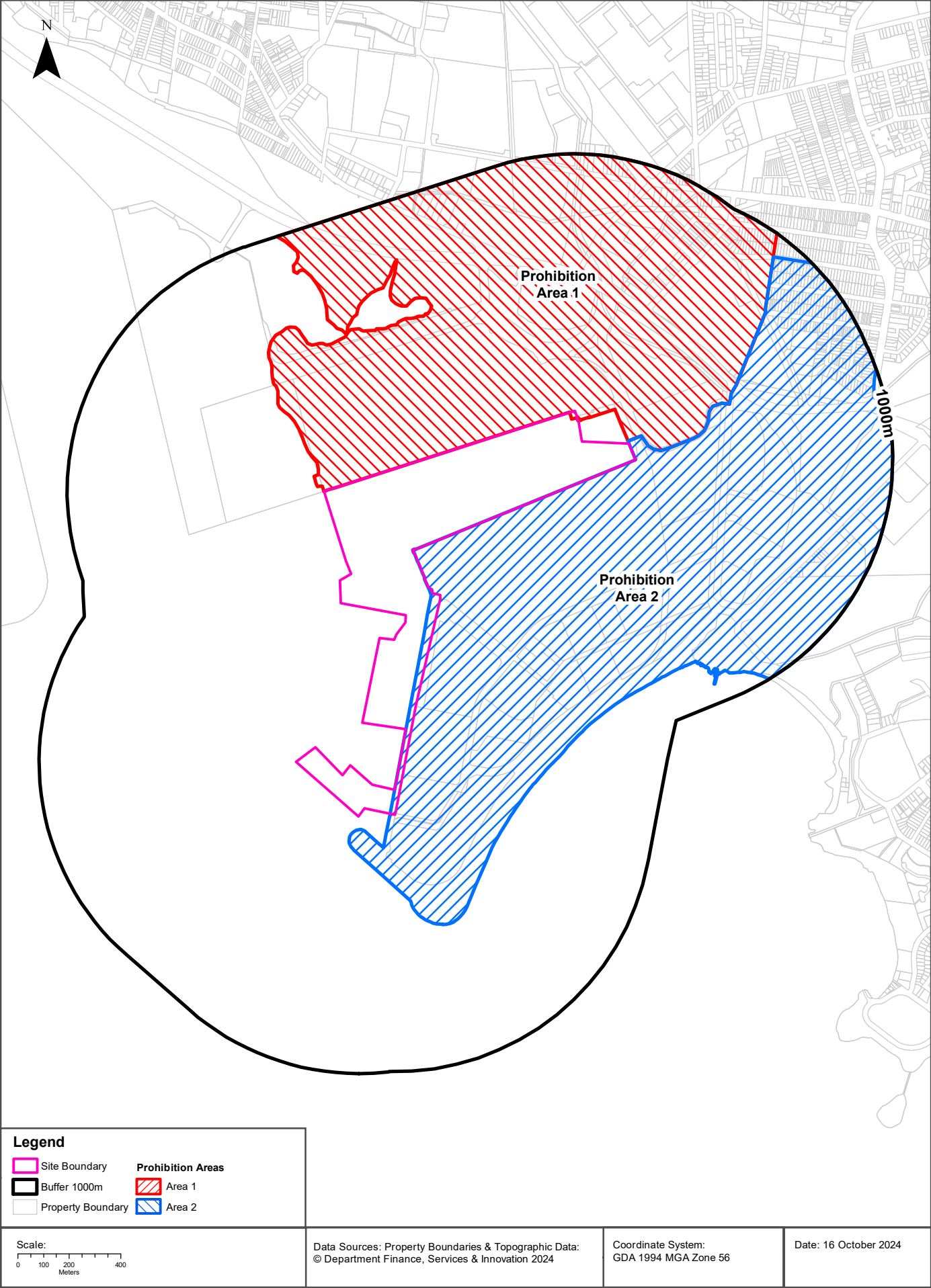
State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018)

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Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Hydrogeology & Groundwater

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Porous, extensive highly productive aquifers	0m	On-site

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

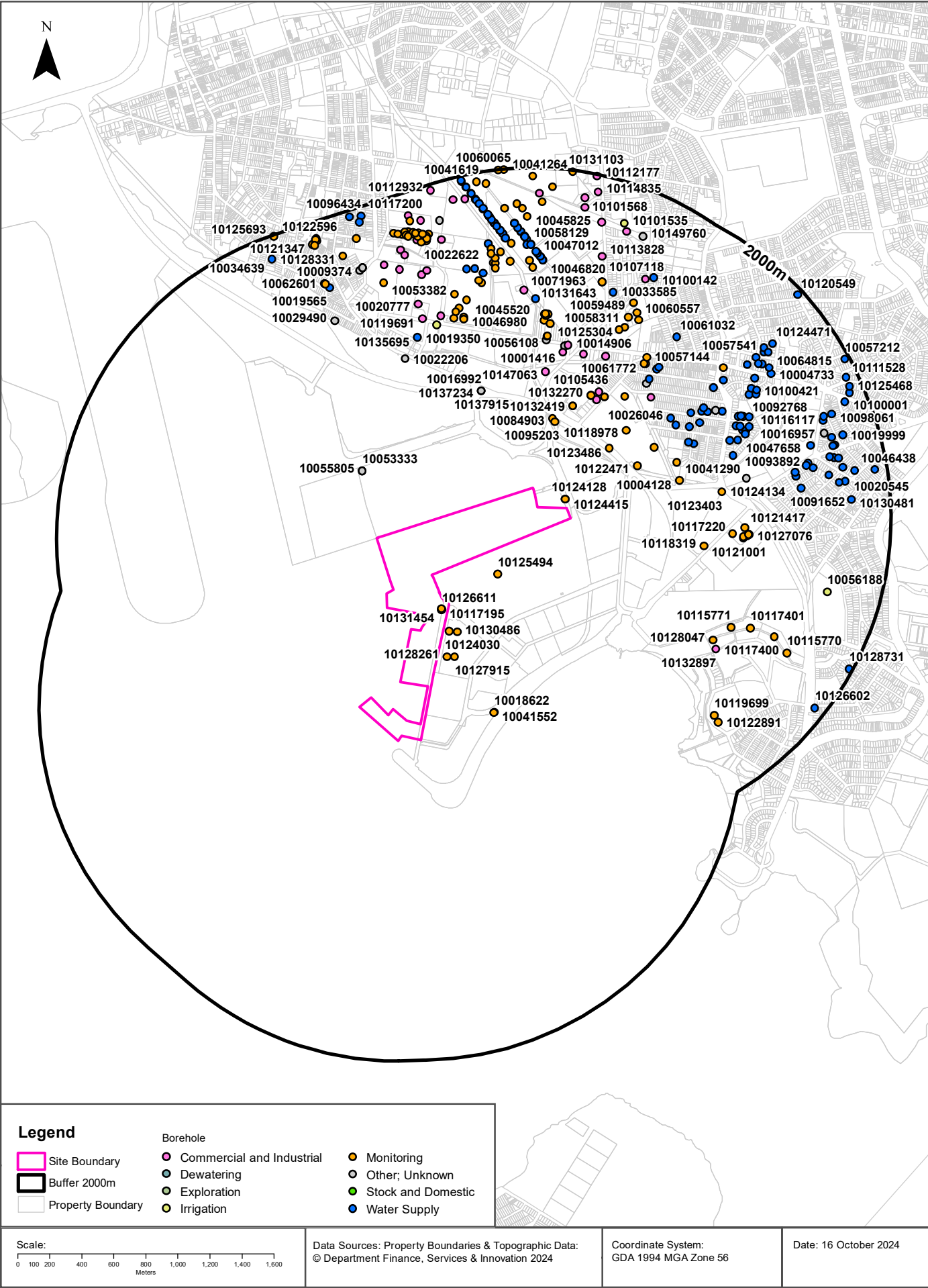
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Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
1	Groundwater cannot be used for any purpose except for: a. the taking of water for remediation, temporary construction dewatering, testing or monitoring purposes; or b. the taking of water using a water supply work nominated by water access licence 24611, 24613, 24566, 24600, 24564, 24583, 24545, or 24588, provided that the water is fit for purpose.	0m	On-site
2	Groundwater cannot be used for: a. human consumption; b. consumption by animals; c. domestic purposes; d. any other purpose, except if the water is fit for purpose, or it is for remediation, temporary construction dewatering, testing or monitoring purposes.	0m	On-site

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries



Hydrogeology & Groundwater

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Groundwater Boreholes

Boreholes within the dataset buffer:

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10117195	GW114336	Monitoring	Functional	27/06/2011	3.00		AHD				0m	On-site
10126611	GW114337	Monitoring	Functional	27/06/2011	4.00		AHD				0m	On-site
10131454	GW114338	Monitoring	Functional	27/06/2011	4.00		AHD				0m	On-site
10124030	GW111326	Monitoring	Functional	15/04/2004	83.00		AHD				39m	South
10124128	GW114334	Monitoring	Functional	28/06/2011	5.80		AHD				54m	North East
10124415	GW114333	Monitoring	Functional	28/06/2011	5.00		AHD				54m	North East
10128261	GW111328	Monitoring	Functional	21/05/2004	86.00		AHD				61m	South
10130486	GW111325	Monitoring	Functional	14/04/2004	143.40		AHD				88m	South
10127915	GW111327	Monitoring	Functional	03/05/2004	160.20		AHD				108m	South
10125494	GW114335	Monitoring	Functional	28/06/2011	5.80		AHD				153m	East
10041552	GW109706	Monitoring	Unknown	15/11/2002	53.20		AHD	30000	0.164		417m	South
10018622	GW109705	Monitoring	Unknown	12/11/2002	163.20		AHD	1.6	0.164		418m	South
10053333	GW040783	Unknown	Unknown				AHD			0.00	424m	North West
10055805	GW040783	Unknown	Unknown		17.06		AHD			0.00	424m	North West
10095203	GW111404	Monitoring	Functional	22/06/2007	4.80		AHD				433m	North East
10084903	GW111403	Monitoring	Functioning	22/06/2007	4.80		AHD				451m	North East
10123486	GW109172	Monitoring	Unknown	06/08/2008	2.80		AHD			1.91	459m	North East
10122471	GW109174	Monitoring	Unknown	06/08/2008	6.20		AHD			4.82	517m	North East
10132419	GW042172	Monitoring	Abandoned	13/02/1975		5.74	AHD			0.00	569m	North East
10132569	GW042172	Unknown	Abandoned	13/02/1975		5.74	AHD			0.00	569m	North East
10118978	GW115209	Monitoring	Functional	02/06/2011	4.50		AHD				612m	North East
10125988	GW109173	Monitoring	Unknown	06/08/2008	4.50		AHD			3.06	667m	North East
10016992	GW040772	Unknown	Unknown				AHD			2.26	673m	North
10137234	GW040772	Unknown	Unknown				AHD			2.26	673m	North
10137915	GW040772	Unknown	Unknown		21.75		AHD			2.26	673m	North
10067290	GW005451	Commercial and Industrial	Functioning	01/12/1949	47.50		AHD				679m	North East
10132270	GW042171	Monitoring	Abandoned	13/02/1975		5.78	AHD			0.00	684m	North East
10132510	GW042171	Unknown	Abandoned	13/02/1975		5.78	AHD			0.00	684m	North East
10004128	GW075019	Monitoring	Unknown	09/07/1998	19.50	8.41	AHD			7.89	719m	East
10131048	GW042170	Monitoring	Abandoned	13/02/1975		6.80	AHD			0.00	723m	North East

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10131182	GW042170	Monitoring	Abandoned	13/02/1975		6.80	AHD			0.00	723m	North East
10147063	GW013844	Commercial and Industrial	Unknown	01/07/1951	21.30		AHD				728m	North East
10105436	GW013576	Commercial and Industrial	Unknown	01/10/1957	27.40		AHD				729m	North East
10129928	GW109170	Monitoring	Unknown	06/08/2008	4.80		AHD				746m	North East
10123273	GW109171	Monitoring	Unknown	06/08/2008	5.60		AHD			3.61	787m	North East
10118319	GW110526	Monitoring	Unknown	27/04/2009	2.00		AHD			1.75	850m	East
10026046	GW102220	Water Supply	Functioning	26/02/1999	5.00		AHD		0.500	3.00	860m	North East
10078551	GW100051	Water Supply	Functioning	08/06/1995	6.00		AHD				860m	North East
10001416	GW013849	Commercial and Industrial	Non-functional	01/05/1951	29.90		AHD				867m	North East
10094753	GW101473	Water Supply	Functioning	06/01/1998	6.00		AHD				867m	North East
10109676	GW013397	Commercial and Industrial	Unknown	01/01/1938	27.70		AHD				870m	North East
10054717	GW101447	Water Supply	Functioning	06/01/1997	6.00		AHD				889m	North East
10125997	GW103971	Commercial and Industrial	Unknown	20/08/1997	10.00		AHD				893m	North East
10137522	GW042177	Unknown	Unknown	19/05/1911		10.10	AHD			0.00	908m	North East
10138366	GW042177	Unknown	Unknown	19/05/1911		10.10	AHD			0.00	908m	North East
10139002	GW042177	Unknown	Unknown	19/05/1911		10.10	AHD			0.00	908m	North East
10014906	GW047112	Commercial and Industrial	Unknown	01/08/1976			AHD	Very Poor			919m	North East
10068368	GW100299	Water Supply	Functioning	15/07/1995	5.00		AHD				921m	North East
10130665	GW042178	Unknown	Unknown	13/02/1975		8.00	AHD				923m	North East
10056108	GW040782	Unknown	Abandoned		6.88		AHD				928m	North East
10141656	GW013438	Commercial and Industrial	Unknown	01/06/1952	32.60		AHD				940m	North East
10119361	GW114471	Monitoring	Functional	25/12/2012	4.00		AHD				949m	North East
10124957	GW114470	Monitoring	Functional	23/01/2012	5.00		AHD				953m	North East
10100192	GW102270	Water Supply	Functioning	27/04/1999	8.00		AHD				958m	North East
10123403	GW110525	Monitoring	Unknown	27/04/2009	11.70		AHD				961m	East
10148036	GW024116	Water Supply	Unknown	01/02/1966	4.20		AHD				980m	North East
10021502	GW102472	Water Supply	Unknown	12/05/1999	8.00		AHD				989m	North East
10022206	GW040773	Unknown	Abandoned		3.00		AHD				1011m	North
10117220	GW113183	Monitoring	Functional	12/07/2013	7.60		AHD			6.70	1019m	East
10061772	GW113007	Monitoring	Functional	22/12/2009	8.00		AHD				1026m	North East
10058124	GW113008	Monitoring	Functional	22/12/2009	8.00		AHD				1031m	North East
10125304	GW114469	Monitoring	Functional	24/01/2012	4.00		AHD				1032m	North East
10057144	GW072910	Water Supply	Unknown	18/04/1995	5.00		AHD				1036m	North East
10021233	GW100920	Water Supply	Functioning	06/11/1997	6.00		AHD		40.000	5.00	1041m	North East

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10124129	GW114465	Monitoring	Functional	23/01/2012	3.00		AHD				1048m	North
10059986	GW072911	Water Supply	Unknown	16/02/1995	6.00		AHD				1050m	North East
10055745	GW101323	Water Supply	Functioning	22/12/1997	6.00		AHD				1061m	North East
10067580	GW113009	Monitoring	Functional	22/12/2009	8.00		AHD				1066m	North East
10024997	GW100919	Water Supply	Unknown	18/11/1994	6.00		AHD		40.000	5.00	1067m	North East
10125495	GW114466	Monitoring	Functional	25/01/2012	3.00		AHD				1079m	North
10121001	GW113184	Monitoring	Functional	12/07/2013	2.20		AHD			1.24	1086m	East
10133551	GW108799	Monitoring	Functional	12/04/2007	3.70		AHD			1.20	1086m	East
10122670	GW114467	Monitoring	Functional	24/01/2012	3.00		AHD				1088m	North
10126612	GW114464	Monitoring	Functional	30/01/2012	4.00		AHD				1089m	North
10041290	GW111240	Water Supply	Functioning	01/01/2002	6.00		AHD		0.167		1090m	East
10121417	GW113182	Monitoring	Functional	12/07/2013	3.90		AHD				1090m	East
10124417	GW114468	Monitoring	Functional	24/01/2012	3.13		AHD				1090m	North
10122319	GW104828	Water Supply	Functioning	08/04/2003	7.00		AHD				1104m	North East
10127036	GW108798	Monitoring	Functional	11/04/2007	6.00		AHD			1.00	1110m	East
10125725	GW105878	Unknown	Unknown	09/05/2005			AHD				1113m	North East
10135695	GW026007	Water Supply	Unknown		6.70		AHD				1114m	North
10133580	GW113185	Monitoring	Functional	15/07/2013	3.80		AHD			2.14	1117m	East
10127076	GW108797	Monitoring	Functional	11/04/2007	6.00		AHD				1121m	East
10064077	GW109858	Monitoring	Unknown	01/01/2006	5.40		AHD				1126m	North East
10124134	GW108408	Other	Proposed	16/10/2007	4.00		AHD	Good	0.500	1.00	1126m	East
10051651	GW105903	Monitoring	Unknown	20/02/2004	21.00		AHD			1.00	1132m	North
10046980	GW109709	Monitoring	Unknown	23/12/2003	21.00		AHD			1.50	1145m	North
10053356	GW100563	Water Supply	Functioning	21/05/1997	5.00		AHD				1147m	North East
10019350	GW042564	Irrigation	Decommissioned	01/12/1969	28.00		AHD	1001-3000 ppm			1151m	North
10047658	GW111239	Water Supply	Functioning	22/11/2010	8.00		AHD				1153m	North East
10058311	GW109855	Monitoring	Unknown	01/01/2006	6.00		AHD				1155m	North East
10053693	GW105902	Monitoring	Unknown	26/02/2004	21.00		AHD			1.20	1158m	North
10128047	GW114312	Monitoring	Functional	08/12/2010	3.50		AHD				1172m	East
10099267	GW107324	Water Supply	Unknown	15/08/2005	7.00		AHD				1178m	North East
10045520	GW114012	Water Supply	Functioning	27/02/2014	17.50		AHD				1180m	North
10054601	GW100557	Water Supply	Functioning	18/04/1997	5.00		AHD				1188m	North East
10053961	GW109710	Monitoring	Unknown	17/12/2003	21.00		AHD			1.70	1191m	North
10145739	GW013434	Commercial and Industrial	Unknown	01/04/1955	25.90		AHD				1196m	North
10125111	GW107882	Water Supply	Functioning	27/02/2006	6.10		AHD		1.000	2.44	1199m	North East
10053381	GW105776	Water Supply	Functioning	08/01/2004	6.00		AHD		0.500	3.00	1203m	North East

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10053909	GW105906	Monitoring	Unknown	05/01/2004	21.00		AHD			1.70	1207m	North
10065403	GW106430	Water Supply	Functioning	10/08/2004	6.10		AHD	Good	1.000	3.50	1208m	North East
10115771	GW114311	Monitoring	Functional	08/12/2010	6.00		AHD				1213m	East
10119691	GW017347	Commercial and Industrial	Functioning	01/06/1957	24.00		AHD				1214m	North
10093545	GW108601	Water Supply	Functioning	05/03/2007	6.10		AHD	Good	1.000	2.44	1217m	North East
10053529	GW107173	Water Supply	Functioning	07/06/2004	5.79		AHD		1.000	3.05	1219m	North East
10059489	GW109854	Monitoring	Unknown	01/01/2006	6.00		AHD				1222m	North East
10132897	GW028816	Commercial and Industrial	Proposed	01/10/1968	21.40		AHD				1223m	East
10118525	GW107869	Water Supply	Functioning	10/03/2006	6.10		AHD		1.000	2.44	1233m	North East
10140796	GW013437	Commercial and Industrial	Unknown	01/01/1947	21.30		AHD				1234m	North
10063162	GW109857	Monitoring	Unknown	01/01/2006	8.50		AHD				1240m	North East
10057880	GW105904	Monitoring	Unknown	09/01/2004	21.00		AHD			1.50	1243m	North
10047433	GW111744	Water Supply	Functioning	28/03/2011	6.10		AHD	good	1.000	1.81	1245m	North East
10093085	GW103777	Water Supply	Unknown	01/01/1995	8.50		AHD				1250m	North East
10077676	GW073504	Water Supply	Unknown	03/11/1995	7.00		AHD				1264m	North East
10060557	GW109856	Monitoring	Unknown	01/01/2006	7.50		AHD				1271m	North East
10061032	GW072898	Water Supply	Unknown	19/12/1994	10.40		AHD	Good			1274m	North East
10150839	GW060595	Water Supply	Unknown	01/10/1984	6.50		AHD	Good			1274m	North East
10053382	GW105905	Monitoring	Unknown	15/01/2004	21.00		AHD			1.00	1297m	North
10020777	GW015273	Commercial and Industrial	Unknown	01/03/1957	22.50		AHD				1310m	North
10060117	GW109853	Monitoring	Unknown	01/01/2006	6.00		AHD				1314m	North East
10133066	GW102687	Monitoring	Functional	09/06/1999	5.00		AHD			1.70	1314m	North East
10117401	GW114310	Monitoring	Functional	08/12/2010	4.80		AHD				1318m	East
10046799	GW109708	Monitoring	Unknown	12/03/2004	11.00		AHD			1.50	1319m	North
10033585	GW101819	Water Supply	Unknown	20/10/1995	5.00		AHD				1321m	North East
10059807	GW109711	Monitoring	Unknown	02/12/2003	11.00		AHD			1.50	1335m	North
10092768	GW106951	Water Supply	Unknown	06/04/2005	7.00		AHD				1344m	North East
10131643	GW042176	Monitoring	Unknown			13.62	AHD			0.00	1355m	North East
10135066	GW042176	Monitoring	Unknown		20.30	13.62	AHD			0.00	1355m	North East
10029490	GW040774	Unknown	Unknown		3.30		AHD				1369m	North West
10040267	GW062280	Water Supply	Unknown	01/02/1987	21.00		AHD	Good			1373m	North
10099564	GW106950	Water Supply	Functioning	05/04/2005	7.00		AHD				1376m	North East
10071963	GW109473	Monitoring	Unknown	21/09/2007	20.00		AHD			2.10	1377m	North
10100421	GW108494	Water Supply	Functioning	18/10/2006	6.10		AHD	Good	1.000	2.35	1383m	North East
10126008	GW102702	Monitoring	Unknown	22/11/1999	4.50		AHD				1389m	North

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10130553	GW112339	Water Supply	Functioning	01/10/2006	6.10		AHD		1.000	2.35	1397m	North East
10043622	GW062281	Water Supply	Unknown	01/02/1987	21.00		AHD	Good			1414m	North
10058290	GW109474	Monitoring	Unknown	21/03/2007	13.00		AHD			2.40	1420m	North
10072953	GW109472	Monitoring	Unknown	21/09/2007	20.00		AHD			2.30	1420m	North
10125312	GW102701	Monitoring	Unknown	22/11/1999	4.50		AHD				1420m	North
10046820	GW114007	Water Supply	Functioning	27/02/2014	11.00		AHD				1423m	North
10047499	GW114006	Water Supply	Functioning	27/02/2014	18.00		AHD				1424m	North
10062887	GW109476	Monitoring	Unknown	22/03/2007	13.00		AHD			1.10	1425m	North
10047729	GW062282	Water Supply	Unknown	01/03/1987	21.00		AHD	Good			1427m	North
10100334	GW100982	Water Supply	Functioning	12/08/1997	6.00		AHD				1429m	North East
10134477	GW108540	Water Supply	Functioning	26/02/2007	9.46		AHD	Good	1.000	6.00	1430m	East
10056414	GW108576	Water Supply	Functioning	11/03/2007	10.00		AHD			6.00	1431m	East
10047012	GW114009	Water Supply	Functioning	27/02/2014	12.00		AHD				1442m	North
10059869	GW110738	Water Supply	Unknown	01/01/2006	8.00		AHD		2.500	2.00	1442m	North East
10052856	GW114008	Water Supply	Functioning	27/02/2014	18.00		AHD				1444m	North
10134115	GW102700	Monitoring	Unknown	22/11/1999	4.50		AHD				1450m	North
10091652	GW111155	Water Supply	Functioning	20/10/2010	12.00		AHD				1451m	East
10048537	GW114011	Water Supply	Functioning	27/02/2014	12.00		AHD				1462m	North
10053208	GW114010	Water Supply	Functioning	27/02/2014	18.30		AHD				1464m	North
10117400	GW114309	Monitoring	Functional	08/12/2010	6.00		AHD				1474m	East
10071085	GW114013	Water Supply	Functioning	27/02/2014	12.00		AHD				1476m	North
10127776	GW060219	Commercial and Industrial	Functioning	01/01/1970	25.00		AHD				1479m	North
10107118	GW013577	Commercial and Industrial	Unknown	01/07/1957	26.80		AHD				1480m	North East
10138725	GW102699	Monitoring	Unknown	22/11/1999	4.50		AHD				1485m	North
10060720	GW109475	Monitoring	Unknown	20/03/2007	15.00		AHD			1.00	1487m	North
10145933	GW013638	Commercial and Industrial	Unknown	01/11/1956	20.40		AHD				1491m	North
10118924	GW112591	Monitoring	Functional	05/11/2003	20.00		AHD				1502m	North
10129877	GW101548	Water Supply	Unknown	06/04/1998	5.00		AHD				1502m	North East
10113828	GW016130	Commercial and Industrial	Functioning	01/11/1957	30.70		AHD				1508m	North East
10099362	GW106560	Water Supply	Functioning	15/11/2004	11.59		AHD	Good	0.100	7.01	1509m	East
10059514	GW023591	Water Supply	Unknown	01/04/1966	3.60		AHD	Fresh			1512m	North East
10100142	GW101750	Water Supply	Unknown	11/10/1995	8.00		AHD				1515m	North East
10126598	GW102697	Monitoring	Unknown	22/11/1999	4.50		AHD				1515m	North
10137905	GW102698	Monitoring	Unknown	22/11/1999	4.50		AHD				1515m	North
10065699	GW114016	Water Supply	Functioning	27/02/2014	17.00		AHD				1519m	North
10067583	GW114015	Water Supply	Functioning	27/02/2014	12.00		AHD				1519m	North

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10058129	GW114014	Water Supply	Functioning	27/02/2014	16.20		AHD				1520m	North
10128747	GW101550	Water Supply	Unknown	05/04/1998	5.00		AHD				1520m	North East
10093892	GW106814	Water Supply	Functioning	13/12/2004	10.37		AHD	Good	1.000	7.01	1522m	East
10119699	GW109513	Monitoring	Unknown	19/07/2007	7.00		AHD				1524m	South East
10004733	GW023137	Water Supply	Unknown	01/11/1965	9.10		AHD				1529m	North East
10058413	GW109470	Monitoring	Unknown	24/09/2007	20.00		AHD			3.10	1534m	North
10064815	GW111375	Water Supply	Functioning	24/01/2011	12.00		AHD				1539m	North East
10097389	GW072772	Water Supply	Unknown	16/02/1995	9.00		AHD				1546m	East
10091314	GW114042	Water Supply	Functioning	28/02/2014	23.00		AHD				1548m	North
10058829	GW114017	Water Supply	Functioning	27/02/2014	12.00		AHD				1550m	North
10141865	GW013435	Commercial and Industrial	Unknown	01/10/1948	53.60		AHD				1551m	North
10016957	GW108813	Water Supply	Unknown	10/04/2007	10.00		AHD				1564m	East
10089682	GW114027	Water Supply	Functioning	27/02/2014	13.00		AHD				1568m	North
10063666	GW114019	Water Supply	Functioning	27/02/2014	13.00		AHD				1569m	North
10058988	GW114026	Water Supply	Functioning	27/02/2014	26.00		AHD				1570m	North
10057541	GW101322	Water Supply	Functioning	24/12/1997	5.00		AHD				1572m	North East
10063525	GW114018	Water Supply	Functioning	27/02/2014	19.00		AHD				1572m	North
10122891	GW109514	Monitoring	Unknown	19/07/2007	7.00		AHD				1573m	South East
10019565	GW073457	Water Supply	Functioning	10/10/1995	5.80		AHD	Good			1575m	North
10058742	GW101333	Water Supply	Functioning	02/01/1998	5.00		AHD				1591m	North East
10070949	GW101332	Water Supply	Functioning	17/12/1997	5.00		AHD				1592m	North East
10115770	GW114308	Monitoring	Functional	08/12/2010	2.90		AHD				1593m	East
10087361	GW114029	Water Supply	Functioning	27/02/2014	13.00		AHD				1597m	North
10059363	GW114021	Water Supply	Functioning	27/02/2014	13.00		AHD				1599m	North
10085092	GW114028	Water Supply	Functioning	27/02/2014	27.00		AHD				1600m	North
10060928	GW114020	Water Supply	Functioning	27/02/2014	21.00		AHD				1601m	North
10140266	GW013433	Commercial and Industrial	Unknown	01/12/1954	31.60		AHD				1605m	North
10123996	GW112590	Monitoring	Functional	03/12/2003	20.00		AHD				1606m	North
10062601	GW100578	Water Supply	Functioning	19/03/1997	5.00		AHD				1610m	North
10094782	GW114030	Water Supply	Functioning	28/02/2014	22.00		AHD				1619m	North
10009374	GW047124	Other	Unknown	01/05/1975	37.80		AHD				1620m	North
10084264	GW114031	Water Supply	Functioning	28/02/2014	14.00		AHD				1621m	North
10062593	GW114023	Water Supply	Functioning	27/02/2014	13.00		AHD				1625m	North
10058275	GW114022	Water Supply	Functioning	27/02/2014	22.00		AHD				1626m	North
10140642	GW018547	Commercial and Industrial	Unknown	01/10/1961	32.30		AHD				1627m	North
10061095	GW040778	Unknown	Unknown				AHD			0.00	1632m	North

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10073365	GW040778	Unknown	Unknown				AHD			0.00	1632m	North
10139557	GW040778	Unknown	Unknown		39.65		AHD			0.00	1632m	North
10029276	GW072865	Water Supply	Functioning	12/12/1994	9.00		AHD				1635m	East
10095824	GW114034	Water Supply	Functioning	28/02/2014	13.50		AHD				1646m	North
10124471	GW109773	Water Supply	Unknown	01/01/2005	6.00		AHD		0.500	3.00	1647m	North East
10090831	GW114032	Water Supply	Functioning	28/02/2014	27.00		AHD				1648m	North
10093434	GW114033	Water Supply	Functioning	28/02/2014	21.00		AHD				1648m	North
10121041	GW022471	Commercial and Industrial	Unknown	01/01/1960	33.00		AHD				1649m	North
10062880	GW114025	Water Supply	Functioning	27/02/2014	13.00		AHD				1653m	North
10060701	GW114024	Water Supply	Functioning	27/02/2014	22.00		AHD				1656m	North
10136312	GW104734	Water Supply	Functioning	15/03/2003	8.00		AHD		1.000	5.00	1663m	East
10103083	GW019098	Commercial and Industrial	Functioning	01/01/1959	27.40		AHD	Poor			1664m	North
10084034	GW114036	Water Supply	Functioning	28/02/2014	22.00		AHD				1666m	North
10022622	GW109198	Monitoring	Unknown	11/08/2008	4.00		AHD				1668m	North
10056188	GW028573	Irrigation	Unknown	01/11/1966	13.10		AHD				1669m	East
10085815	GW114035	Water Supply	Functioning	28/02/2014	26.00		AHD				1670m	North
10125678	GW105873	Unknown	Unknown	06/05/2005			AHD				1670m	East
10082716	GW114037	Water Supply	Functioning	28/02/2014	12.50		AHD				1672m	North
10099725	GW110376	Monitoring	Unknown	18/11/1999	7.50		AHD				1672m	North
10124244	GW112841	Monitoring	Functional	08/12/2010	8.10		AHD			5.30	1683m	North
10025539	GW109196	Monitoring	Unknown	11/08/2008	4.00		AHD				1684m	North
10091487	GW104663	Water Supply	Functioning	07/01/2003	7.00		AHD				1688m	East
10116117	GW100865	Water Supply	Functioning	03/09/1996	6.71		AHD	Good	1.000		1689m	East
10091626	GW110378	Monitoring	Unknown	16/04/2004	7.00		AHD				1692m	North
10134610	GW108654	Water Supply	Unknown	30/03/2007	13.00		AHD				1692m	East
10002590	GW022536	Commercial and Industrial	Unknown	01/01/1958	27.80		AHD				1693m	North
10045825	GW109467	Monitoring	Unknown	20/09/2007	20.00		AHD			4.40	1693m	North
10088693	GW114038	Water Supply	Functioning	28/02/2014	22.00		AHD				1693m	North
10052173	GW106666	Water Supply	Unknown	10/10/2004	9.50		AHD				1698m	East
10123392	GW112837	Monitoring	Functional	08/12/2010	8.10		AHD			5.30	1698m	North
10134598	GW101020	Water Supply	Functioning	30/09/1995	7.31		AHD	Good	1.000	4.88	1704m	East
10142303	GW013432	Commercial and Industrial	Unknown	01/07/1956	28.00		AHD				1704m	North East
10051581	GW026480	Water Supply	Unknown	01/10/1966	6.00		AHD				1705m	East
10023272	GW109194	Monitoring	Unknown	11/08/2008	7.00		AHD				1706m	North
10084933	GW114040	Water Supply	Functioning	28/02/2014	22.50		AHD				1711m	North
10050985	GW111614	Water Supply	Functioning	01/10/2004	3.00		AHD				1713m	East
10123635	GW106971	Water Supply	Unknown	15/12/2004	8.00		AHD				1713m	East

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10114892	GW016129	Commercial and Industrial	Functioning	01/11/1957	34.30		AHD				1714m	North East
10084932	GW114039	Water Supply	Functioning	28/02/2014	29.00		AHD				1715m	North
10124764	GW112835	Monitoring	Functional	08/12/2010	7.70		AHD			5.30	1715m	North
10149760	GW060240	Other	Unknown	01/01/1980	20.00		AHD				1716m	North East
10125788	GW112838	Monitoring	Functional	08/12/2010	8.05		AHD			5.30	1718m	North
10140179	GW026380	Water Supply	Unknown	01/10/1965	4.50		AHD	Good			1728m	East
10090721	GW114041	Water Supply	Functioning	28/02/2014	29.30		AHD				1729m	North
10020545	GW111718	Water Supply	Functioning	04/10/2010	12.00		AHD				1731m	East
10021361	GW109197	Monitoring	Unknown	11/08/2008	7.00		AHD				1731m	North
10122237	GW112843	Monitoring	Functional	10/12/2010	8.10		AHD			5.30	1731m	North
10128204	GW112844	Monitoring	Functional	10/12/2010	8.10		AHD			5.30	1733m	North
10129425	GW112842	Monitoring	Functional	08/12/2010	8.10		AHD			5.30	1736m	North
10128331	GW042162	Monitoring	Unknown		24.00	6.62	AHD				1738m	North
10058289	GW109469	Monitoring	Unknown	22/10/2007	20.00		AHD			3.20	1744m	North
10124769	GW112839	Monitoring	Functional	08/12/2010	8.10		AHD			5.30	1745m	North
10126189	GW112836	Monitoring	Functional	08/12/2010	7.80		AHD			5.30	1746m	North
10101535	GW027761	Irrigation	Unknown	01/08/1965	31.00		AHD				1748m	North East
10067792	GW109471	Monitoring	Unknown	25/09/2007	20.00		AHD			3.20	1754m	North
10088245	GW110380	Monitoring	Unknown	08/05/2007	7.00		AHD				1754m	North
10098061	GW112412	Water Supply	Functioning	20/01/2008	10.00		AHD		0.250	6.00	1756m	East
10130481	GW113062	Water Supply	Functioning	01/01/2007	9.00		AHD		0.500	4.00	1758m	East
10027044	GW109195	Monitoring	Unknown	11/08/2008	7.80		AHD				1761m	North
10117344	GW112840	Monitoring	Functional	07/12/2010	8.10		AHD			5.30	1763m	North
10100408	GW110377	Monitoring	Unknown	18/11/1999	7.00		AHD				1765m	North
10045985	GW040779	Unknown	Abandoned		10.66		AHD				1767m	North
10097382	GW114044	Water Supply	Functioning	28/02/2014	24.00		AHD				1767m	North
10098882	GW114043	Water Supply	Functioning	28/02/2014	29.00		AHD				1770m	North
10019999	GW101434	Water Supply	Functioning	27/01/1998	12.81		AHD	Good	1.000	9.76	1777m	East
10060589	GW109468	Monitoring	Unknown	19/09/2007	20.00		AHD			4.30	1777m	North
10098019	GW110379	Monitoring	Unknown	08/05/2007	7.00		AHD				1778m	North
10141178	GW015991	Commercial and Industrial	Functioning	01/02/1957	30.00		AHD				1780m	North
10060064	GW109477	Monitoring	Unknown	19/10/2007	20.00		AHD			2.40	1786m	North
10127045	GW108800	Water Supply	Unknown	10/05/2007	12.00		AHD				1800m	East
10088309	GW114046	Water Supply	Functioning	28/02/2014	22.00		AHD				1804m	North
10121089	GW013383	Commercial and Industrial	Unknown	01/01/1958	34.10		AHD	Good			1804m	North
10085805	GW114045	Water Supply	Functioning	28/02/2014	27.00		AHD				1807m	North
10125643	GW112592	Monitoring	Functional	07/11/2003	20.00		AHD				1818m	North

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10126120	GW110015	Monitoring	Unknown	09/05/2007	7.00		AHD				1820m	North
10088094	GW114048	Water Supply	Functioning	03/03/2014	24.50		AHD				1830m	North
10082023	GW114049	Water Supply	Functioning	03/03/2014	14.00		AHD				1833m	North
10081778	GW114047	Water Supply	Functioning	03/03/2014	29.50		AHD				1837m	North
10144523	GW015990	Commercial and Industrial	Functioning	01/02/1957	28.80		AHD				1838m	North
10101568	GW025949	Commercial and Industrial	Functioning	01/02/1967	35.00		AHD				1840m	North
10013103	GW025710	Commercial and Industrial	Unknown	01/07/1965	29.50		AHD	Good			1850m	North
10117200	GW013387	Commercial and Industrial	Unknown	01/05/1957	34.70		AHD	Good			1855m	North
10129224	GW109796	Monitoring	Unknown	18/09/2006	3.60		AHD			0.80	1857m	North
10034639	GW100276	Water Supply	Functioning	15/01/1994	6.00		AHD				1859m	North West
10100001	GW108230	Water Supply	Unknown	26/07/2006	13.00		AHD				1861m	North East
10120257	GW017350	Commercial and Industrial	Unknown	01/11/1957	32.30		AHD				1864m	North
10121347	GW109795	Monitoring	Unknown	18/09/2006	3.60		AHD			0.80	1867m	North
10094737	GW114050	Water Supply	Functioning	03/03/2014	26.70		AHD				1875m	North
10121609	GW109797	Monitoring	Unknown	18/09/2006	3.60		AHD			0.70	1877m	North
10089462	GW114051	Water Supply	Functioning	03/03/2014	14.00		AHD				1878m	North
10057176	GW109462	Monitoring	Unknown	18/10/2007	20.00		AHD			3.50	1881m	North
10122732	GW109794	Monitoring	Unknown	18/09/2006	3.60		AHD			0.70	1889m	North
10114835	GW060372	Commercial and Industrial	Functioning	01/01/1962	30.00		AHD	0-500 ppm			1890m	North
10122596	GW109793	Monitoring	Unknown	18/09/2006	3.60		AHD			0.70	1894m	North
10119301	GW101806	Water Supply	Functioning	04/11/1995	11.89		AHD	Good			1910m	North
10125468	GW107779	Water Supply	Functioning	13/02/2006	9.15		AHD	Good	1.000	5.80	1911m	North East
10084030	GW114052	Water Supply	Functioning	03/03/2014	26.00		AHD				1920m	North
10052840	GW109466	Monitoring	Unknown	17/10/2007	20.00		AHD			0.90	1922m	North
10081994	GW114053	Water Supply	Functioning	03/03/2014	13.00		AHD				1923m	North
10046438	GW109081	Water Supply	Unknown	17/07/2008	13.00		AHD				1924m	East
10125841	GW101812	Water Supply	Unknown	16/11/1995	9.15		AHD	Good	1.000	6.10	1925m	North East
10111528	GW107739	Water Supply	Unknown	05/01/2006	10.00		AHD				1929m	North East
10126602	GW109021	Water Supply	Unknown	10/07/2008	4.00		AHD				1932m	East
10096434	GW100586	Water Supply	Unknown	31/12/1996	15.00		AHD				1942m	North
10041619	GW109464	Monitoring	Unknown	27/09/2007	20.00		AHD			2.40	1943m	North
10041264	GW109463	Monitoring	Unknown	11/10/2007	20.00		AHD			4.00	1946m	North
10125041	GW101785	Water Supply	Unknown	22/02/1999	6.00		AHD		0.400	4.00	1958m	North
10112932	GW020494	Commercial and Industrial	Unknown	01/06/1963	30.90		AHD				1962m	North
10120549	GW025623	Water Supply	Functioning	01/10/1965	3.60		AHD	Good	0.330	3.00	1963m	North East
10097929	GW114054	Water Supply	Functioning	03/03/2014	26.00		AHD				1965m	North

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10120199	GW114055	Water Supply	Functioning	03/03/2014	13.00		AHD				1969m	North
10057212	GW101070	Water Supply	Functioning	08/11/1997	5.00		AHD				1970m	North East
10128731	GW105111	Water Supply	Functioning		4.00		AHD				1980m	East
10112177	GW060371	Commercial and Industrial	Functioning	01/01/1963	38.00		AHD	0-500 ppm			1986m	North
10125693	GW103694	Monitoring	Functioning	20/02/2001	5.00		AHD			2.80	1989m	North West
10131103	GW042175	Monitoring	Unknown	13/02/1975		16.23	AHD				1989m	North
10060065	GW109480	Monitoring	Unknown	23/10/2007	13.00		AHD			2.30	1994m	North
10072566	GW109478	Monitoring	Unknown	23/10/2007	13.00		AHD			3.20	1996m	North

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Hydrogeology & Groundwater

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Driller's Logs

Drill log data relevant to the boreholes within the dataset buffer:

NGIS Bore ID	Drillers Log	Distance	Direction
10124030	0.00m-7.00m FILL 7.00m-8.00m SAND,CLEAN QUARTZ MEDIUM BROWN 8.00m-9.00m SAND M/BROWN 0.5-1mm 9.00m-12.00m SAND AND CARBONACEOUS MATERIAL 12.00m-13.00m SAND AND CARBONACEOUS MATERIAL,WOOD FRAGMENTS 13.00m-16.00m SAND AND CARBONACEOUS MATERIAL,SHELL FRAGS. 16.00m-20.00m SAND DARK BROWN 20.00m-21.00m SAND AND CARBONACEOUS MATERIAL 21.00m-22.00m SAND,MEDIUM BROWN 22.00m-23.00m SAND LIGHT BROWN 23.00m-27.50m SAND LIGHT BROWN,SHELL FRAGMENTS 27.50m-32.50m SANDSTONE 32.50m-36.20m SANDSTONE,FINE TO COARSE GRAINED 36.20m-37.50m SANDSTONE ORANGE BROWN,MASSIVE 37.50m-48.00m SANDSTONE,FINE TO COARSE GRAINED,ORANGE BROWN 48.00m-53.20m SANDSTONE,FINE TO COARSE 53.20m-53.40m SANDSTONE FINE TO MEDIUM 53.40m-55.30m SANDSTONE FINE TO COARSE 55.30m-55.40m SHALE,FINE GRAINED,BLACK 55.40m-59.50m SANDSTONE,FINE TO MEDIUM 59.50m-60.00m SHALE,FINE TO GRAINED,BLACK 60.00m-62.50m SANDSTONE,FINE TO MEDIUM GRAINED,GREY 62.50m-68.10m SANDSTONE,FINE TO MEDIUM GRAINED,GREY 68.10m-69.10m SANDSTONE INTERBEDDED WITH SHALE 69.10m-76.00m SANDSTONE,FINE GRAINED,GREY,SOME SHALE 76.00m-81.50m SANDSTONE FINE TO MEDIUM GRAINED,GREY 81.50m-83.00m SANDSTONE,FINE TO MEDIUM GRAINED,GREY,MASSIVE	39m	South
10128261	0.00m-11.00m SAND CLEAN 11.00m-14.00m SAND AND CARBONACEOUS MATERIAL 14.00m-17.00m SAND AND CARBONACEOUS MATERIAL FINE TO MEDIUM GRAINED 17.00m-21.00m SAND,QUARTZ FINE TO MEDIUM GRAINED 21.00m-24.00m SAND FINE QUARTZ , MINOR SHELL FRAGS. 24.00m-26.00m SAND AND CARBONACEOUS MATERIAL,NO SHELL FRAGS 26.00m-28.00m SAND, FINE TO MEDIUM,GRAINED QUARTZ 28.00m-41.00m SAND AND CARBONACEOUS MATERIAL 41.00m-44.00m SAND MEDIUM TO COARSE QUARTZ 44.00m-49.00m SANDSTONE GREY AND ORANGE 49.00m-51.10m SANDSTONE FINE TO MEDIUM GRAINED,GREY 51.10m-85.00m SANDSTONE FINE TO COARSE GRAINED,GREY 85.00m-86.00m SANDSTONE FINE TO COARSE,GRAINED,GREY,GRAVEL	61m	South

NGIS Bore ID	Drillers Log	Distance	Direction
10130486	0.00m-0.13m TOPSOIL,DARK BROWN 0.13m-0.36m TOPSOIL RED BROWN 0.36m-1.20m FILL,SANDSTONE 1.20m-1.80m FILL,CRUSHED SANDSTONE 1.80m-2.20m CLAY SANDY,GRAVELLY 2.20m-4.90m SAND,ORANGE,MINOR CLAY 4.90m-7.00m CARBONACEOUS MATERIAL,MINOR SAND 7.00m-8.40m SAND MEDIUM GRAINED 8.40m-9.40m SAND AND CARBONACEOUS MATERIAL 9.40m-9.70m SAND,PALE GREY 9.70m-10.40m SAND AND CARBONACEOUS MATERIAL 10.40m-12.40m SAND AND CARBONACEOUS MATERIAL,FINE GRAINED 12.40m-13.40m SAND MEDIUM TO FINE GRAINED 13.40m-22.40m SAND AND CARBONACEOUS MATERIAL 22.40m-26.80m SAND AND CARBONACEOUS MATERIAL,LESS SHELLS 26.80m-32.42m SANDSTONE 32.42m-56.00m SANDSTONE,FINE TO COARSE GRAINED 56.00m-56.20m INTERBEDDED SANDSTONE AND SILTSTONE 56.20m-60.00m SHALE,DARK GREY 60.00m-66.00m SANDSTONE FINE TO MEDIUM GRAINED 66.00m-68.20m SANDSTONE FINE TO MEDIUM GRAINED,GREY 68.20m-69.00m SHALE,DARK GREY 69.00m-70.00m SANDSTONE,FINE MEDIUM GRAINED,GREY 70.00m-75.00m SANDSTONE FINE TO COARSE GRAINED 75.00m-78.40m SANDSTONE FINE TO MEDIUM GRAINED,GREY BANDED 78.40m-79.20m SANDSTONE FINE GRAINED,GREY BANDED 79.20m-81.20m SANDSTONE LIGHT GREY 81.20m-103.00m SANDSTONE FINE TO MEDIUM GRAINED LIGHT GREY 103.00m-112.50m SHALE,DARK GREY THINLY LAMINATED 112.50m-120.10m SANDSTONE INTERBEDDED AND SILTSTONE 120.10m-121.00m SANDSTONE FINE TO COARSE GRAINED 121.00m-121.20m SANDSTONE INTERBEDDED AND SILTSTONE 121.20m-123.50m SHALE DARK GREY 123.50m-143.40m SANDSTONE,MEDIM TO COARSE GRAINED,GRAVEL	88m	South
10127915	0.00m-1.50m SAND CLEAN 1.50m-2.00m SANDSTONE FILL,LARGE 2.00m-11.00m SAND,CLEAN 11.00m-12.00m SAND AND CARBONACEOUS MATERIAL 12.00m-16.00m SAND AND CARBONACEOUS MATERIAL,SHELL FRAGMENTS 16.00m-21.00m SAND,LIGHT BROWN,SHELL FRAGS. AND PEBBLES 21.00m-22.00m SAND,CLEAN SILVER QUARTZ SAND 22.00m-24.00m SAND AND CARBONACEOUS MATERIAL,SHELL FRAGS. 24.00m-29.00m SAND AND CARBONACEOUS MATERIAL,SILTY FROM 26m 29.00m-32.00m SAND,MEDIUM TO COARSE SAND 32.00m-34.00m SAND,MEDIUM TO COARSE SAND,SILTY FROM 33m 34.00m-36.00m SAND AND CARBONACEOUS MATERIAL 36.00m-41.00m SAND,SHELL FRAGMENTS 41.00m-44.00m SAND,CLEAN QUARTZ, 44.00m-49.00m SANDSTONE CLEAN SAND,1-3mm 49.00m-49.00m COMMENCE CORING AT 49 m 49.00m-66.10m SANDSTONE 66.10m-67.00m SHALE,FINE GRAINED,DARK GREY 67.00m-84.70m SANDSTONE 84.70m-85.10m SANDSTONE MEDIUM TO COARSE 85.10m-86.20m SHALE,FINE GRAINED,DARK GREY 86.20m-90.40m SANDSTONE FINE TO MEDIUM GRAINED 90.40m-105.40m SHALE,FINE GRAINED,DARK GREY 105.40m-123.30m SANDSTONE MEDIUM TO COARSE,PALE GREY 123.30m-124.20m SHALE DARK GREY,WITH PALE GREY SANDSTONE 124.20m-125.30m SANDSTONE FINE GRAINED,PALE GREY 125.30m-125.40m SHALE FINE GRAINED,DARK GREY 125.40m-160.20m SANDSTONE,FINE TO MEDIUM,GRAINED PALE GREY,QUARTZ	108m	South

NGIS Bore ID	Drillers Log	Distance	Direction
10041552	0.00m-0.10m SAND 0.10m-0.20m FILL,BASALT FRAGMENTS 0.20m-3.00m SAND,GREY,BEIGE 3.00m-5.00m CARBONACEOUS MATERIAL,DARK BROWN 5.00m-7.50m SAND AND CARBONACEOUS MATERIAL 7.50m-9.50m SAND AND CARBONACEOUS MATERIAL,WHITE GREY 9.50m-13.00m CARBONACEOUS MATERIAL, SOFT TO HARD 13.00m-18.00m CARBONACEOUS MATERIAL,CLAY AND SHELLS 18.00m-19.00m CLAYEY SAND WITH SHELLS 19.00m-20.00m SAND 20.00m-21.00m CARBONACEOUS MATERIAL,SAND AND CLAY 21.00m-24.00m CARBONACEOUS MATERIALSAND,SHELLS AND CLAY 24.00m-26.00m BLACK CLAY 26.00m-28.80m CARBONACEOUS MATERIALSAND,SHELLS AND CLAY 28.80m-29.30m CARBONACEOUS MATERIALSAND,SHELLS AND CLAY 29.30m-33.00m SANDY CLAY 33.00m-34.30m WEATHERED SANDSTONE 34.30m-35.30m WEATHERED SANDSTONE,FINE SAND GRAINS 35.30m-39.90m WEATHERED SANDSTONE COARSE 39.90m-41.00m SANDSTONE COARSE SAND GRAINS 41.00m-42.00m SANDSTONE COARSE SAND GRAINS 42.00m-44.00m SANDSTONE BLACK PARTICLES 44.00m-46.20m SANDSTONE SAND SIZED AND GRAIN 46.20m-53.20m SANDSTONE,SOFT PALE TO MID GREY	417m	South
10018622	0.00m-0.10m SAND MED, GREY BROWN COLOURED 0.10m-0.20m FILL, BASALT FRAGMENTS 0.20m-2.20m SAND,GREY,BEIGE 2.20m-2.40m CARBONACEOUS MATERIAL WHITE GREY 2.40m-14.20m SAND AND CARBONACEOUS MATERIAL WHITE,GREY 14.20m-18.20m SAND AND CARBONACEOUS MATERIAL WHITE,GREY 18.20m-22.00m SANDSTONE,WHITE GREY SAND SIZED GRAINS 22.00m-22.20m SANDSTONE AND CARBONACEOUS MATERIAL 22.20m-26.30m SANDSTONE AND CARBONACEOUS MATERIAL,60%SANDSTONE 26.30m-32.00m SANDSTONE AND CARBONACEOUS MATERIAL 70%SANDSTONE 32.00m-34.10m SANDSTONE AND CARBONACEOUS MATERIAL AS ABOVE 34.10m-34.30m HARD SANDSTONE 34.30m-39.90m SANDSTONE 39.90m-48.00m HARD SANDSTONE FINE GREY 48.00m-49.10m HARD SANDSTONE 49.10m-51.10m SANDSTONE/ FINE GRAINED SAND 51.10m-52.50m SANDSTONE/ FINE GRAINED SAND 52.50m-55.10m SANDSTONE,SILT AND SAND/SMALL PEBBLES 55.10m-59.90m SANDSTONE,SMALL ROCK CHIPS 59.90m-69.00m SANDSTONE MOSTLY SAND SIZED 69.00m-70.00m SHALE AND SANDSTONE 70.00m-71.00m SHALE 71.00m-72.00m SANDSTONE 72.00m-73.00m SHALE 73.00m-80.00m SANDSTONE 80.00m-80.10m SANDSTONE,PALE GREY 80.10m-87.10m SANDSTONE,PALE GREY SAND GRAINS 87.10m-88.00m SHALE AND SANDSTONE 88.00m-89.00m SANDSTONE 89.00m-90.00m SHALE AND SANDSTONE 90.00m-102.00m SANDSTONE,SAND GRAINS AND CHIPS 102.00m-110.00m SHALE AND SANDSTONE 110.00m-113.00m SHALE,SILT SIZED,DARK GREY 113.00m-118.00m SANDSTONE 118.00m-120.00m SHALE 120.00m-126.00m SHALE AND SANDSTONE 126.00m-134.00m SANDSTONE,SANDS GRAINDS WITH BLACK FLECKS 134.00m-139.00m SHALE AND SANDSTONE 139.00m-145.00m SANDSTONE MOSTLY SAND SIZED GRAINS 145.00m-150.00m SANDSTONE 150.00m-153.00m SANDSTONE,SILT AND SAND SIZED GRAINS 153.00m-156.00m SHALE,FRAGMENTS FROM SAND SIZED TO 10mm 156.00m-159.00m SANDSTONE 159.00m-161.00m SHALE AND SANDSTONE 161.00m-163.20m SHALE,SILT SIZED GRAINS TO FRAGMENTS UP TO 15mm	418m	South
10095203	0.00m-0.90m FILL CONSISTING OF SILTY SAND 0.90m-3.60m FILL CONSISTING OF SAND MEDIUM TO COARSE GRAINED 3.60m-4.80m SILTY SAND,FINE TO MEDIUM GRAINED,GREY BROWN	433m	North East
10084903	0.00m-0.30m FILL CONSISTING OF SANDY GRAVEL 0.30m-0.80m FILL CONSISTING OF GRAVEL SANDSTONE 0.80m-4.10m FILL CONSISTING OF SAND,FINE TO MEDIUM 4.10m-4.80m SILTY SAND,FINE TO MEDIUM GRAINED	451m	North East
10123486	0.00m-0.20m CONCRETE 0.20m-1.00m SAND,LIGHT BROWN 1.00m-1.50m SAND,RED BROWN 1.50m-2.80m SANDSTONE	459m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10122471	0.00m-0.20m CONCRETE 0.20m-0.30m SAND,LIGHT BROWN 0.30m-0.50m SAND,DARK BROWN 0.50m-6.20m SAND YELLOW	517m	North East
10125988	0.00m-0.20m CONCRETE 0.20m-0.60m SAND,DARK BROWN 0.60m-0.80m SAND,LIGHT BROWN 0.80m-1.20m SAND,RED,BROWN 1.20m-4.50m SAND YELLOW	667m	North East
10067290	0.00m-0.91m Sand Grey 0.91m-1.21m Sand Hard Cemented 1.21m-3.04m Sand Yellow 3.04m-5.48m Sand Light Yellow 5.48m-6.09m Clay Sandy 6.09m-17.98m Sand Light Yellow Water Supply 17.98m-18.59m Clay White 18.59m-18.89m Peat 18.89m-21.33m Sand Water Supply 21.33m-21.64m Clay Soft 21.64m-22.55m Sand Coarse Water Supply 22.55m-23.16m Wood Peat 23.16m-24.68m Sand Grey 24.68m-24.99m Clay Grey 24.99m-27.12m Sand Grey Coarse Water Supply 27.12m-28.04m Clay Sandy 28.04m-29.26m Sand Coarse Water Supply 29.26m-29.87m Stones Loose Pyrite 29.87m-32.00m Sand Grey Water Supply 32.00m-32.30m Stones Large Loose Water Supply 32.30m-34.13m Clay Grey Tight 34.13m-36.57m Clay Grey Soft 36.57m-37.79m Sandstone Grey Soft 37.79m-38.40m Clay Grey Soft 38.40m-39.92m Sand White Water Supply 39.92m-41.45m Clay White Stiff 41.45m-45.11m Sand Light Brown Water Supply 45.11m-46.02m Mud 46.02m-46.63m Clay 46.63m-47.54m Sandstone	679m	North East
10004128	0.00m-11.20m SAND,MED GRAINED,YELLOW BROWN 11.20m-19.50m SILTY SAND,VERY FINE TO FINE GRAINED, WHITE 19.50m-21.00m BED ROCK	719m	East
10147063	0.00m-9.14m Sand Dry 9.14m-12.19m Clay Sandy Bands 12.19m-15.24m Sand Wet 15.24m-20.11m Sand Water Supply 20.11m-21.33m Clay Grey Stiff	728m	North East
10105436	0.00m-2.13m Sand Greasy 2.13m-5.63m Sand Light Brown 5.63m-6.40m Mud Peaty 6.40m-9.44m Sand White Water Supply 9.44m-13.19m Sand White Yellow Water Supply 13.19m-13.41m Sand Light Brown Wet Water Supply 13.41m-18.59m Sand Light Brown Water Supply 18.59m-18.65m Clay Peaty 18.65m-21.64m Sand River Coarse Water Supply 21.64m-22.09m Sand Greasy Water Supply 22.09m-25.60m Sand, with peat bands, and hard cemented bands, water supply 25.60m-26.06m Sand Greasy Water Supply 26.06m-26.15m Clay White 26.15m-26.51m Sand Water Supply 26.51m-26.57m Clay 26.57m-26.82m Sand Water Supply 26.82m-26.91m Clay 26.91m-27.12m Sand Water Supply 27.12m-27.49m Peat	729m	North East
10129928	0.00m-1.30m FILL-RUBBLE 1.30m-1.60m CONCRETE 1.60m-2.60m FILL , ASH 2.60m-3.50m SAND, GREY 3.50m-4.80m SAND, LIGHT GREY	746m	North East
10123273	0.00m-0.10m BITUMEN 0.10m-0.30m SAND,LIGHT / BROWN 0.30m-0.60m SAND GREY 0.60m-0.90m SAND,RED BROWN 0.90m-5.60m SAND YELLOW	787m	North East
10118319	0.00m-1.20m FILL 1.20m-1.90m SAND,LOOSE,GREY 1.90m-2.00m CEMENTED ROCK	850m	East
10026046	0.00m-5.00m Sand	860m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10078551	0.00m-6.00m SAND	860m	North East
10001416	0.00m-0.60m Sand Grey 0.60m-1.52m Sand Hard Cemented 1.52m-5.18m Sand Dry 5.18m-6.09m Clay Black 6.09m-10.05m Sand Some Hard Cemented 10.05m-18.59m Sand White Water Supply 18.59m-19.20m Clay Seams 19.20m-19.81m Sand Water Supply 19.81m-19.96m Peat Seams 19.96m-22.25m Sand Grey Gravel Water Supply 22.25m-23.16m Clay Grey Stiff 23.16m-24.00m Sand Grey 24.00m-24.60m Peat 24.60m-28.24m Sand Grey Clay 28.24m-29.87m Peat Clay	867m	North East
10094753	0.00m-6.00m SAND	867m	North East
10109676	0.00m-1.82m Sand Grey 1.82m-2.43m Sand Hard Cemented 2.43m-3.65m Sand 3.65m-4.87m Sand Clay 4.87m-6.09m Sand Yellow 6.09m-6.55m Sandstone Soft 6.55m-7.62m Sand White 7.62m-7.92m Sandstone Soft 7.92m-13.71m Sand Yellow 13.71m-13.86m Clay Yellow 13.86m-17.98m Sand Yellow Water Supply 17.98m-18.28m Clay Sandy 18.28m-19.20m Sand Yellow Water Supply 19.20m-19.81m Sand Water Supply 19.81m-23.77m Sand Yellow Water Supply 23.77m-24.38m Clay Grey Sandy 24.38m-26.51m Sand White Water Supply 26.51m-27.12m Clay Sandy Water Supply 27.12m-27.43m Sand Grey 27.43m-27.73m Sandstone	870m	North East
10054717	0.00m-6.00m SAND	889m	North East
10125997	0.00m-10.00m SAND	893m	North East
10014906	0.00m-5.49m Sand White 5.49m-10.36m Sand Green 10.36m-11.89m Peat 11.89m-18.59m Sand Grey 18.59m-24.39m Sand White	919m	North East
10068368	0.00m-5.00m SAND	921m	North East
10141656	0.00m-1.21m Sand Grey Dry 1.21m-1.52m Sand Black Dry 1.52m-4.57m Sand Yellow Dry 4.57m-7.01m Sand Yellow Water Supply 7.01m-7.31m Sand Grey Water Supply 7.31m-7.62m Sand Clayey Fossils:peat 7.62m-13.10m Sand Grey Clay Seams Water Supply 13.10m-15.84m Sand Yellow Clay Seams Water Supply 15.84m-16.76m Sand Grey Water Supply 16.76m-18.59m Sand Grey Loose Some Solid Seams 18.59m-19.50m Sand Yellow Water Supply 19.50m-20.11m Sand White Water Supply 20.11m-20.42m Peat 20.42m-21.94m Sand White Coarse Water Supply 21.94m-22.25m Peat 22.25m-24.38m Sand White Clay Coarse Seams 24.38m-25.75m Sand Yellow Water Supply 25.75m-26.06m Clay Peaty 26.06m-26.36m Sand White Coarse Water Supply 26.36m-27.12m Clay Hard Fossils:peat 27.12m-28.80m Sand White Coarse Water Supply 27.12m-28.80m Clay Peaty Seams 28.80m-30.78m Clay Stiff Sandy 30.78m-31.69m Sand Water Supply 31.69m-32.00m Clay 32.00m-32.61m Sand Water Supply	940m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10119361	0.00m-0.15m CONCRETE SLAB 0.15m-0.35m FILLING,GREY/DARK GREYSAND AND GRAVEL 0.35m-0.95m FILLING GREY AND BROWN,SILTY SAND 0.95m-1.10m FILLING DARK BROWN,CLAYEY SILTY SAND 1.10m-2.10m FILLING DARK BROWN,SILTY SAND 2.10m-2.30m FILLING GREY DARK GREY 2.30m-2.50m FILLING LIGHT BROWN, SAND AND SILT 2.50m-2.75m FILLING DARK BROWN GREY ,SILTY SAND 2.75m-2.90m FILLING BROWN,SAND WITH SILT 2.90m-4.00m SAND L/GREY,WITH FAINT ORGANIC ODOUR	949m	North East
10124957	0.00m-0.05m ASPHALT PAVEMENT 0.05m-0.40m FILLING GREY BROWN,GRAVEL AND SAND 0.40m-0.60m FILLING DARK BROWN TO GREY 0.60m-0.70m FILLING BROWN AND GREY,SILTY SAND 0.70m-0.80m FILLING MEDIUM GREY/SILTY SAND 0.80m-1.50m FILLING LIGHT GREY,SILTY SAND FILLING 1.50m-2.50m FILLING DARK BROWN,SILTY SAND 2.50m-5.00m SAND LIGHT GREY,FINE GRAINED	953m	North East
10100192	0.00m-8.00m Sand	958m	North East
10123403	0.00m-1.20m FILL 1.20m-9.50m SAND 9.50m-10.00m ROCK 10.00m-11.70m SAND MEDIUM	961m	East
10021502	0.00m-8.00m SAND	989m	North East
10125304	0.00m-0.05m FILLING RED BROWN 0.05m-0.25m FILLING GRAVELLY CLAYEY SAND 0.25m-0.30m FILLING ORANGE PINK SANDSTONE 0.30m-0.70m FILLING BLACK SILT,TRACE OF SAND 0.70m-1.20m FILLING DARK GREY, SILTY ,F/GRAINED 1.20m-1.80m SAND YELLOW BROWN FINE GRAINED 1.80m-4.00m SAND LIGHT GREY,FINE GRAINED	1032m	North East
10057144	0.00m-5.00m	1036m	North East
10124129	0.00m-0.14m CONCRETE SLAB 0.14m-0.50m FILLING DARK GREY/ GRAVEL 0.50m-0.70m FILLING DARK GREY /SANDY CLAY 0.70m-1.11m FILLING BLACK ORGANIC CLAYEY SILT 1.11m-1.60m FILLING LIGHT BROWN,SAND 1.60m-2.40m FILLING LIGHT BROWN,SAND WITH ORGANIC MATTER	1048m	North
10059986	0.00m-6.00m	1050m	North East
10055745	0.00m-6.00m sand	1061m	North East
10125495	0.00m-0.15m CONCRETE 0.15m-0.45m FILING GREY BROWN,SAND AND GRAVEL 0.45m-0.60m FILLING DARK GREY BLACK 0.60m-0.85m FILLING GREY BLACK AND GRAVEL 0.85m-1.15m FILLING GREY BLACK,SILTY SAND 1.15m-1.25m FILLING GREY/SANDY SILT 1.25m-1.35m FILLING BROWN GREY /SILTY SAND 1.35m-1.45m FILLING GREY BLACK 1.45m-2.15m FILLING L/BROWN GREY/SAND/SILT 2.15m-3.00m SAND LIGHT GREY WITH TRACE SILT	1079m	North
10133551	0.00m-3.20m FILL 3.20m-3.70m SANDSTONE	1086m	East
10122670	0.00m-0.10m CONCRETE SLAB 0.10m-0.55m FILLING GREY 0.55m-0.75m FILLING YELLOW GREY 0.75m-1.40m FILLING BLACK SANDY GRAVEL 1.40m-1.90m FILLING ,BLACK SILT 1.90m-3.00m SAND YELLOW TO YELLOW GREY	1088m	North
10126612	0.00m-0.20m FILLING,GREY GRAVEL 0.20m-0.35m CONCRETE 0.35m-0.70m FILLING TRACE OF GRAVEL 0.70m-1.30m FILLING DARK GREY/BLACK SANDY SILT 1.30m-1.40m FILLING LIGHT GREY 1.40m-1.60m FILLING DARK GREY TO BLACK,SOME SAND 1.60m-1.70m FILLING DARK GREY CLAYEY SANDY SILT 1.70m-2.40m SAND,MEDIUM GREY 2.40m-4.00m SAND LIGHT YELLOW BROWN	1089m	North
10124417	0.00m-0.10m CONCRETE SLAB 0.10m-0.30m FILLING DARK GREY,SAND AND SILT 0.30m-0.60m FILING BLACK DARK GREY,SOME GRAVEL 0.60m-3.13m SAND,L/BROWN FINE GRAINED,SILT	1090m	North
10122319	0.00m-7.00m SAND	1104m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10127036	0.00m-0.34m MADE GROUND 0.34m-0.50m FILL 0.50m-0.60m SANDSTONE	1110m	East
10135695	0.00m-6.70m Soil Sandy Water Supply	1114m	North
10127076	0.00m-0.27m FLOOR SLAB 0.27m-1.60m MADE GROUND 1.60m-2.80m SAND 2.80m-6.00m BED ROCK ,SANDSTONE	1121m	East
10064077	0.00m-0.45m FILLING,BROWN,GRAVELLY SAND 0.45m-5.40m SAND,DARK BROWN,BLACK,WHITE	1126m	North East
10124134	0.00m-0.30m TOPSOIL 0.30m-2.50m BROWN SAND 2.50m-4.00m YELLOW SAND	1126m	East
10051651	0.00m-3.00m FILL,BRICKS, CLAY 3.00m-6.50m BROWN SAND 6.50m-17.00m YELLOW SAND 17.00m-20.50m BROWN SAND 20.50m-21.00m DARK BROWN CLAY	1132m	North
10046980	0.00m-3.00m FILL,GRAVELLY SAND,MEDIUM GRAIN,ORANGE 3.00m-8.00m SAND,MEDIUM GRAIN,DARK BROWN,YELLOW 8.00m-10.00m PEAT LAYER,DARK BROWN , STIFF 10.00m-21.00m SAND MEDIUM GRAIN,YELLOW,UNIFORM,,WHITE,UNIFORM	1145m	North
10053356	0.00m-5.00m Sand	1147m	North East
10019350	0.00m-1.06m Made Ground 1.06m-4.72m Sand Black 4.72m-6.55m Sand Yellow 6.55m-9.44m Sand Yellow Clean Water Supply 9.44m-10.21m Sand Peaty Water Supply 10.21m-11.21m Peat Water Supply Sand Yellow Water Supply 11.21m-18.28m Sand Yellow Clean Water Supply 18.28m-20.72m Sand Black Peaty Water Supply 20.72m-21.94m Clay Peaty 21.94m-27.73m Sand Black Water Supply 27.73m-28.04m Clay	1151m	North
10047658	0.00m-8.00m SAND	1153m	North East
10058311	0.00m-1.60m FILLING,ROADBASE,GRAVEL AND GREY ASH 1.60m-6.00m SAND,BROWN,WHITE,STRONG HYDROCARBON ODOUR	1155m	North East
10053693	0.00m-3.00m FILL ROCKS 3.00m-6.00m BROWN SAND 6.00m-10.00m YELLOW SAND 10.00m-21.00m BROWN SAND	1158m	North
10099267	0.00m-7.00m sand	1178m	North East
10054601	0.00m-5.00m SAND	1188m	North East
10053961	0.00m-1.00m FILL,MEDIUM GRAINED SAND,SOME CLAY 1.00m-1.50m FILL,FINE TO MEDIUM,YELLOW GREY,TRACE ASH.SILT,GRAVEL 1.50m-3.60m FILL.BECOMING BLACK,YELLOW,GRAVEL 3.60m-4.50m SAND,FINE TO MEDIUM GRAINED,BLACK,YELLOW,CLAY 4.50m-5.50m SAND F/GRAINED,BLACK/YELLOW,TRACE CLAY 5.50m-6.60m SAND,F/GRAINED,ORGANIC GRAINS 6.60m-7.00m SAND,BECOMING FINE TO MEDIUM GRAINED 7.00m-7.50m SAND,FINE GRAINED,YELLOW/GREY,ORGANIC GRAINS 7.50m-8.00m SAND,M/GRAINED,UNIFOR,WELL ROUNDED 8.00m-9.00m SAND,FINE GRAINED,YELLOW/GREY,ORGANIC GRAINS 9.00m-11.00m SAND,MEDIUM GRAINED,UNIFOR,WELL ROUNDED,YELLOW/WHITE	1191m	North
10145739	0.00m-1.21m Made Ground 1.21m-4.87m Peat Sand 4.87m-8.53m Sand Dark Brown Water Supply 8.53m-10.97m Sand 10.97m-11.43m Peat 11.43m-13.41m Sand Water Supply 13.41m-15.54m Sand Dirty 15.54m-16.76m Sand Water Supply 16.76m-17.06m Clay Grey 17.06m-18.59m Sand Water Supply 18.59m-19.81m Sand Dirty Water Supply 19.81m-21.03m Sand Peaty 21.03m-21.64m Peat Clay 21.64m-25.90m Clay Sandy	1196m	North
10125111	0.00m-6.10m sand	1199m	North East
10053381	0.00m-0.30m topsoil 0.30m-3.50m sand, light brown 3.20m-5.00m sand, light silty brown 5.00m-6.00m sand, yellow	1203m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10053909	0.00m-2.00m FILL.GRAVELLY SAND 2.00m-6.20m SAND,MEDIUM GRAINED 6.20m-10.50m SAND,GRAINED,FIRMER THEN ABOVE 10.50m-11.00m CLAYEY PEAT,DARK BROWN 11.00m-16.40m SAND,MEDIUM GRAINED,WHITE,YELLOW 16.40m-21.00m SAND,M/GRAINED,UNIFORM,YELLOW	1207m	North
10065403	0.00m-6.10m sand, unconsolidated	1208m	North East
10119691	0.00m-0.30m Soil 0.30m-16.45m Sand Water Supply 16.45m-18.89m Sand White 18.89m-22.86m Sand Water Supply 22.86m-23.77m Sand White Water Supply 23.77m-24.07m Peat 24.07m-24.09m Clay	1214m	North
10093545	0.00m-6.10m sand	1217m	North East
10053529	0.00m-5.79m san	1219m	North East
10059489	0.00m-3.20m FILLING 3.20m-6.00m SAND	1222m	North East
10132897	0.00m-1.82m Topsoil Sandy 1.82m-5.48m Sand Grey 5.48m-12.80m Sand White Grey 12.80m-19.20m Sand White Yellow 19.20m-21.03m Sand White 21.03m-21.42m Sand White Clayey	1223m	East
10118525	0.00m-6.10m sand	1233m	North East
10140796	0.00m-1.68m Peat 1.68m-2.29m Sand 2.29m-3.96m Sand Yellow Water Supply 3.96m-4.42m Clay Grey 4.42m-9.45m Sand Grey Water Supply 9.45m-11.89m Sand Yellow 11.89m-15.85m Sand White Water Supply 15.85m-15.86m Clay Seam 15.86m-20.42m Sand Light Yellow Clay Bands Water Supply 20.42m-20.73m Clay Grey 20.73m-21.35m Sandstone White Hard	1234m	North
10063162	0.00m-5.80m FILLING,BROWN SAND 5.80m-8.50m SAND,GREY,WHITE,YELLOW,STRONG HYDROCARBON ODOUR	1240m	North East
10057880	0.00m-2.00m FILL,SAND BROWN/S/S,BRICK,CONCRETE 2.00m-3.60m SAND,FINE TO MEDIUM GRAINED 3.60m-11.40m SAND, MEDIUM GRAINED, WHITE,YELLOW 11.40m-11.90m CLAY,PEAT,DARK BROWN 11.90m-15.60m SAND,YELLOW,WHITE 15.60m-21.00m SAND,UNIFORM, WELL ROUNDED	1243m	North
10047433	0.00m-6.10m UNCONSOLIDATED ALL SANDS.	1245m	North East
10077676	0.00m-7.00m Sand	1264m	North East
10060557	0.00m-4.80m FILLING.BROWN SANDY CLAY,DARK GREY 4.80m-7.50m SAND,GREY,STRONG HYDROCARBON ODOUR	1271m	North East
10061032	0.00m-10.36m Unconsolidated Sand. Clay Below 10.36	1274m	North East
10150839	0.00m-2.50m Sand Grey 2.50m-3.00m Sand Dark Brown Indurated 3.00m-6.50m Sand White Water Supply	1274m	North East
10053382	0.00m-1.70m FILL.GRAVELLY SAND 1.70m-4.00m SAND,MEDIUM GRAINED 4.00m-9.60m SAND,YELLOW,WHITE 9.60m-10.00m PEAT LAYER 10.00m-16.40m SAND,MEDIUM GRAINED,YELLOW,WHITE 16.40m-21.00m SAND,UNIFORM,WELL ROUNDED	1297m	North
10020777	0.00m-0.91m Ash 0.91m-1.52m Made Ground 1.52m-4.57m Sand 4.57m-4.87m Peat 4.87m-10.66m Sand 10.66m-21.03m Sand Yellow Water Supply 21.03m-21.33m Peat Water Supply 21.33m-22.55m Sand White Water Supply	1310m	North
10060117	0.00m-1.60m FILLING 1.60m-6.00m SAND	1314m	North East
10133066	0.00m-4.60m FINE QUARTZ SAND 4.60m-5.00m SANDY CLAY	1314m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10046799	0.00m-1.00m FILL,MEDIUM GRAINED SAND,SOME CLAY 1.00m-1.50m FILL,FINE TO MEDIUM GRAINED,YELLOW,GREY 1.50m-3.60m FILL,BECOMING BLACK,YELLOW,GRAVEL 3.60m-4.50m SAND,FINE TO MEDIUM GRAINED 4.50m-5.50m SAND,MEDIUM GRAINED,BLACK,YELLOW,TRACE CLAY 5.50m-6.50m SAND,FINE GRAINED YELLOW,GREY,TRACE ORGANIC 6.50m-7.00m SAND BECOMING FINE TO MEDIUM GRAINED 7.00m-7.50m SAND,FINE GRAINED,YELLOW,GREY 7.50m-8.00m SAND,MEDIUM GRAINED,UNIFORM 8.00m-9.00m SAND,FINE GRAINED,YELLOW,GREY,WELL ROUNDED 9.00m-11.00m SAND MEDIUM GRAINED,UNIFORM,WELL ROUNDED,YELLOW,WHITE.	1319m	North
10033585	0.00m-5.00m SAND	1321m	North East
10059807	0.00m-1.00m FILL,MEDIUM GRAINED SAND,SOME CLAY,GRAVEL,SILT 1.00m-1.50m FILL,FINE TO MEDIUM GRAINED,YELLO GREY,ASH,SILT,GRAVEL 1.50m-3.60m FILL,BECOMING BLACK/YELLOW,GRAVEL,TRACE SILT 3.60m-4.50m SAND,FINE TO MEDIUM GRAINED,UNIFOR,WELL ROUNDED 4.50m-5.50m SAND.MEDIUM GRAINED,BLACK,YELLOW,CLAY,MINOR PEAT LAYER 5.50m-6.50m SAND,FINE GRAINED,YELLOSIW,GREY,ORGANIC GRAINS 6.50m-7.00m SAND BECOMING FINE TO MEDIUM GRAINED 7.00m-7.50m SAND,FINE GRAINED,YELLOW,GREY,ORGANIC GRAINS 7.50m-8.00m SAND,MEDIUM GRAINED,UNIFORM,YELLOW / WHITE 8.00m-9.00m SAND,FINE GRAINED,YELLOW,GREY,WELL ROUNDED 9.00m-11.00m SAND,MEDIUM GRAINED,UNIFORM,WELL ROUNDED,YELLOW/WHITE	1335m	North
10092768	0.00m-7.00m sand	1344m	North East
10040267	0.00m-1.00m Fill 1.00m-6.40m Sand Peaty Water Supply 6.40m-20.80m Sand Water Supply 20.80m-21.00m Clay Dark Grey	1373m	North
10099564	0.00m-7.00m sand	1376m	North East
10100421	0.00m-6.10m Sand, unconsolidated	1383m	North East
10126008	0.00m-1.00m FILL 1.00m-4.50m SAND MED. FINE	1389m	North
10043622	0.00m-4.20m Fill Water Supply 4.20m-21.00m Sand Peaty Water Supply 21.00m-22.00m Clay Dark Grey	1414m	North
10125312	0.00m-1.00m FILL 1.00m-4.50m SAND MED. FINE	1420m	North
10047729	0.00m-4.00m Fill Water Supply 4.00m-13.00m Sand Peaty Water Supply 13.00m-13.50m Peat Water Supply 13.50m-19.00m Sand Peaty Water Supply 19.00m-20.80m Sand Water Supply 20.80m-22.50m Clay Dark Grey Water Supply	1427m	North
10100334	0.00m-6.00m SAND	1429m	North East
10134477	0.00m-9.46m Sand, unconsolidated	1430m	East
10134115	0.00m-1.00m FILL 1.00m-4.50m SAND MED. FINE	1450m	North
10091652	0.00m-12.00m SAND	1451m	East
10107118	0.00m-0.60m Made Ground 0.60m-2.13m Sand Dry 2.13m-3.04m Sand Dry Hard Cemented 3.04m-3.65m Sand Dry Clean 3.65m-6.09m Sand White 6.09m-6.70m Clay White Sandy Water Supply 6.70m-9.14m Sand White Water Supply 9.14m-9.44m Sand Light Brown Water Supply 9.44m-13.10m Sand Light Brown Clay Hard Cemented 13.10m-15.24m Sand Dark Brown Peat Water Supply 15.24m-15.39m Sand Dark Quartz 15.39m-15.84m Sand Dark Hard Cemented 15.84m-16.76m Sand Light Brown Hard Cemented 16.76m-19.81m Sand Light Brown Clay Hard Cemented 19.81m-24.99m Sand Grey Hard Cemented 24.99m-25.29m Sand White Clay Clay Hard Cemented Water Supply 25.29m-26.67m Sand Grey Hard Cemented 26.67m-26.82m Sand Dirty Clay Peaty 26.82m-26.83m Clay	1480m	North East
10138725	0.00m-1.00m FILL 1.00m-4.50m SAND MED. FINE	1485m	North

NGIS Bore ID	Drillers Log	Distance	Direction
10145933	0.00m-0.76m Made Ground 0.76m-1.52m Peat 1.52m-7.62m Sand 7.62m-7.92m Sand Hard Cemented 7.92m-12.98m Sand Water Supply 12.98m-13.28m Wood 13.28m-15.42m Sand 15.42m-15.54m Clay 15.54m-17.67m Sand White 17.67m-19.20m Sand Water Supply 19.20m-20.11m Clay Stiff 20.11m-20.42m Clay Grey 20.42m-20.43m Sandstone	1491m	North
10118924	0.00m-0.50m GRAVELLY CLAY/SAND 0.50m-2.50m SAND 2.50m-6.50m SAND YELLOW/BROWN 6.50m-7.30m PEATY SAND 7.30m-8.00m SAND 8.00m-8.40m PEATY SAND 8.40m-19.00m SAND 19.00m-20.00m PEAT BLACK FIRM	1502m	North
10113828	0.00m-3.65m Sand 3.65m-4.57m Sand Dark Brown 4.57m-7.31m Sand Dry 7.31m-7.92m Sand Dark Brown 7.92m-11.27m Sand Clean 11.27m-13.01m Sand Wet 13.01m-13.16m Clay Grey 13.16m-13.41m Sand Water Supply 13.41m-13.56m Clay Grey Stiff Water Supply 13.56m-19.38m Sand Water Supply 19.38m-19.50m Clay Quartz Gravel 19.50m-20.11m Sand 20.11m-26.51m Sand White Water Supply 26.51m-27.43m Sand White Clay Water Supply 27.43m-28.65m Sand Peaty 28.65m-29.87m Clay Peaty 29.87m-30.48m Sand Dirty Coarse 30.48m-30.78m Clay Grey Dirty Sandy Coarse	1508m	North East
10099362	0.00m-11.59m sand, unconsolidated	1509m	East
10059514	0.00m-3.65m Sand Water Supply 3.65m-3.67m Clay	1512m	North East
10100142	0.00m-8.00m SAND	1515m	North East
10126598	0.00m-1.00m FILL 1.00m-4.50m SAND MED. FINE	1515m	North
10137905	0.00m-1.00m fill 1.00m-4.50m sand med. fine	1515m	North
10128747	0.00m-5.00m SAND	1520m	North East
10093892	0.00m-10.37m sand, unconsolidated	1522m	East
10064815	0.00m-12.00m SAND	1539m	North East
10097389	0.00m-9.00m	1546m	East

NGIS Bore ID	Drillers Log	Distance	Direction
10141865	0.00m-1.21m Sand Dry 1.21m-1.52m Sand Hard Cemented 1.52m-6.70m Sand White 6.70m-6.85m Sand Hard Cemented 6.85m-9.29m Sand White Water Supply 9.29m-9.75m Peat 9.75m-10.97m Sand Dark Grey 10.97m-12.19m Sand Hard Cemented Peaty 12.19m-16.76m Sand Grey Water Supply 16.76m-29.71m Sand Yellow Water Supply 29.71m-30.17m Peat 30.17m-31.08m Sand Light Grey Water Supply 31.08m-31.24m Peat Clay 31.24m-33.98m Sand Grey Water Supply 33.98m-34.74m Peat Hard Fossils:wood 34.74m-35.96m Clay Dark Grey 35.96m-37.33m Sand Dark Grey Clay Seams Water Supply 37.33m-38.55m Clay Grey Shaley 38.55m-39.01m Sand Dark Grey Water Supply 39.01m-43.73m Sand Dark Grey Water Supply 39.01m-43.73m Clay Peat Bands 43.73m-44.50m Clay Light Grey Sandy 44.50m-45.72m Clay Black Stiff 45.72m-47.24m Clay Grey Stiff 47.24m-49.68m Clay Grey Shaley 49.68m-53.34m Sand Grey Coarse Water Supply 53.34m-53.64m Clay Grey	1551m	North
10016957	0.00m-10.00m sand	1564m	East
10057541	0.00m-5.00m sand	1572m	North East
10019565	0.00m-5.80m	1575m	North
10058742	0.00m-5.00m sand	1591m	North East
10070949	0.00m-5.00m sand	1592m	North East
10140266	0.00m-0.30m Ash 0.30m-2.74m Sand Dry 2.74m-3.65m Sand Hard Cemented 3.65m-12.19m Sand 12.19m-14.02m Sand Wet 14.02m-15.54m Clay Sandy 15.54m-17.98m Sand 15.54m-17.98m Clay Waddy 17.98m-18.89m Sand 18.89m-19.81m Peat 19.81m-27.12m Sand Peat Fossils:wood Water Supply 27.12m-30.48m Sand Wood Seams Water Supply 30.48m-31.39m Sand Wood Seams Water Supply 31.39m-31.69m Clay Peaty	1605m	North
10123996	0.00m-1.50m SAND 1.50m-1.80m CLAYEY SAND, DARK GREY 1.80m-2.80m PEAT 2.80m-3.90m SAN DARK BROWN 3.90m-4.30m PEAT 4.30m-8.30m SAND YELLOW, M/GRAIN 8.30m-8.70m PEATY SAND 8.70m-9.70m SAND L/BROWN 9.70m-10.00m PEATY SAND 10.00m-20.00m SAND L/BROWN	1606m	North
10062601	0.00m-5.00m sand	1610m	North
10009374	0.00m-0.61m Topsoil Sandy 0.61m-1.52m Sand Grey 1.52m-12.34m Sand Yellow 12.34m-14.94m Sand Dirty Peaty Water Supply 14.94m-17.68m Sand Water Supply 17.68m-19.20m Peat 19.20m-20.73m Sand Dirty Peaty Water Supply 20.73m-28.04m Sand Peaty Water Supply 28.04m-28.35m Peat 28.35m-32.31m Sand Water Supply 32.31m-33.22m Peat 33.22m-34.75m Sand Grey Water Supply 34.75m-37.80m Clay Dark Grey	1620m	North

NGIS Bore ID	Drillers Log	Distance	Direction
10140642	0.00m-0.60m Made Ground 0.60m-2.74m Sand Clean Dry 2.74m-3.96m Sand Dry Peaty 3.96m-4.87m Sand Dry 4.87m-8.22m Sand White Clean 8.22m-9.75m Sand White Slightly Coloured Pete Water Supply 9.75m-12.80m Sand Very Dirty Pete Water Supply 12.80m-14.32m Sand Peaty Water Supply 14.32m-14.94m Sand Very Dirty Pete Water Supply 14.94m-16.76m Peat Water Supply 16.76m-18.28m Sand Peaty Water Supply 18.28m-21.64m Sand White Clean Water Supply 21.64m-22.25m Sand Water Supply Clay Traces Water Supply 22.25m-25.29m Sand Yellow Clean Water Supply 25.29m-29.57m Sand Grey Slightly Coloured Pete Water Supply 29.57m-32.30m Peat Sand Water Supply	1627m	North
10029276	1.00m-9.00m SAND	1635m	East
10121041	0.00m-1.21m Made Ground 1.21m-3.65m Sand Peaty 3.65m-4.57m Sand Peaty Wet 4.57m-9.14m Sand Dirty 9.14m-10.66m Sand Peaty Water Supply 10.66m-15.24m Sand Dirty 15.24m-19.50m Sand Water Supply 19.50m-20.72m Sand Dirty 20.72m-21.03m Sand Peaty Dirty 21.03m-23.77m Sand Peaty Wood 23.77m-25.90m Sand Peaty 25.90m-27.43m Clay Grey 27.43m-28.95m Sand Dirty Peaty 28.95m-32.91m Sand Dirty 32.91m-33.07m Clay Grey	1649m	North
10136312	0.00m-8.00m SANDS	1663m	East
10103083	0.00m-1.82m Ash Made Ground 1.82m-8.53m Sand Dry 8.53m-10.97m Sand Peaty Hard Cemented 10.97m-12.19m Sand Dark Brown Wet 12.19m-14.32m Sand Hard Cemented Bands 14.32m-15.24m Sand Peaty 15.24m-16.61m Sand Water Supply 16.61m-18.28m Peat Solid 18.28m-20.87m Sand Clean Water Supply 20.87m-23.77m Sand Water Supply 23.77m-24.07m Sand Peat Water Supply 24.07m-27.12m Sand Water Supply 27.12m-27.43m Peat	1664m	North
10022622	0.00m-0.20m CONCRETE 0.20m-0.30m FILL, ROADBASE 0.30m-1.60m SAND,FINE TO MED. GRAINED 1.60m-2.50m SAND,FINE TO MED. GRAINED YELLOW,MOIST 2.50m-3.10m SAND, FINE TO MED,GRAINED, YELLOW,TAN 3.10m-4.00m SAND,FINE TO MED GRAINED, YELLOW,TAN,MOIST	1668m	North
10056188	0.00m-2.26m Clay Sandy Made Ground 2.26m-12.80m Sand White Clean Water Supply 12.80m-13.10m Sandstone Very Soft Weathered	1669m	East
10099725	0.00m-0.10m CONCRETE 0.10m-0.25m FILL, GRAVELLY SAND, GRAVEL M/GRAINED 0.25m-7.50m SAND, FINE TO COARSE, YELLOW L/BROWN	1672m	North
10025539	0.00m-0.20m CONCRETE 0.20m-0.30m FILL, ROADBASE, GRAVEL 0.30m-2.20m SAND, FINE TO MEDIUM GRAINED 2.20m-3.50m SAND, FINE TO MEDIUM GR. L/BROWN 3.50m-4.00m SAND, FINE TO MEDIUM, YELLOW, TAN	1684m	North
10091487	0.00m-7.00m SAND	1688m	East
10116117	0.00m-6.71m UNCOSOLIDATED ALL SANDS	1689m	East
10091626	0.00m-0.20m CONCRETE 0.20m-0.40m ASPHALT 0.40m-1.40m SAND, FINE GRAINED, BROWN AND ORANGE 1.40m-5.00m SAND, FINE GRAINED, LIGHT BROWN 5.00m-7.00m SAND, FINE GRAIN, LIGHT YELLOW, MOIS	1692m	North
10134610	0.00m-13.00m sand 13.00m-14.00m clay	1692m	East

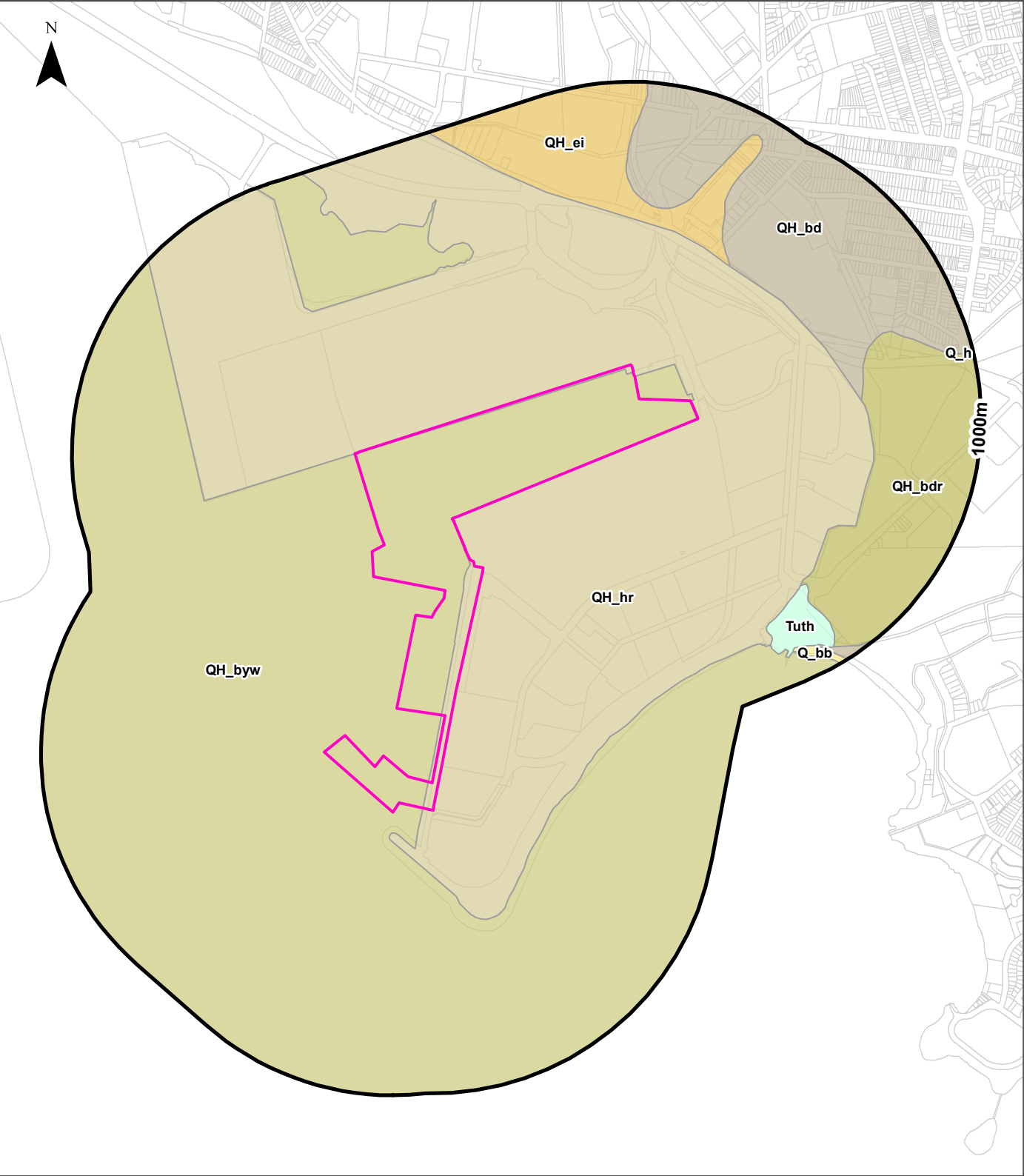
NGIS Bore ID	Drillers Log	Distance	Direction
10002590	0.00m-6.70m Sand Grey Dry 6.70m-8.83m Sand Peaty Wet 8.83m-9.14m Sand Hard Cemented 9.14m-12.80m Sand Water Supply 12.80m-15.84m Sand Grey Peat 15.84m-16.45m Peat 16.45m-17.98m Peat Sandy Water Supply 17.98m-24.68m Sand Water Supply 24.68m-25.60m Sand Peaty 25.60m-26.82m Sand Wood 26.82m-27.43m Sand Dirty 26.82m-27.43m Peat 27.43m-27.82m Clay Peaty	1693m	North
10052173	0.00m-9.50m sand	1698m	East
10134598	0.00m-7.31m UNCONSOLIDATED ALL SANDS	1704m	East
10142303	0.00m-2.43m Sand 2.43m-4.57m Sand White 4.57m-11.58m Sand Light Brown Water Supply 11.58m-11.89m Sand Hard Cemented Pete 11.89m-15.24m Quartz Small Sand Water Supply 15.24m-16.15m Peat 16.15m-19.81m Sand White Fine Water Supply 19.81m-21.33m Sand Yellow Water Supply 21.33m-26.51m Sand White Fine Water Supply 26.51m-27.43m Clay Sandy Some Peat 27.43m-28.04m Sand Clay	1704m	North East
10051581	0.00m-4.87m Sand White 4.87m-6.09m Sand Yellow	1705m	East
10023272	0.00m-0.20m FILL, GRAVEL 0.20m-2.00m SAND, FINE TO MEDIUM GRAINED. 2.00m-3.00m SAND, FINE TO MEDIUM GRAINED, YELLOW 3.00m-3.60m SAND, F/TO MEDIUM GR. L/BROWN. MOIST 3.60m-7.00m SAND, FINE TO MEDIUM, GR. TAN, MOIST	1706m	North
10123635	0.00m-8.00m Sand	1713m	East
10114892	0.00m-0.45m Sand Peaty Dry 0.45m-2.43m Sand White Dry 2.43m-7.01m Sand Clean 7.01m-7.31m Peat 7.31m-7.92m Sand Clean 7.92m-8.22m Sand Peaty Dry 8.22m-10.97m Sand 10.97m-13.71m Sand Wet Water Supply 13.71m-13.86m Clay Bands Water Supply 13.86m-17.67m Sand Water Supply 17.67m-17.98m Clay Peaty Bands 17.98m-23.46m Sand Water Supply 23.46m-23.77m Sand White Water Supply 23.77m-26.21m Sand White 23.77m-26.21m Clay Sandy Bands 26.21m-32.15m Sand White Water Supply 32.15m-32.61m Clay Peaty 32.61m-32.91m Sand Dirty 32.91m-34.38m Clay Dark Grey Stiff	1714m	North East
10140179	0.00m-3.35m Sand 3.35m-3.96m Sand Hard Cemented 3.96m-4.57m Sand Water Supply	1728m	East
10020545	0.00m-12.00m SAND	1731m	East
10021361	0.00m-0.20m CONCRETE 0.20m-0.40m FILL, ROADBASE 0.40m-2.00m SAND, FINE TO MEDIUM, GRAINED, L/GREY 2.00m-2.20m SAND, FINE TO MED. GRAINED 2.20m-3.50m SAND, FINE TO MED GR. MOIST 3.50m-5.00m SAND FINE TO MED. L/GREY 5.00m-7.00m SAND, FINE TO MED GR. WET, SWEET ODOUR	1731m	North
10101535	0.00m-1.37m Sand 1.37m-1.52m Sand Grey 1.52m-3.81m Sand Peaty Hard Cemented 3.81m-4.87m Sand Light Brown 4.87m-7.01m Sand Clayey Peaty 7.01m-7.31m Sand Grey Clayey 7.31m-8.22m Sand Grey 8.22m-9.75m Sand Peaty 9.75m-19.20m Sand Light Brown Grey 19.20m-22.55m Sand Light Brown Water Supply 22.55m-31.08m Sand Grey Slightly Peaty Water Supply	1748m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10088245	0.00m-0.20m CONCRETE 0.20m-0.40m GRAVELLY SAND,WELL GRADED 0.40m-0.90m SAND, DARK BROWN 0.90m-1.30m SAND,FINE GRAINED 1.30m-2.20m SAND,BROWN, FINE GRAINED 2.20m-7.00m SAND,YELLOW,WHITE,VERY MOIST	1754m	North
10027044	0.00m-0.20m CONCRETE 0.20m-0.40m FILL,ROADBASE 0.40m-2.00m SAND,L/GREY/BROWN,TAN,MOIST 2.00m-3.50m SAND,ORANGE/BROWN,MOIST 3.50m-5.50m SAND,LIGHT,ORANGE,TAN 5.50m-7.80m SAND,L/TAN,FINE TO MED.	1761m	North
10100408	0.00m-0.15m CONCRETE 0.15m-0.40m FILL,GRAVELLY SAND,FINE TO COARSE,GRAVEL FINE TO MEDIUM GRAINED 0.40m-2.20m SAND,FINE TO COARSE GRAINED,L/BROWN 2.20m-2.60m SAND,FINE TO MEDIUM GRAINED DARK BROWN 2.60m-3.40m SAND,FINE TO MEDIUM GRAINED,ORANGE BROWN 3.40m-5.10m SAND,FINE TO COARSE GRAINED,YELLOW L/BROWN 5.10m-7.00m SAND	1765m	North
10019999	0.00m-12.81m SAND, UNCONSOLIDATED	1777m	East
10098019	0.00m-0.20m CONCRETE 0.20m-0.30m GRAVELLY SAND DARK BROWN 0.30m-7.00m SAND,DARK,BROWN,WET,WHITE,MOIST	1778m	North
10141178	0.00m-8.53m Sand Dry 8.53m-10.97m Sand Wet 10.97m-11.88m Clay Grey Sandy 11.88m-14.63m Clay Sandy Water Supply 14.63m-19.81m Sand Water Supply 19.81m-24.99m Sand White Water Supply 24.99m-29.56m Sand Light Brown Water Supply 29.56m-30.08m Sand Clay Bands	1780m	North
10127045	0.00m-12.00m sand	1800m	East
10121089	0.00m-7.31m Sand White Dry 7.31m-9.14m Sand Dark Grey Water Supply 9.14m-10.36m Sand Dark Brown Water Supply 10.36m-16.61m Sand Water Supply 16.61m-18.28m Peat Wood Dry 18.28m-21.33m Sand Grey Clean Water Supply 21.33m-24.99m Sand Light Brown Water Supply 24.99m-26.21m Sand Dark Brown Water Supply 26.21m-28.04m Sand Dark Grey Water Supply 28.04m-34.13m Sand Dark Brown Peat Water Supply 34.13m-34.15m Clay Peaty	1804m	North
10125643	0.00m-0.30m FILL 0.30m-1.70m PEAT BLACK 1.70m-3.00m PEATY SAND DARK BROWN 3.00m-7.80m SAND BROWN M/GRAINED 7.80m-8.30m SANDY PEAT ,PEATY SAND 8.30m-9.20m SAND YELLOW 9.20m-12.00m SAND LIGHT YELLOW 12.00m-12.60m SANDY PEAT 12.60m-15.50m SAND 15.50m-16.40m SANDY PEAT 16.40m-20.00m SAND L/YELLOW,L/BROWN	1818m	North
10126120	0.00m-0.20m CONCRETE 0.20m-0.50m SAND,FINE GRAINED,BROWN,FEW GRAVEL 0.50m-7.00m SAND,BROWN,FINE GRAINED,WHITE,WET,STRONG HYDROCARBON ODOUR	1820m	North
10144523	0.00m-0.91m Made Ground Sand 0.91m-1.37m Sand 1.37m-2.74m Peat 2.74m-6.09m Sand Dirty 6.09m-10.66m Sand Wet 10.66m-13.71m Sand Water Supply 13.71m-15.24m Sand Clay Bands 15.24m-21.64m Sand Water Supply 21.64m-23.16m Sand White Water Supply 23.16m-23.40m Sand White 23.40m-23.46m Clay White Bands 23.46m-26.21m Sand White Water Supply 26.21m-28.83m Sand White Clay Bands	1838m	North

NGIS Bore ID	Drillers Log	Distance	Direction
10101568	0.00m-0.91m Made Ground 0.91m-4.57m Sand 4.57m-7.62m Sand Peaty 7.62m-13.71m Sand Clean 13.71m-14.93m Sand Peaty 14.93m-18.89m Sand 18.89m-19.81m Sand Peaty 19.81m-23.77m Sand 23.77m-28.34m Sand White 28.34m-28.65m Sand Clayey 28.65m-28.95m Clay Peaty 28.95m-29.56m Clay Grey 29.56m-30.78m Sand Grey 30.78m-35.05m Sand White 35.05m-35.08m Clay	1840m	North
10013103	0.00m-0.91m Made Ground 0.91m-4.57m Sand Dirty 4.57m-9.44m Sand Peaty 9.44m-14.02m Sand Peaty Peat Wood Water Supply 14.02m-17.06m Sand Yellow Peat Water Supply 17.06m-17.67m Peat Wood Water Supply 17.67m-19.50m Sand Peaty Water Supply 19.50m-22.55m Sand Yellow Clean Water Supply 22.55m-26.21m Sand Yellow Peat Water Supply 26.21m-29.56m Sand White Peat Bands Water Supply 29.56m-29.71m Clay Grey	1850m	North
10117200	0.00m-1.82m Sand 1.82m-9.14m Sand Dry 9.14m-11.58m Sand Black 9.14m-11.58m Peat Some 11.58m-12.34m Clay Black 12.34m-16.15m Sand Grey Water Supply 16.15m-16.76m Sand Hard Cemented 16.76m-18.28m Sand Dry 18.28m-19.65m Clay 19.65m-24.99m Sand Grey Water Supply 24.99m-26.82m Sand Water Supply 26.82m-28.65m Sand Pete Water Supply 28.65m-34.75m Sand Grey Pete Water Supply	1855m	North
10129224	0.00m-0.17m CONCRETE 0.17m-0.40m FILL, GRAVELLY SAND 0.40m-1.50m SAND, NATURAL, BROWN, FINE 1.50m-3.60m SAND, NATURAL, LIGHT GREY, FINE	1857m	North
10034639	0.00m-6.00m BOTANY SAND	1859m	North West
10100001	0.00m-13.00m sand	1861m	North East
10120257	0.00m-0.76m Soil Black Sandy Made Ground 0.76m-2.43m Sand Light Brown 2.43m-3.65m Sand Grey Dirty 3.65m-11.36m Sand Light Brown Water Supply 11.36m-12.58m Peat 12.58m-15.24m Sand Dark Brown Water Supply 15.24m-26.82m Sand Grey Clean 26.82m-26.97m Peat 26.97m-28.19m Sand Dark Grey 28.19m-28.28m Peat 28.28m-31.85m Sand 31.85m-32.30m Clay Grey Sandy	1864m	North
10121347	0.00m-0.20m CONCRETE 0.20m-0.70m SAND, NATURAL, DARK GREY, FINE TO MEDIUM GRAINED 0.70m-1.80m SAND, NATURAL, LIGHT GREY, FINE TO MEDIUM GRAINED 1.80m-3.60m SAND, NATURAL, DARK BROWN, FINE TO MEDIUM GRAINED	1867m	North
10121609	0.00m-0.20m CONCRETE 0.20m-1.50m SAND, NATURAL, DARK, RED/BROWN, FINE TO MEDIUM GRAINED 1.50m-3.60m SAND, NATURAL, LIGHT GREY, FINE TO MEDIUM GRAINED	1877m	North
10122732	0.00m-0.20m CONCRETE 0.20m-0.90m SAND, NATURAL, BLACK, FINE TO MEDIUM GRAINED 0.90m-2.50m SAND, NATURAL, RED/BROWN, FINE TO MEDIUM GRAINED 2.50m-3.60m SAND, NATURAL, LIGHT GREY, FINE TO MEDIUM GRAINED	1889m	North
10122596	0.00m-0.20m CONCRETE 0.20m-0.50m SAND, NATURAL, DARK GREY, FINE TO MEDIUM GRAINED 0.50m-1.60m SAND, NATURAL, RED/BROWN, FINE TO MEDIUM GRAINED 1.60m-3.60m SAND NATURAL, LIGHT GREY, FINE TO MEDIUM GRAINED	1894m	North
10119301	0.00m-11.89m UNCONSOLIDATED SAND	1910m	North
10125468	0.00m-9.15m Sand, unconsolidated	1911m	North East
10125841	0.00m-9.15m UNCONSOLIDATED SAND	1925m	North East

NGIS Bore ID	Drillers Log	Distance	Direction
10111528	0.00m-10.00m sand	1929m	North East
10125041	0.00m-6.00m Brown Sand	1958m	North
10112932	0.00m-2.74m Sand 2.74m-2.89m Peat 2.89m-6.09m Sand Dirty 6.09m-10.66m Sand Dirty 10.66m-11.58m Sand Peaty 11.58m-13.71m Sand Dirty Water Supply 13.71m-14.63m Sand Clean Water Supply 14.63m-15.24m Peat 15.24m-16.76m Sand Dirty Peaty Water Supply 16.76m-18.59m Sand Peaty Water Supply 18.59m-24.38m Sand Clean Water Supply 24.38m-24.99m Wood Peaty 24.99m-26.21m Sand Dirty Water Supply 26.21m-26.82m Peat 26.82m-28.04m Sand Clean Water Supply 28.04m-28.65m Clay Peaty 28.65m-29.87m Sand Water Supply 29.87m-30.93m Sand Dirty Water Supply 30.93m-30.96m Clay Peaty	1962m	North
10057212	0.00m-5.00m sand	1970m	North East
10128731	0.00m-4.00m SAND	1980m	East
10125693	0.00m-5.00m SAND	1989m	North West

Drill Log Data Source: Bureau of Meteorology; Water NSW. Creative Commons 3.0 © Commonwealth of Australia <http://creativecommons.org/licenses/by/3.0/au/deed.en>



Legend		Linear Geological Structures and Boundaries	
Site Boundary	Trendline	Marker Bed	Miscellaneous Boundary
Report Buffer	Fold Axis	Faulted Boundary	Water/Coastline Boundary
Property Boundary	Geological Boundary	Shear Zone or Schist Zone Boundary	State/Territory Border

Scale: 0 100 200 400 600 800 1,000 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2024	Coordinate System: GDA 1994 MGA Zone 56	Date: 16 October 2024
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Geology

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Geological Units

Geological units within the dataset buffer:

Code	Unit Name	Description	Stratigraphy	Age Range	Dominant Lithology	Dist	Dir
QH_byw	Coastal deposits - bay sand sheet (subaqueous)	Medium- to fine-grained quartzose sand; slightly shelly; well-sorted.	/Coastal deposits//Coastal deposits - bay sand sheet/Coastal deposits - bay sand sheet (subaqueous)/	Holocene (base) to Now (top)	Sand	0m	On-site
QH_hr	Anthropogenic deposits - reclaimed estuarine areas	Natural surface elevation raised by placement of fill over former estuarine swamps and subaqueous estuarine margins (supratidal to subtidal zone); estuarine banks and islands formed from dredge spoil.	/Anthropogenic deposits//Anthropogenic deposits - reclaimed estuarine areas//	Holocene (base) to Now (top)	Anthropogenic material	0m	On-site
QH_bd	Coastal deposits - dune facies	Marine-deposited and aeolian-reworked coastal sand dunes.	/Coastal deposits//Coastal deposits - dune facies//	Holocene (base) to Now (top)	Sand	472m	North East
QH_ei	Estuarine interbarrier creek deposits	Fine- to medium-grained lithic-carbonate-quartz sand (marine-deposited), silt, clay, organic mud, peat, gravel, shell material.	/Estuarine deposits//Estuarine interbarrier creek deposits//	Holocene (base) to Now (top)	Clastic sediment	487m	North
QH_bdr	Coastal deposits - bedrock-mantling dune facies	Marine-deposited and aeolian-reworked fine- to coarse-grained quartz-lithic sand with abundant carbonate, sporadic humic debris in stabilised dunes.	/Coastal deposits//Coastal deposits - dune facies/Coastal deposits - bedrock-mantling dune facies/	Holocene (base) to Now (top)	Sand	581m	East
Tuth	Hawkesbury Sandstone	Medium- to coarse-grained quartz sandstone displaying small- to large-scale, high-angle cross-bedding; minor shale and laminite lenses.	/Ungrouped Triassic units//Hawkesbury Sandstone//	Anisian (base) to Anisian (top)	Sandstone	692m	East
Q_bb	Coastal deposits - beach facies	Marine-deposited quartz-lithic fine- to medium-grained sand, shell and shell material, polymictic gravel.	/Coastal deposits//Coastal deposits - beach facies//	Quaternary (base) to Now (top)	Sand	878m	East
Q_h	Anthropogenic deposits	Anthropocene deposits varying from large man-made clasts (concrete blocks to building demolition rubble) to quarried natural boulders, with interstitial sand-sized to clay matrix.	/Anthropogenic deposits////	Quaternary (base) to Now (top)	Anthropogenic material	997m	East

Geology

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Linear Geological Structures

Fault and shear or schist zone boundaries within the dataset buffer:

Map ID	Boundary Type	Feature Description	Fault Dip Angle	Fault Dip Direction	Dist	Dir
NA	No records in buffer					

Trendlines within the dataset buffer:

Map ID	Feature Description	Observation Method	Structure Name	Dist	Dir
NA	No records in buffer				

Fold axes within the dataset buffer:

Map ID	Feature Description	Observation Method	Structure Name	Dist	Dir
NA	No records in buffer				

Marker beds within the dataset buffer:

Map ID	Feature Description	Rock Unit Description	Dist	Dir
NA	No records in buffer			

Geological Data Source: Statewide Seamless Geology v2.4, NSW Department of Primary Industries and Regional Development
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Naturally Occurring Asbestos Potential

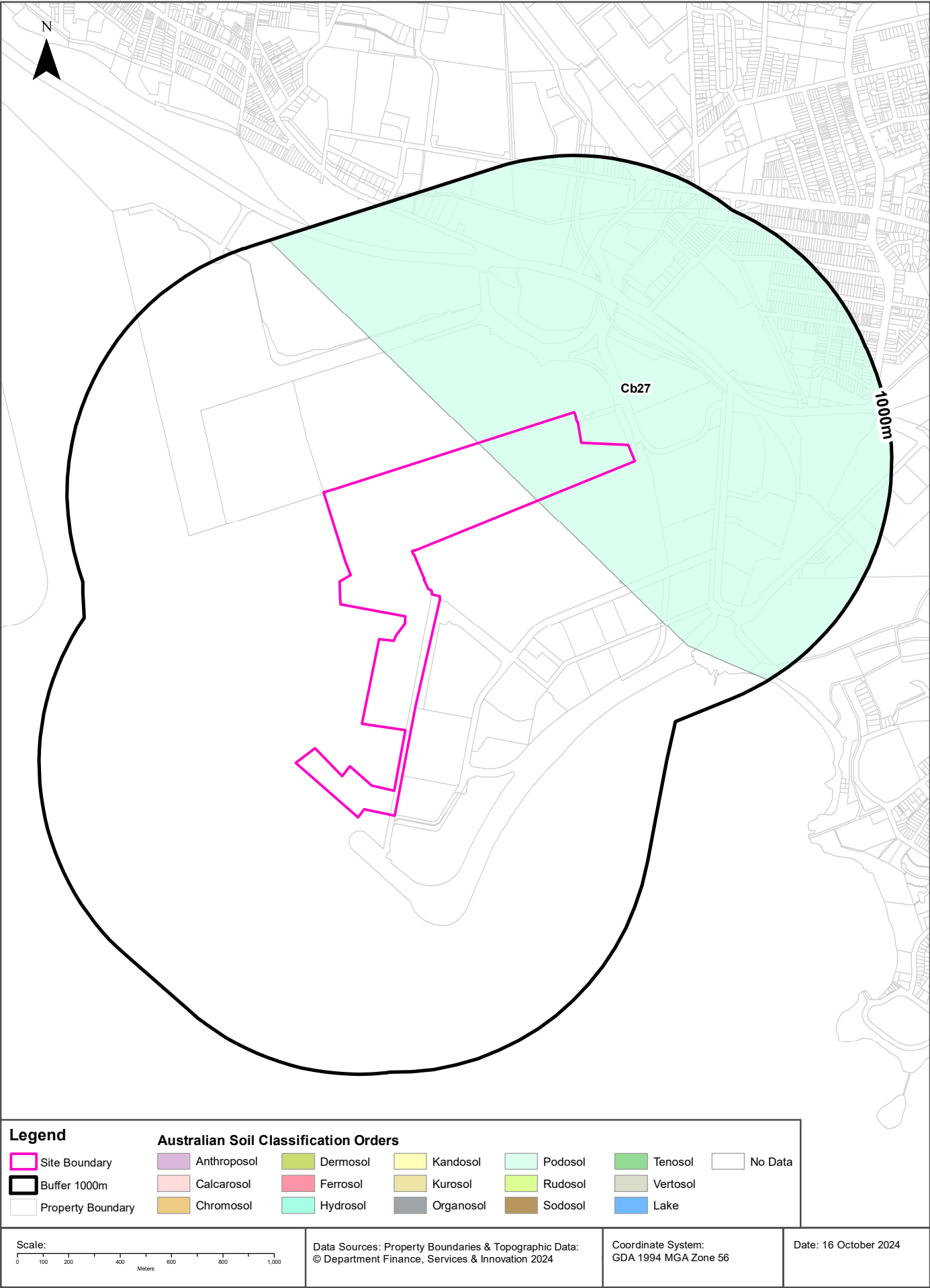
Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Naturally Occurring Asbestos Potential

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy



Soils

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Atlas of Australian Soils

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

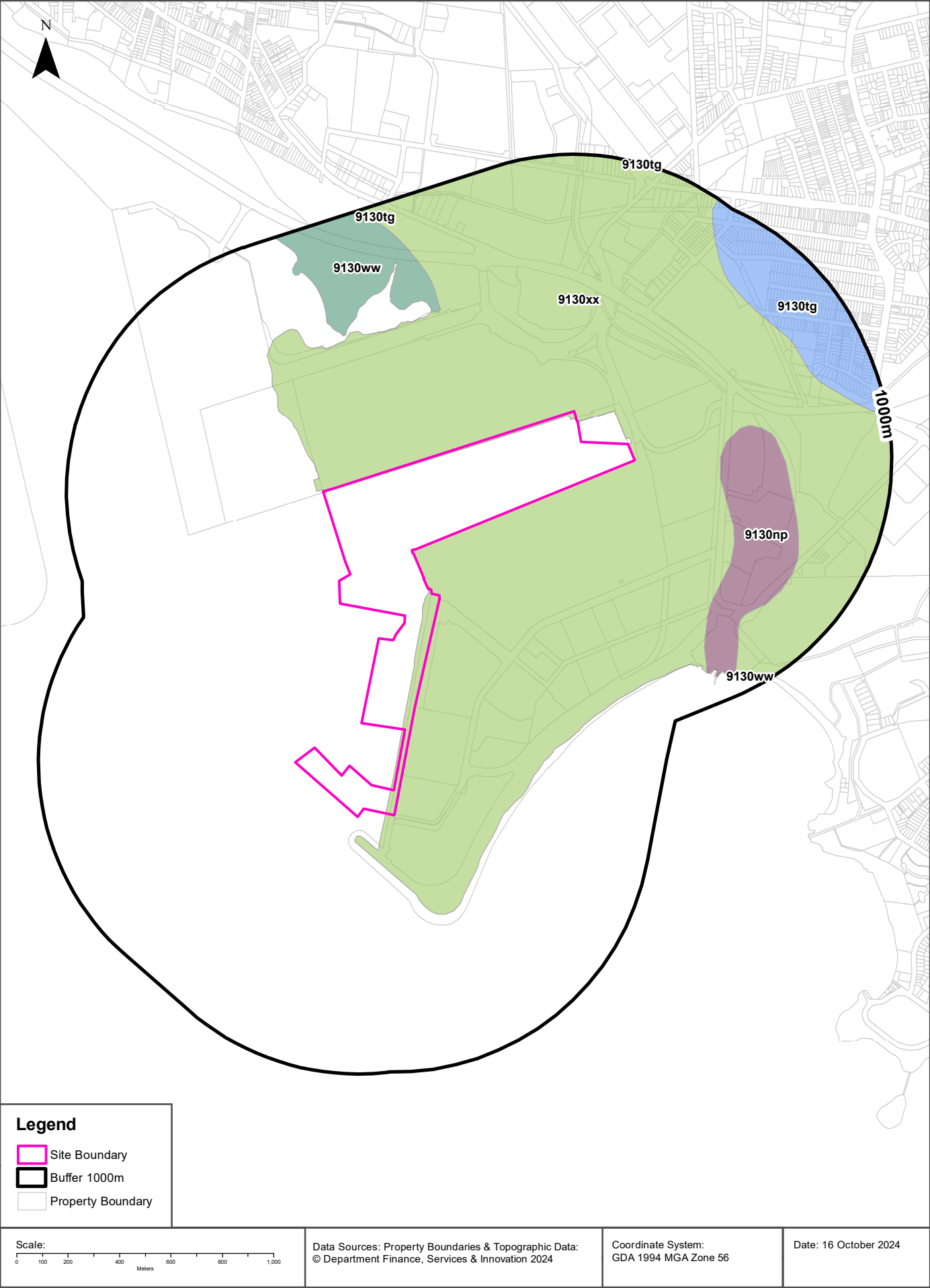
Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Cb27	Podosol	Coastal sand plains and dunes, lagoons, and swampy areas: chief soils are leached sands (Uc2.3 and Uc2.2). Associated are dunes of siliceous sands (Uc1.2) and/or calcareous sands (Uc1.l) fringing the coastline; and swampy areas of (Uf6) soils and (Uc1.2) soils with peaty surfaces. Unit Cb27 has similarities with units Cb28 and Ca6.	0m	On-site

Atlas of Australian Soils Data Source: CSIRO

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Soil Landscapes of Central and Eastern NSW

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Soils

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Soil Landscapes of Central and Eastern NSW

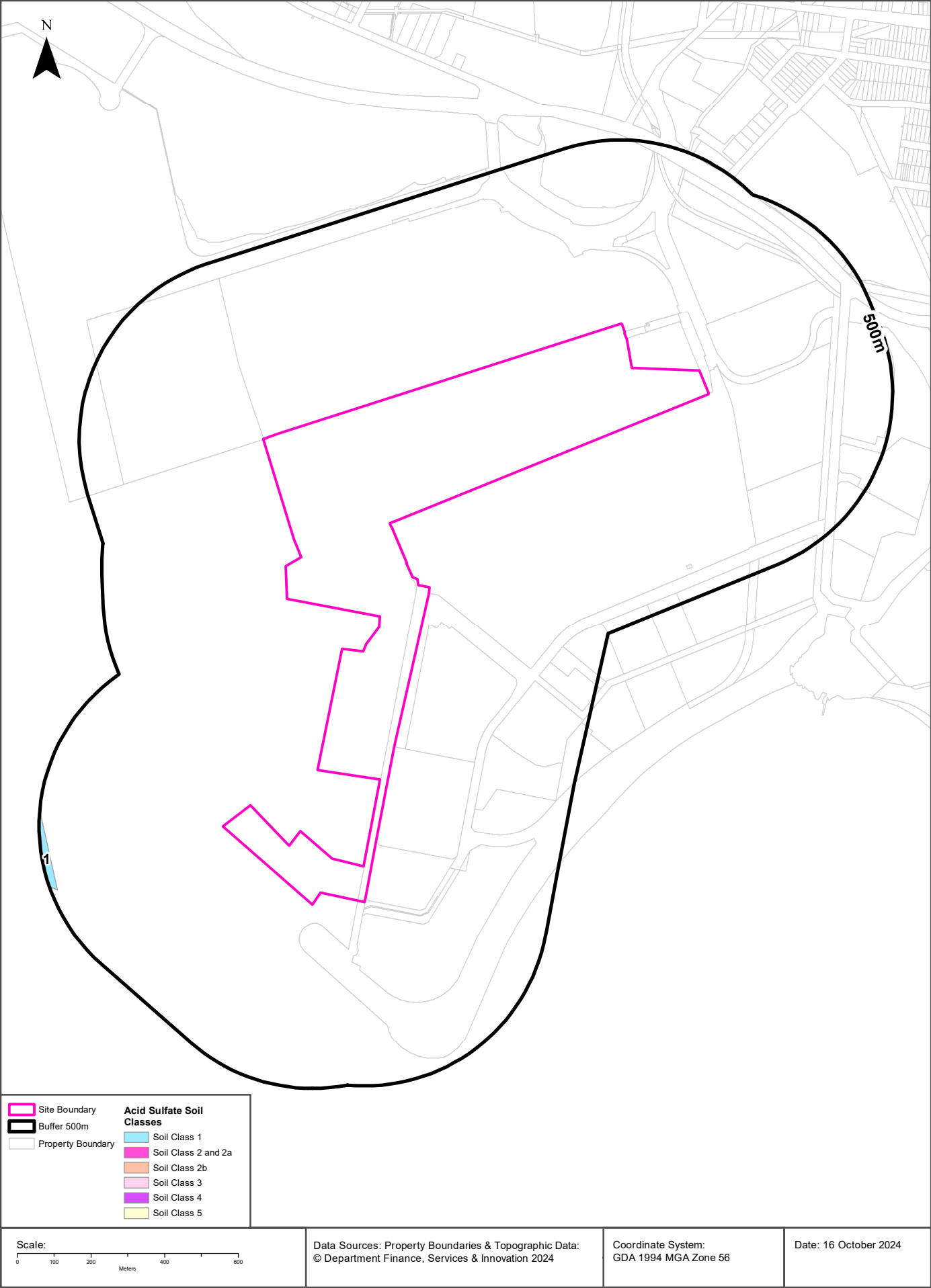
Soil Landscapes of Central and Eastern NSW within the dataset buffer:

Soil Code	Name	Distance	Direction
9130xx	Disturbed Terrain	0m	On-site
9130np	Newport	331m	East
9130ww	Woy Woy	532m	North
9130tg	Tuggerah	719m	North East

Soil Landscapes of Central and Eastern NSW: NSW Department of Planning, Industry and Environment
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Acid Sulfate Soils

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Acid Sulfate Soils

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Environmental Planning Instrument - Acid Sulfate Soils

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

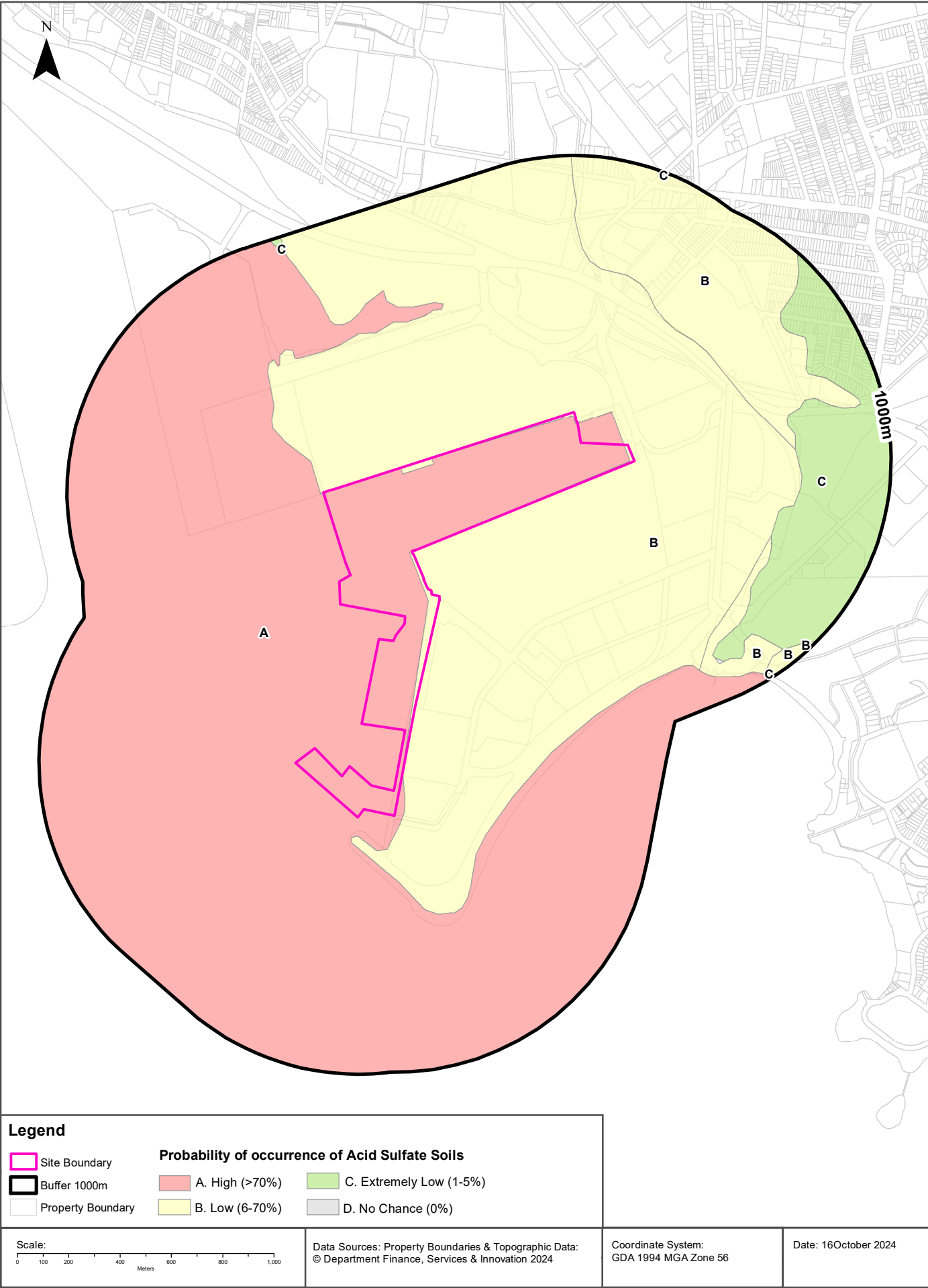
Soil Class	Description	EPI Name
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

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Acid Sulfate Soils

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Atlas of Australian Acid Sulfate Soils

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
A	High Probability of occurrence. >70% chance of occurrence.	0m	On-site
B	Low Probability of occurrence. 6-70% chance of occurrence.	0m	On-site
C	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	593m	East

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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Dryland Salinity

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Dryland Salinity - National Assessment

Is there Dryland Salinity - National Assessment data onsite?

No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

No

What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A		

Dryland Salinity Data Source : National Land and Water Resources Audit

The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.

In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

Mining

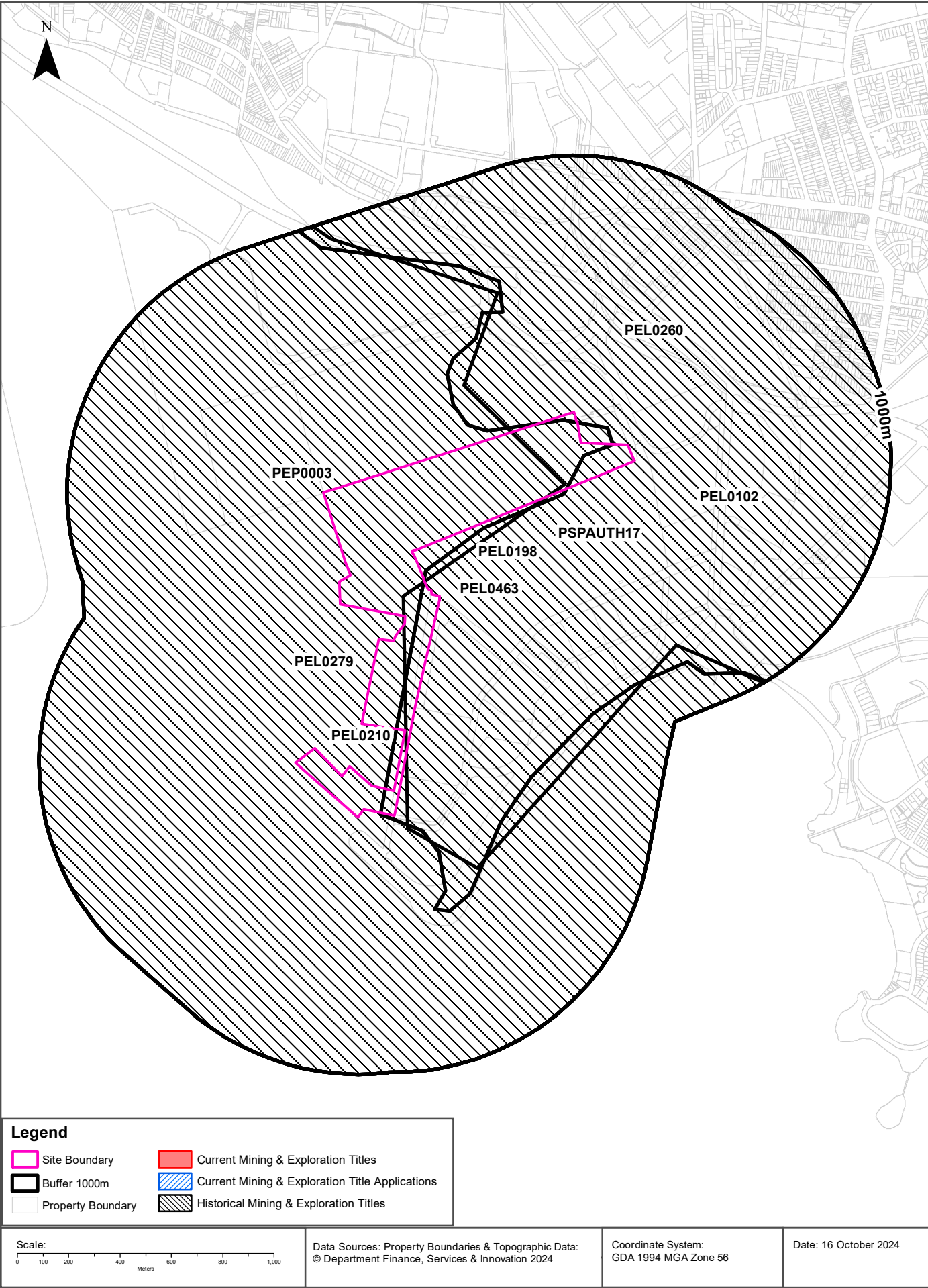
Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Mining Subsidence Districts

Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016)
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Mining

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Current Mining & Exploration Titles

Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

Current Mining & Exploration Title Applications

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

Mining

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Historical Mining & Exploration Titles

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
PEL0210	THE AUSTRALIAN GAS LIGHT COMPANY (AGL), NORTH BULLI COLLIERIES PTY LTD			PETROLEUM	Petroleum	0m	On-site
PSPAUTH17	MACQUARIE ENERGY PTY LTD	20070803	20080703	PETROLEUM	Petroleum	0m	On-site
PEL0260	NORTH BULLI COLLIERIES PTY LTD, AGL PETROLEUM OPERATIONS PTY LTD, THE AUSTRALIAN GAS LIGHT CO.	19810909	19930803	PETROLEUM	Petroleum	0m	On-site
PEL0102	AUSTRALIAN OIL AND GAS CORPORATION LTD			PETROLEUM	Petroleum	0m	On-site
PEL0198	JOHN STREVS (TERRIGAL) NL			PETROLEUM	Petroleum	0m	On-site
PEP0003	LONGREACH OIL LTD, ENDEAVOUR OIL COMPANY NL, RESOURCE EXPLORATION NL, LASKAN MINERALS PTY LTD			PETROLEUM	Petroleum	0m	On-site
PEL0463	DART ENERGY (APOLLO) PTY LTD	20091010	20150603	PETROLEUM	Petroleum	0m	On-site
PEL0279	THE ELECTRICITY COMMISSION OF NSW (TRADING AS PACIFIC POWER)	19910504	19931111	PETROLEUM	Petroleum	0m	On-site

Historical Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

State Environmental Planning Policy

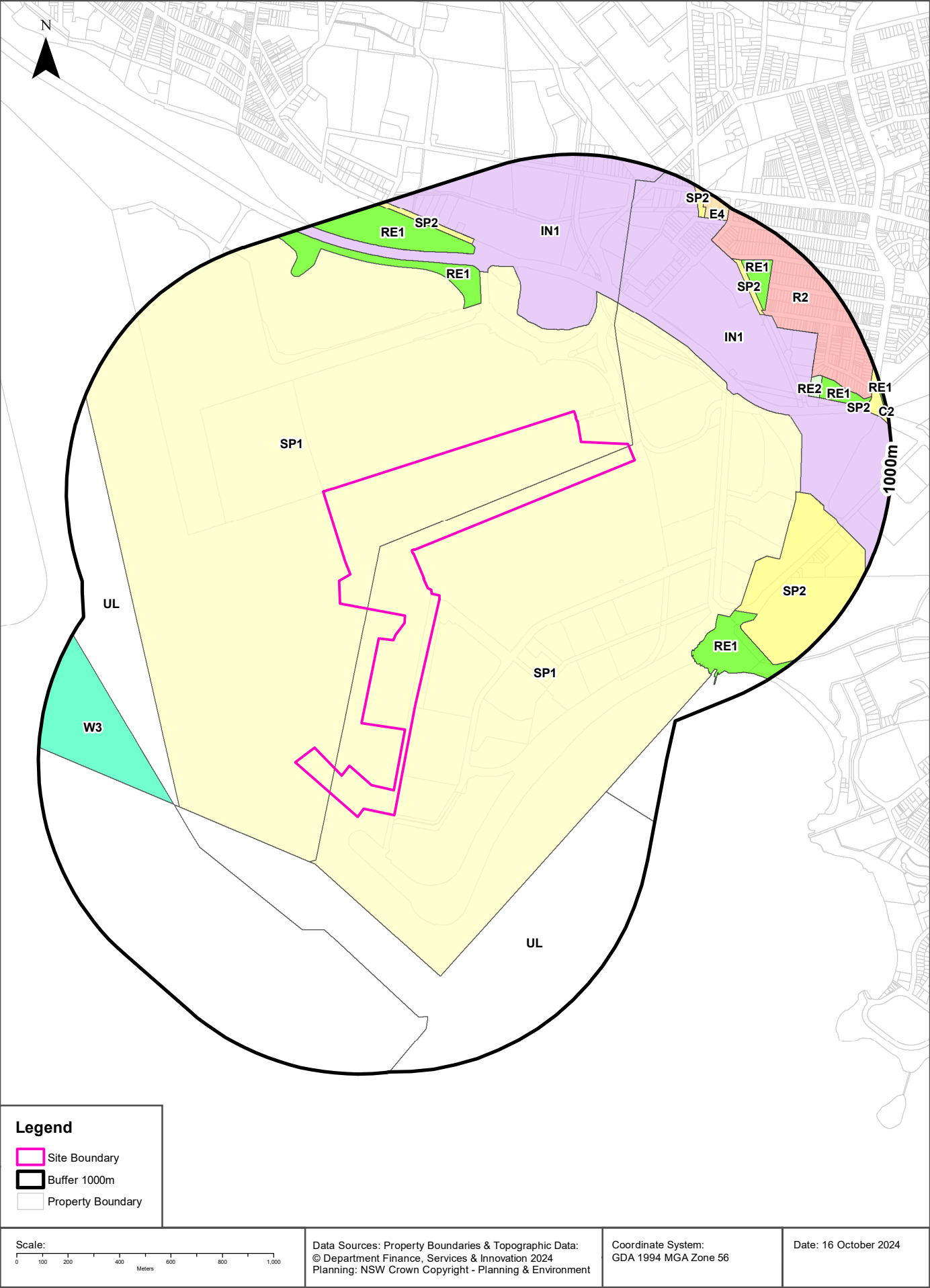
Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

State Significant Precincts

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment
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Environmental Planning Instrument

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Land Zoning

What EPI Land Zones exist within the dataset buffer?

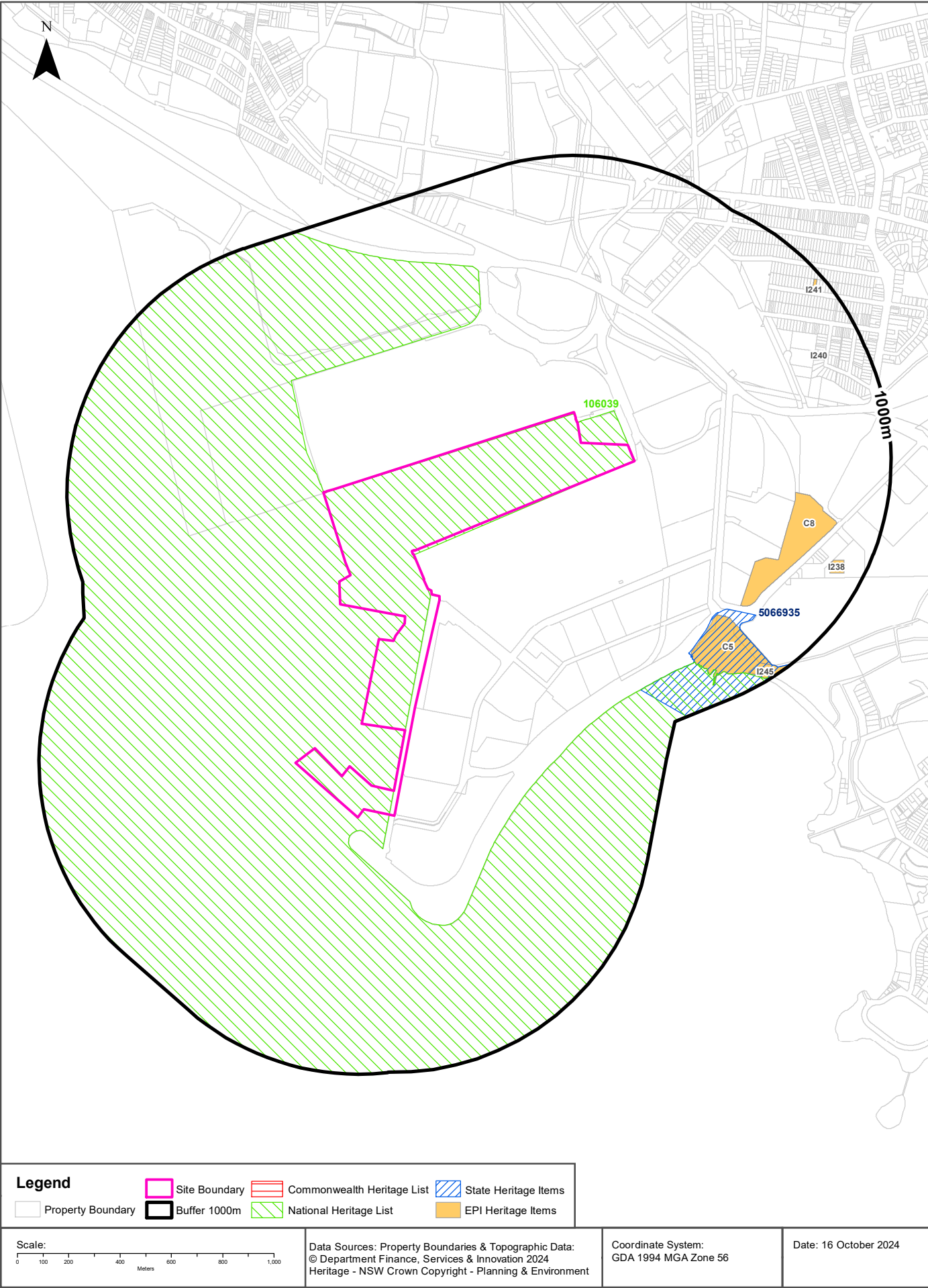
Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
SP1	Special Activities		State Environmental Planning Policy (Transport and Infrastructure) 2021	08/07/2022	08/07/2022	26/08/2022	State Environmental Planning Policy (Transport and Infrastructure) Amendment (Three Ports) 2022	0m	On-site
UL	Unzoned Land		State Environmental Planning Policy (Transport and Infrastructure) 2021	08/07/2022	08/07/2022	26/08/2022	State Environmental Planning Policy (Transport and Infrastructure) Amendment (Three Ports) 2022	248m	South
IN1	General Industrial		State Environmental Planning Policy (Transport and Infrastructure) 2021	08/07/2022	08/07/2022	26/08/2022	State Environmental Planning Policy (Transport and Infrastructure) Amendment (Three Ports) 2022	317m	North
IN1	General Industrial		State Environmental Planning Policy (Transport and Infrastructure) 2021	08/07/2022	08/07/2022	26/08/2022	State Environmental Planning Policy (Transport and Infrastructure) Amendment (Three Ports) 2022	434m	North East
UL	Unzoned Land		State Environmental Planning Policy (Transport and Infrastructure) 2021	08/07/2022	08/07/2022	26/08/2022	State Environmental Planning Policy (Transport and Infrastructure) Amendment (Three Ports) 2022	480m	West
W3	Working Waterways		Bayside Local Environmental Plan 2021	21/04/2023	26/04/2023	06/09/2024	Map Amendment No 3	501m	South West
RE1	Public Recreation		State Environmental Planning Policy (Transport and Infrastructure) 2021	08/07/2022	08/07/2022	26/08/2022	State Environmental Planning Policy (Transport and Infrastructure) Amendment (Three Ports) 2022	514m	North
SP2	Infrastructure	Cemetery	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	611m	East
RE1	Public Recreation		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	679m	East
RE1	Public Recreation		Bayside Local Environmental Plan 2021	21/04/2023	26/04/2023	06/09/2024	Map Amendment No 3	703m	North
SP2	Infrastructure	Electricity Distribution	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	717m	North East

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
RE2	Private Recreation		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	720m	East
R2	Low Density Residential		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	728m	North East
RE1	Public Recreation		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	740m	North East
SP2	Infrastructure	Classified Road	Bayside Local Environmental Plan 2021	21/04/2023	26/04/2023	06/09/2024	Map Amendment No 3	741m	North
RE1	Public Recreation		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	756m	East
SP2	Infrastructure	Classified Road	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	868m	East
SP2	Infrastructure	Electricity Distribution	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	897m	North East
E4	General Industrial		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	907m	North East
RE1	Public Recreation		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	986m	East
C2	Environmental Conservation		Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	01/09/2023	Amendment No 9	990m	East

Environmental Planning Instrument Data Source: NSW Crown Copyright - Planning & Environment
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Heritage Items

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Heritage

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Commonwealth Heritage List

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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National Heritage List

What are the National Heritage List Items located within the dataset buffer?

Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
106039	Botany Bay	Foreshore Rd, Botany NSW	1/16/007/0013	Historic	Nomination now ineligible for PPAL		0m	On-site

Heritage Data Source: Australian Government Department of the Environment and Energy - Heritage Branch
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State Heritage Register - Curtilages

What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5066935	Gooriwal (Frenchmans Bay and Yarra Bay) Cultural Landscape	Phillip Bay	RANDWICK	28/06/2024	02090	3298	673m	South East

Heritage Data Source: NSW Crown Copyright - Office of Environment & Heritage
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Environmental Planning Instrument - Heritage

What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
C8	Bunnerong Power Station	Conservation Area - General	Local	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	08/12/2023	610m	East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
C5	Kamay Botany Bay National Park (Botany Bay National Park, La Perouse Headland, Yarra & Frenchman's Bay)	Conservation Area - General	State	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	08/12/2023	677m	East
I240	Post-war brick house	Item - General	Local	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	08/12/2023	803m	North East
I238	Eastern Suburbs Crematorium	Item - General	Local	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	08/12/2023	858m	East
I245	Yarra Bay Beach and Reserve	Item - General	Local	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	08/12/2023	923m	East
I241	Late modern house	Item - General	Local	Randwick Local Environmental Plan 2012	18/08/2023	01/09/2023	08/12/2023	936m	North East

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Natural Hazards

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Bush Fire Prone Land

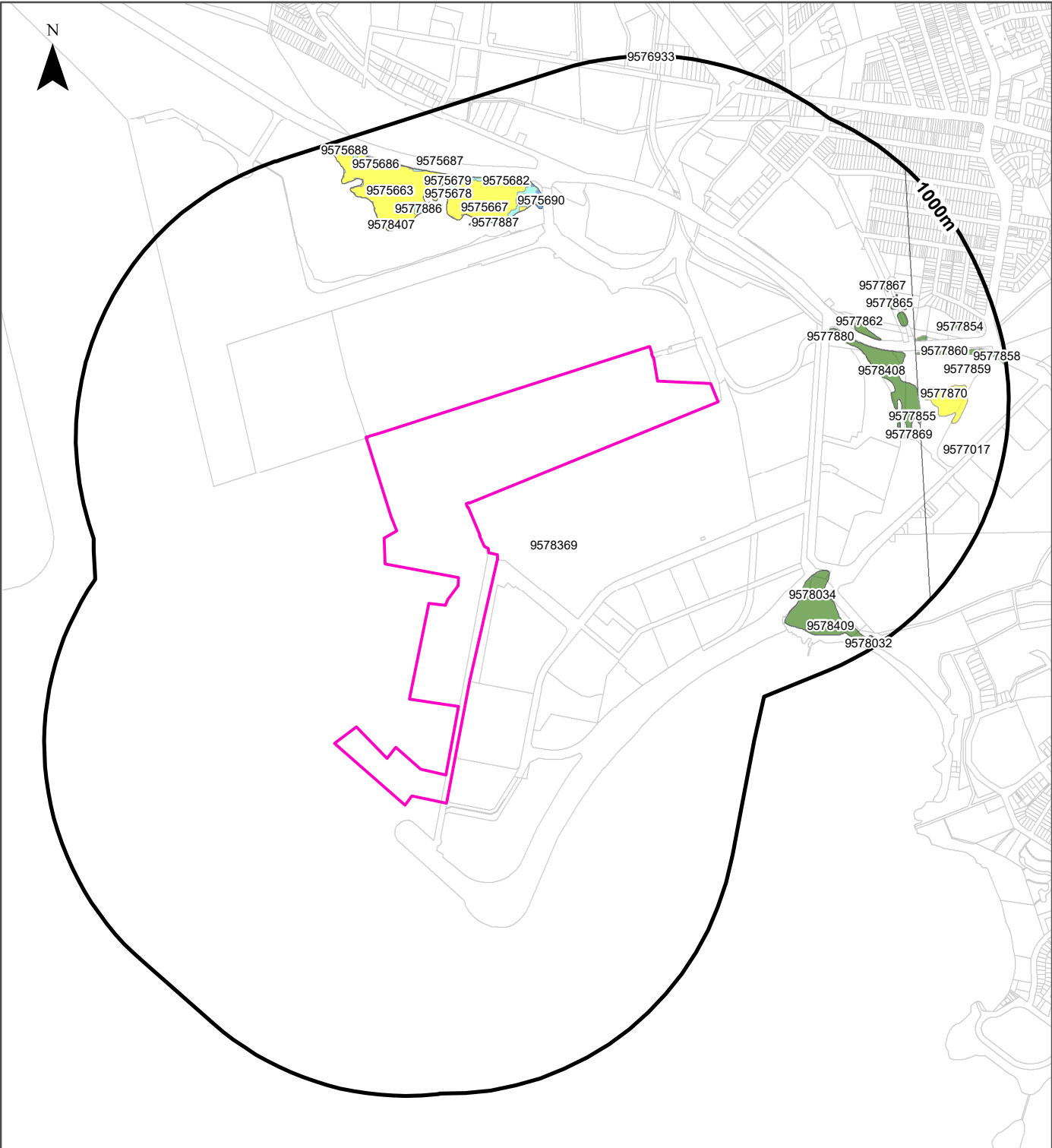
What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
No records in buffer		

NSW Bush Fire Prone Land - © NSW Rural Fire Service under Creative Commons 4.0 International Licence

Ecological Constraints - Vegetation & Ramsar Wetlands

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036



Site Boundary	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Semi-arid Woodlands (Grassy sub-formation)
ReportBuffer	Dry Sclerophyll Forests (Shrubby sub-formation)	Semi-arid Woodlands (Shrubby sub-formation)
Property Boundary	Forested Wetlands	Wet Sclerophyll Forests (Grassy sub-formation)
Ramsar Wetland	Freshwater Wetlands	Wet Sclerophyll Forests (Shrubby sub-formation)
Native Vegetation		
Alpine Complex	Grasslands	Non vegetated
Arid Shrublands (Acacia sub-formation)	Grassy Woodlands	Unattributed
Arid Shrublands (Chenopod sub-formation)	Heathlands	Not classified
	Rainforests	Other
	Saline Wetlands	

Scale: 0 100 200 400 600 800 1,000 Meters	Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2024	Coordinate System: GDA 1994 MGA Zone 56	Date: 16 October 2024
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Ecological Constraints

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Native Vegetation

What native vegetation exists within the dataset buffer?

Map ID	Vegetation Formation	Plant Community Type and Vegetation Formation	Vegetation Class	Dist	Dir
9578369	Not classified	(Not classified) Not classified	Not classified	0m	On-site
9577855	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	439m	East
9577880	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	439m	North East
9577879	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	482m	North East
9577862	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	530m	North East
9577887	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	556m	North
9578408	Not classified	(Not classified) Not classified	Not classified	561m	East
9575690	Freshwater Wetlands	(Freshwater Wetlands) Sydney Creekflat Wetland	Coastal Freshwater Lagoons	566m	North
9575667	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	574m	North
9577885	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	580m	North
9575664	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	586m	North
9575666	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	590m	North
9576654	Not classified	(Not classified) Not classified	Not classified	618m	North
9577856	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	620m	East
9575691	Freshwater Wetlands	(Freshwater Wetlands) Sydney Creekflat Wetland	Coastal Freshwater Lagoons	646m	North
9575663	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	654m	North
9577869	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	658m	East
9575665	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	665m	North
9578407	Not classified	(Not classified) Not classified	Not classified	666m	North
9577865	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	669m	North East
9575682	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	672m	North
9578034	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Littoral Scrub-Forest	Coastal Dune Dry Sclerophyll Forests	676m	East
9577867	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	678m	North East
9577886	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	678m	North
9577863	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	680m	North East
9577017	Not classified	(Not classified) Not classified	Not classified	686m	East

Map ID	Vegetation Formation	Plant Community Type and Vegetation Formation	Vegetation Class	Dist	Dir
9577860	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	697m	East
9575668	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	699m	North
9577870	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	702m	East
9577866	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	704m	North East
9577864	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	708m	North East
9577861	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	709m	East
9575678	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	715m	North
9575679	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	718m	North
9575683	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	720m	North
9575680	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	746m	North
9575684	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	809m	North
9575687	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	817m	North
9577881	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	846m	East
9575685	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	847m	North
9577854	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	847m	East
9578409	Not classified	(Not classified) Not classified	Not classified	855m	East
9577859	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	859m	East
9575686	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	879m	North
9575688	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	924m	North
9577858	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Bloodwood Low Forest	Coastal Dune Dry Sclerophyll Forests	950m	East
9578036	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Littoral Scrub-Forest	Coastal Dune Dry Sclerophyll Forests	957m	East
9578033	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Littoral Scrub-Forest	Coastal Dune Dry Sclerophyll Forests	960m	East
9578035	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Littoral Scrub-Forest	Coastal Dune Dry Sclerophyll Forests	966m	East
9578032	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Littoral Scrub-Forest	Coastal Dune Dry Sclerophyll Forests	967m	East
9575681	Saline Wetlands	(Saline Wetlands) Samphire Saltmarsh	Saltmarshes	976m	North West
9577878	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	981m	East
9578031	Dry Sclerophyll Forests (Shrubby sub-formation)	(Dry Sclerophyll Forests (Shrubby sub-formation)) Coastal Sands Littoral Scrub-Forest	Coastal Dune Dry Sclerophyll Forests	993m	East
9576933	Heathlands	(Heathlands) Sydney Coastal Sand Mantle Heath	Wallum Sand Heaths	996m	North
9577877	Heathlands	(Heathlands) Southern Sandplain Heath	Wallum Sand Heaths	999m	East

Native Vegetation Type Map : NSW Department of Planning and Environment 2022

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Ecological Constraints

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Ramsar Wetlands

What Ramsar Wetland areas exist within the dataset buffer?

Map ID	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Agriculture, Water and the Environment

Ecological Constraints

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Collaborative Australian Protected Areas Database - Terrestrial

Protected areas in terrestrial environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
N/A	No records in buffer						

Collaborative Australian Protected Areas Database - Marine

Protected areas in marine environments identified by the CAPAD within the dataset buffer:

Map ID	Area Name	Area Details	Management Category	Authority	Jurisdiction	Dist	Dir
N/A	No records in buffer						

Source: Collaborative Australian Protected Areas Database (CAPAD) 2022
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Ecological Constraints

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Groundwater Dependent Ecosystems Atlas

Type	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
N/A	No records in buffer					

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology
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Ecological Constraints

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

Inflow Dependent Ecosystems Likelihood

Type	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
N/A	No records in buffer					

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

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Ecological Constraints

Brotherson Dock, Penrhyn Road, Port Botany, NSW 2036

NSW BioNet Species Sightings

Species sightings from the NSW BioNet Repository that have either a state or federal conservation status, or a sensitivity status, and are within 10 km of the site:

Note: This data does not include NSW Category 1 sensitive species.

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Amphibia	Crinia tinnula	Wallum Froglet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Amphibia	Litoria aurea	Green and Golden Bell Frog	Not Sensitive	Endangered	Vulnerable	
Animalia	Aves	Actitis hypoleucos	Common Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Anous stolidus	Common Noddy	Not Sensitive	Not Listed	Not Listed	CAMBA;JAMBA
Animalia	Aves	Anseranas semipalmata	Magpie Goose	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Anthochaera phrygia	Regent Honeyeater	Category 2	Critically Endangered	Critically Endangered	
Animalia	Aves	Apus pacificus	Fork-tailed Swift	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Ardenna carneipes	Flesh-footed Shearwater	Not Sensitive	Vulnerable	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Ardenna grisea	Sooty Shearwater	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Ardenna pacifica	Wedge-tailed Shearwater	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Ardenna tenuirostris	Short-tailed Shearwater	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Arenaria interpres	Ruddy Turnstone	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Botaurus poiciloptilus	Australasian Bittern	Not Sensitive	Endangered	Endangered	
Animalia	Aves	Burhinus grallarius	Bush Stone-curlew	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	Calamanthus fuliginosus	Striated Fieldwren	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	Calidris acuminata	Sharp-tailed Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calidris alba	Sanderling	Not Sensitive	Vulnerable	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calidris canutus	Red Knot	Not Sensitive	Not Listed	Endangered	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calidris ferruginea	Curlew Sandpiper	Not Sensitive	Critically Endangered	Critically Endangered	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calidris ruficollis	Red-necked Stint	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calidris subminuta	Long-toed Stint	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calidris tenuirostris	Great Knot	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Callocephalon fimbriatum	Gang-gang Cockatoo	Category 3	Endangered	Endangered	
Animalia	Aves	Calonectris leucomelas	Streaked Shearwater	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	Calyptorhynchus banksii banksii	Red-tailed Black-Cockatoo (coastal subspecies)	Category 2	Critically Endangered	Not Listed	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	<i>Calyptrorhynchus banksii samueli</i>	Red-tailed Black-Cockatoo (inland subspecies)	Category 2	Vulnerable	Not Listed	
Animalia	Aves	<i>Calyptrorhynchus lathamii lathamii</i>	South-eastern Glossy Black-Cockatoo	Category 2	Vulnerable	Vulnerable	
Animalia	Aves	<i>Certhionyx variegatus</i>	Pied Honeyeater	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Charadrius leschenaultii</i>	Greater Sand-plover	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Charadrius mongolus</i>	Lesser Sand-plover	Not Sensitive	Vulnerable	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Charadrius veredus</i>	Oriental Plover	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Chlidonias leucopterus</i>	White-winged Black Tern	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Circus assimilis</i>	Spotted Harrier	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Cuculus optatus</i>	Oriental Cuckoo	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Dasyornis brachypterus</i>	Eastern Bristlebird	Category 2	Endangered	Endangered	
Animalia	Aves	<i>Diomedea exulans</i>	Wandering Albatross	Not Sensitive	Endangered	Vulnerable	
Animalia	Aves	<i>Diomedea gibsoni</i>	Gibson's Albatross	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Epthianura albifrons</i>	White-fronted Chat	Not Sensitive	Endangered Population, Vulnerable	Not Listed	
Animalia	Aves	<i>Esacus magnirostris</i>	Beach Stone-curlew	Not Sensitive	Critically Endangered	Not Listed	
Animalia	Aves	<i>Falco subniger</i>	Black Falcon	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Fregata ariel</i>	Lesser Frigatebird	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Gallinago hardwickii</i>	Latham's Snipe	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;JAMBA
Animalia	Aves	<i>Gelochelidon nilotica</i>	Gull-billed Tern	Not Sensitive	Not Listed	Not Listed	CAMBA
Animalia	Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Gygis alba</i>	White Tern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Haematopus longirostris</i>	Pied Oystercatcher	Not Sensitive	Endangered	Not Listed	
Animalia	Aves	<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Halobaena caerulea</i>	Blue Petrel	Not Sensitive	Not Listed	Vulnerable	
Animalia	Aves	<i>Hieraaetus morphnoides</i>	Little Eagle	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Hirundapus caudacutus</i>	White-throated Needletail	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Hirundo rustica</i>	Barn Swallow	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	<i>Hydroprogne caspia</i>	Caspian Tern	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	<i>Ixobrychus flavicollis</i>	Black Bittern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Lathamus discolor</i>	Swift Parrot	Not Sensitive	Endangered	Critically Endangered	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Limicola falcinellus	Broad-billed Sandpiper	Not Sensitive	Vulnerable	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica	Bar-tailed Godwit	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Limosa lapponica baueri	Bar-tailed Godwit (baueri)	Not Sensitive	Not Listed	Vulnerable	
Animalia	Aves	Limosa limosa	Black-tailed Godwit	Not Sensitive	Vulnerable	Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Lophochroa leadbeateri	Pink Cockatoo	Category 2	Vulnerable	Not Listed	
Animalia	Aves	Lophoictinia isura	Square-tailed Kite	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Macronectes giganteus	Southern Giant Petrel	Not Sensitive	Endangered	Endangered	
Animalia	Aves	Macronectes halli	Northern Giant-Petrel	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Manorina melanotis	Black-eared Miner	Not Sensitive	Critically Endangered	Endangered	
Animalia	Aves	Motacilla flava	Yellow Wagtail	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Neochmia ruficauda	Star Finch	Not Sensitive	Extinct	Endangered	
Animalia	Aves	Neophema chrysogaster	Orange-bellied Parrot	Category 3	Critically Endangered	Critically Endangered	
Animalia	Aves	Neophema chrysostoma	Blue-winged Parrot	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	Ninox connivens	Barking Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Ninox strenua	Powerful Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Numenius madagascariensis	Eastern Curlew	Not Sensitive	Not Listed	Critically Endangered	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius minutus	Little Curlew	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Numenius phaeopus	Whimbrel	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Oceanites oceanicus	Wilson's Storm-Petrel	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	Onychoprion fuscata	Sooty Tern	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Oxyura australis	Blue-billed Duck	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pandion cristatus	Eastern Osprey	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Petroica boodang	Scarlet Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Petroica phoenicea	Flame Robin	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pezoporus wallicus wallicus	Eastern Ground Parrot	Category 3	Vulnerable	Not Listed	
Animalia	Aves	Phaethon lepturus	White-tailed Tropicbird	Not Sensitive	Not Listed	Not Listed	CAMBA;JAMBA
Animalia	Aves	Phaethon rubricauda	Red-tailed Tropicbird	Not Sensitive	Vulnerable	Not Listed	CAMBA;JAMBA
Animalia	Aves	Philomachus pugnax	Ruff	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis fulva	Pacific Golden Plover	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Pluvialis squatarola	Grey Plover	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Aves	Polytelis swainsonii	Superb Parrot	Category 3	Vulnerable	Vulnerable	
Animalia	Aves	Procelsterna cerulea	Grey Ternlet	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	Pterodroma leucoptera leucoptera	Gould's Petrel	Not Sensitive	Vulnerable	Endangered	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	<i>Pterodroma neglecta neglecta</i>	Kermadec Petrel (west Pacific subspecies)	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Pterodroma nigripennis</i>	Black-winged Petrel	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Pterodroma solandri</i>	Providence Petrel	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Ptilinopus regina</i>	Rose-crowned Fruit-Dove	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Ptilinopus superbus</i>	Superb Fruit-Dove	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Puffinus assimilis</i>	Little Shearwater	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Rostratula australis</i>	Australian Painted Snipe	Not Sensitive	Endangered	Endangered	
Animalia	Aves	<i>Stagonopleura guttata</i>	Diamond Firetail	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Stercorarius longicaudus</i>	Long-tailed Jaeger	Not Sensitive	Not Listed	Not Listed	CAMBA;JAMBA
Animalia	Aves	<i>Stercorarius parasiticus</i>	Arctic Jaeger	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Stercorarius pomarinus</i>	Pomarine Jaeger	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Sterna hirundo</i>	Common Tern	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Sternula albigrons</i>	Little Tern	Not Sensitive	Endangered	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Sternula nereis nereis</i>	Fairy Tern	Not Sensitive	Not Listed	Vulnerable	
Animalia	Aves	<i>Stictonetta naevosa</i>	Freckled Duck	Not Sensitive	Vulnerable	Not Listed	
Animalia	Aves	<i>Sula leucogaster</i>	Brown Booby	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Thalassarche bulleri</i>	Buller's Albatross	Not Sensitive	Not Listed	Vulnerable	
Animalia	Aves	<i>Thalassarche cauta</i>	Shy Albatross	Not Sensitive	Endangered	Endangered	
Animalia	Aves	<i>Thalassarche melanophris</i>	Black-browed Albatross	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Aves	<i>Thalasseus bergii</i>	Crested Tern	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Dotterel	Not Sensitive	Critically Endangered	Vulnerable	
Animalia	Aves	<i>Tringa brevipes</i>	Grey-tailed Tattler	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Tringa glareola</i>	Wood Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Tringa incana</i>	Wandering Tattler	Not Sensitive	Not Listed	Not Listed	JAMBA
Animalia	Aves	<i>Tringa nebularia</i>	Common Greenshank	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Tringa stagnatilis</i>	Marsh Sandpiper	Not Sensitive	Not Listed	Not Listed	ROKAMBA;CAMBA;JAMBA
Animalia	Aves	<i>Tyto longimembris</i>	Eastern Grass Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	<i>Tyto novaehollandiae</i>	Masked Owl	Category 3	Vulnerable	Not Listed	
Animalia	Aves	<i>Xenus cinereus</i>	Terek Sandpiper	Not Sensitive	Vulnerable	Vulnerable	ROKAMBA;CAMBA;JAMBA
Animalia	Gastropoda	<i>Meridolum maryae</i>	Maroubra Woodland Snail	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Arctocephalus forsteri</i>	New Zealand Fur-seal	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Arctocephalus pusillus doriferus</i>	Australian Fur-seal	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	<i>Balaenoptera musculus</i>	Blue Whale	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Not Sensitive	Vulnerable	Not Listed	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Animalia	Mammalia	Chalinolobus dwyeri	Large-eared Pied Bat	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Not Sensitive	Vulnerable	Endangered	
Animalia	Mammalia	Dugong dugon	Dugong	Not Sensitive	Endangered	Not Listed	
Animalia	Mammalia	Eubalaena australis	Southern Right Whale	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Miniopterus australis	Little Bent-winged Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent-winged Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Myotis macropus	Southern Myotis	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Notomys cervinus	Fawn Hopping-mouse	Not Sensitive	Extinct	Not Listed	
Animalia	Mammalia	Perameles nasuta	Long-nosed Bandicoot	Not Sensitive	Endangered Population	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Not Sensitive	Endangered	Endangered	
Animalia	Mammalia	Physeter macrocephalus	Sperm Whale	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Pseudomys novaehollandiae	New Holland Mouse	Not Sensitive	Not Listed	Vulnerable	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Mammalia	Saccolaimus flaviventris	Yellow-bellied Sheath-tail-bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Mammalia	Scoteanax rueppellii	Greater Broad-nosed Bat	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Aspidites ramsayi	Woma	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Caretta caretta	Loggerhead Turtle	Not Sensitive	Endangered	Endangered	
Animalia	Reptilia	Chelonia mydas	Green Turtle	Not Sensitive	Vulnerable	Vulnerable	
Animalia	Reptilia	Dermochelys coriacea	Leatherback Turtle	Not Sensitive	Endangered	Endangered	
Animalia	Reptilia	Diplodactylus platyurus	Eastern Fat-tailed Gecko	Not Sensitive	Endangered	Not Listed	
Animalia	Reptilia	Eretmochelys imbricata	Hawksbill Turtle	Not Sensitive	Not Listed	Vulnerable	
Animalia	Reptilia	Hoplocephalus stephensii	Stephens' Banded Snake	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Lucasium stenodactylum	Crowned Gecko	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Tiliqua occipitalis	Western Blue-tongued Lizard	Not Sensitive	Vulnerable	Not Listed	
Animalia	Reptilia	Varanus rosenbergi	Rosenberg's Goanna	Not Sensitive	Vulnerable	Not Listed	
Fungi	Flora	Hygrocybe austropratensis		Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Acacia bynoeana	Bynoe's Wattle	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Acacia prominens	Gosford Wattle	Not Sensitive	Endangered Population	Not Listed	
Plantae	Flora	Acacia pubescens	Downy Wattle	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Acacia terminalis subsp. Eastern Sydney	Sunshine wattle	Not Sensitive	Endangered	Endangered	
Plantae	Flora	Caladenia tessellata	Thick Lip Spider Orchid	Category 2	Vulnerable	Vulnerable	
Plantae	Flora	Callistemon linearifolius	Netted Bottle Brush	Category 3	Vulnerable	Not Listed	
Plantae	Flora	Chamaesyce psammogeton	Sand Spurge	Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Dichanthium setosum	Bluegrass	Not Sensitive	Vulnerable	Vulnerable	

Kingdom	Class	Scientific	Common	Sensitivity Class	State Conservation Status	Federal Conservation Status	Migratory Species Agreements
Plantae	Flora	Doryanthes palmeri	Giant Spear Lily	Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Epacris purpurascens var. purpurascens		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Eucalyptus fracta	Broken Back Ironbark	Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Eucalyptus leucoxylon subsp. pruinosa	Yellow Gum	Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Eucalyptus scoparia	Wallangarra White Gum	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Genoplesium baueri	Bauer's Midge Orchid	Category 2	Endangered	Endangered	
Plantae	Flora	Hibbertia puberula		Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Macadamia integrifolia	Macadamia Nut	Not Sensitive	Not Listed	Vulnerable	
Plantae	Flora	Maundia triglochinoides		Not Sensitive	Vulnerable	Not Listed	
Plantae	Flora	Melaleuca deanei	Deane's Paperbark	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Persoonia hirsuta	Hairy Geebung	Category 3	Endangered	Endangered	
Plantae	Flora	Prostanthera densa	Villous Mint-bush	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Prostanthera marifolia	Seaforth Mintbush	Category 3	Critically Endangered	Critically Endangered	
Plantae	Flora	Pterostylis sp. Botany Bay	Botany Bay Bearded Orchid	Category 2	Endangered	Endangered	
Plantae	Flora	Senecio spathulatus	Coast Groundsel	Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Senna acclinis	Rainforest Cassia	Not Sensitive	Endangered	Not Listed	
Plantae	Flora	Syzygium paniculatum	Magenta Lilly Pilly	Not Sensitive	Endangered	Vulnerable	
Plantae	Flora	Tetradlea juncea	Black-eyed Susan	Not Sensitive	Vulnerable	Vulnerable	
Plantae	Flora	Thelymitra atronitida	Black-hooded Sun Orchid	Category 2	Critically Endangered	Not Listed	
Plantae	Flora	Tinospora tinoporoides	Arrow-head Vine	Not Sensitive	Vulnerable	Not Listed	

Source: NSW BioNet Species Sightings

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Annexure B

Interim Audit Advice

12 June 2025

Port Botany Operations Pty Limited
Attn: Chris Gorman
Brotherson House, Gate B103 Penrhyn Road
Port Botany NSW 2036

By email: Chris.Gorman@pbqep.com.au

Dear Chris

**RE: INTERIM AUDIT ADVICE LETTER NO. 1 - REVIEW OF PRELIMINARY
SITE INVESTIGATION, PORT BOTANY QUAYLINE EQUALISATION
PROJECT**

Ramboll Australia Pty Ltd
Level 3, 100 Pacific Highway
PO Box 560
North Sydney NSW 2060

T +61 2 9954 8100
www.ramboll.com

Ref: 318002292

Audit Number: RS-194

1. INTRODUCTION

As a NSW Environment Protection Authority (EPA) accredited Contaminated Sites Auditor, I am conducting an Audit (RS-194) under the NSW *Contaminated Land Management Act 1997* (CLM Act) in relation to the Port Botany Quayline Equalisation Project (PBQEP). This initial review has been undertaken to provide an independent review of the preliminary site investigation (PSI) undertaken for the project. The primary objective of the PSI is to identify any past or present activities (either on-site or nearby) that may have introduced contaminants into the soil, sediments or groundwater.

The objective of the project is to provide equivalent quayline length for each container stevedore company operating at Port Botany. The project includes extending the southern quay of Brotherson Dock by 314 metres and constructing an adjoining hardstand area to enable ships to be loaded and unloaded.

It is understood that a State Significant Infrastructure (SSI) application will be lodged for the project. Port Botany Operations Pty Limited as Trustee for Port Botany Unit Trust (referred to herein as NSW Ports) have been issued with Secretary's environmental assessment requirements (SEARs) for the project on 25 March 2025 which require the following: *"Any Preliminary Site Investigation, Detailed Site Investigation, or other related reports on contamination (including but not limited to a Sampling Analysis Quality Plan), must be accompanied with an Interim Audit Advice or a Site Audit Statement from a NSW EPA accredited Site Auditor certifying the appropriateness of the assessments. Any risk rating of areas of environmental interest (or areas of environmental concerns or any*

other similar terminology) as well as the proposed mitigation measures must be also reviewed as appropriate by the accredited Site Auditor”.

This interim audit advice (IAA #1) is based on a review of the documents listed below, as well as correspondence with NSW Ports and AECOM Australia Pty Ltd (AECOM) who undertook the PSI.

The primary report reviewed was:

- ‘Preliminary Site Investigation, Port Botany Quayline Equalisation Project’ dated 9 June 2025 (and previous versions dated 29 April and 29 May 2025), AECOM (**the PSI**).

The following reports were also reviewed for background information:

- ‘Review of Contamination Issues Associated with the Port Botany Expansion’, 2003, URS
- ‘Bulk Liquids Berth No.2 Environmental Assessment’, 2007, Sinclair Knight Merz (SKM)
- ‘Site Audit Report for QENOS Port Botany Hydrocarbon Storage Terminal’, 29 April 2015, ENVIRON Australia Pty Ltd
- ‘Characterisation of Sediment Quality in Port Botany’, 20 January 2020, Geochemical Assessments Pty Ltd
- ‘Characterisation of Sediment Quality in Brotherson Dock’, 20 January 2020, Geochemical Assessments Pty Ltd
- ‘Brotherson Dock Sediment Contamination Assessment’, 10 September 2024, AECOM
- ‘Orica Groundwater Treatment Plant – Annual Groundwater and Surface Monitoring Report’, 31 October 2024, WSP
- ‘Sediment Contamination Assessment Maintenance Dredging Areas, Port Botany’, 11 November 2024, AECOM
- ‘JUHI Pipeline Leak – Post Remediation Targeted Monitoring Program’, 10 April 2025, Ramboll Australia Pty Ltd

Auditor comments were provided on draft versions of the PSI and the final version was updated in response to comments.

I have reviewed the PSI against the requirements of guidelines made or approved under Section 105 of the CLM Act, including the following:

- ANZECC (2000) ‘Australian and New Zealand Guidelines for Fresh and Marine Water Quality’. These provide interim sediment quality guidelines (ISQG) values for affects range-low and – high. Low (or ‘trigger’ value) concentrations are threshold concentrations, and below this concentration the frequency of adverse biological effects is expected to be low.
- Commonwealth of Australia, Canberra, Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2009) ‘National Assessment Guidelines for Dredging’ (NAGD)
- National Environment Protection Council (NEPC) ‘National Environment Protection (Assessment of Site Contamination) Measure 1999’, as Amended 2013
- CSIRO (2013) Revision of the ANZECC/ARMCANZ Sediment Quality Guidelines Technical Report, CSIRO Land and Water Science, May 2013
- NSW EPA (2015) ‘Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997’
- NSW EPA (2017) ‘Guidelines for the NSW Site Auditor Scheme (3rd Edition)’

- Australian and New Zealand Guidelines (ANZG) (2018) 'Guidelines for Fresh and Marine Water Quality'
- Australia and New Zealand Heads of EPAs (HEPA 2020) 'PFAS National Environmental Management Plan, Version 2.0' (applicable at the time of the investigations)
- NSW EPA (2020) 'Contaminated Land Guidelines, Consultants Reporting on Contaminated Land'
- Chapter 4 Remediation of Land in the Resilience and Hazards State Environment Planning Policy (SEPP) (2021) (SEPP R&H, formerly known as SEPP 55) and NSW Department of Urban Affairs and Planning and NSW EPA (1998) 'Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land'
- Western Australia Department of Health (2021) 'Guidelines for the assessment, remediation and management of asbestos contaminated sites'
- NSW EPA (2022a) 'Contaminated Land Guidelines, Sampling design part 1 – application' and 'Contaminated Land Guidelines, Sampling design part 2 – interpretation'
- NSW EPA (2022b) 'Contaminated Land Consultant Certification Policy'.

2. SITE DETAILS

2.1. Location

The site details are shown in **Attachment 1** and summarised as follows:

Street address:	Brotherson Dock, Port Botany, NSW 2036 and Botany Bay NSW
Identifier:	Part Lot 3 DP1165618
Local Government:	Randwick City Council (southern portion) and Bayside Council (northern portion)
Zoning:	SP1 Special Activities under State Environmental Planning Policy (Transport and Infrastructure) 2021

The majority of the site is over water. The boundaries of the site are not well defined.

2.2. Adjacent Uses

The site is located within the existing Port Botany Lease Area. The surrounding site use comprises industrial port uses. Botany Bay and Sydney Airport are located to the west.

2.3. Site Condition

The site condition is described in the PSI as follows. The project is located in Port Botany around one kilometre southeast of Sydney Kingsford Smith Airport. The suburb of Botany is predominantly industrial, including the port and airport, and is flanked to the north, south and east by pockets of residential, industrial and recreational land.

The project area is an existing seaport which mainly trades containerised products. The project area is located at around sea level, reflective of its port-related land use. The topography around the study area broadly falls from a ridgeline to the east, extending north from La Perouse towards Kingsford. To the west, the ridgeline of Arncliffe to Rockdale falls towards the low-lying Brighton-Le-Sands and Sans Souci. South of the study area is Botany Bay which is bounded to the south by the Kurnell Peninsula. The Kurnell peninsula is largely low lying with a maximum 31-40 m elevated headland to the east.

A visual inspection of the project area was undertaken on 31 October 2024 by AECOM for the PSI. The findings of the inspection are provided below:

- Current bulk liquid berthing (BLB) operations at Port Botany comprise product being pumped from shipping vessels to the terminals using pumps within the vessels. All pipelines are fully welded with no flanges to minimise spills. Spills of product during the transport of product from the vessel to the terminal are managed through an Operation Environment Management Plan, including a spillage retrieval system, spill containments, trays and spill kits for small spills. In the event of a spill over water, the Port Authority deploys an emergency response via an emergency boat for control of the spills
- Current stormwater pits on the berth capture stormwater that drains to a pit and the water is taken off-site if potentially contaminated
- There was a historic spill of aviation fuel in vicinity of BLB2 and the Vopak terminal in 2019. It is understood that Vopak is currently conducting remediation works
- Fires at the BLB and Port Botany are prevented by monitoring cameras and visual observations. Sea water is used to extinguish fires in addition to Aqueous Film Forming Foam (AFFF). Systems with non- Per- and polyfluoroalkyl substances (PFAS) containing foams have been installed on BLB1. Historically AFFF containing PFAS was used at the port. Personnel reported that no fire-fighting training was conducted using AFFF containing PFAS at the port
- All terminals within the port connect via pipelines within a pipeline corridor to the BLBs. The majority of the pipelines are above ground
- An Elgas facility was observed from Charlotte Road, to the east of the project area. The Elgas cavern is understood to be cut into sandstone (at 130 m depth) and used for the storage of LPG for supply to the NSW market. The Elgas cavern has a vibration limit and vibration monitor. Elgas is a licensed facility with the EPA under EPL 10698
- The Qenos pipeline is not operational as Qenos is no longer operating from its Botany complex
- Vopak Terminals comprising above ground storage tanks (ASTs) in a bunded area for storage of diesel is located to the east of the project area (*the Auditor notes aviation fuel is also stored at this site*). Vopak is the largest bulk liquids storage at the port
- The Smit Lamnalco facility, comprising office buildings, is located to the southeast of the new (proposed) BLB3 site, along Fishburn Road. Smit Lamnalco provides marine support for port operations
- There is a facility on the corner of Friendship Road and Fishburn Road on the waterside that comprises a roofed storage facility for storage of 200 Litre drums within a bunded area. The ground cover across the facility is completely sealed and there was no evidence of spills or contamination impacts when observed from the boundary fence line.

2.4. Proposed Development

It is understood that the project would involve two principal components:

- Construction of an extended quayline (BD12) on the southern side of Brotherson Dock, including dredging of the Brotherson Dock channel and berths to provide material for reclamation of land. This would provide:
 - Extension of the southern side of the Brotherson Dock quayline by around 314 metres to provide a combined quayline length on the southern side of Brotherson Dock of around 1,250 metres to accommodate up to three longer container vessels, commensurate with the quayline length available to stevedore operators in other parts of the port

- An additional approximately 5.27 hectares of wharf area (wharf hardstand)
- Consequential changes to the bulk liquids berths at the port, including demolition of the existing Bulk Liquids Berth 1 (BLB1), construction and operation of a new Bulk Liquids Berth (BLB3) in a more southerly location, and associated changes to pipework and bulk liquids handling infrastructure within the port. The types and volumes of bulk liquids stored at BLB3 would remain unchanged.

The extended quayline and associated wharf area would be constructed and made available for container terminal operations in future by a stevedore.

3. SITE HISTORY AND PREVIOUS INVESTIGATIONS

3.1. Site History

AECOM provided a summary of the site history in the PSI which was based on information presented in a report prepared by a third-party (Lotsearch Pty Ltd). The Lotsearch report was appended to the PSI and presented information relevant to the project area including historical aerial photographs, NSW EPA record searches and historical business directories. The Auditor has summarised the site history in **Table 3.1**.

Table 3.1: Site History

Date	Activity
1930 to 1970	The project area remained open water within Botany Bay, exhibiting no natural land surface features or man-made structures
1975	A small portion of the northeast corner of the project area (< 100 m ²) is covered by Bunnerong Power Station.
1978 to 1990s	Aerial imagery showed that the south-eastern and north-eastern parts of the project area had been developed into Brotherson Dock in its current formation, featuring a dedicated ship dock at the centre. Throughout the 1980s and 1990s the dock area saw extensive development with the addition of large hardstand areas, ASTs, warehouse buildings, cranes and shipping container storage yards.
2014	An additional ship dock was constructed in the southern portion.

The List of Contaminated Sites Notified to the EPA under Section 60 of the CLM Act provided in the Lotsearch Report included five sites within the project area and seven sites located approximately 270 to 990 m away from the project area. The notified sites located within the project area were categorised as Other Petroleum, Chemical Industry or Other Industry and were listed as "*contamination regulation under the CLM Act not required*". The sites located in the vicinity of the project area were categorised as Other Petroleum, Chemical Industry or Other Industry and were generally listed as "*contamination currently regulated under the CLM Act*".

Two properties within 500 metres of the project area were identified as having previous NSW EPA Records of Notice, including five former contamination notices at the decommissioned Bunnerong Power Station (located 365 m east of the project area) and six current and 28 former contamination notices at Orica Botany Groundwater Project (16-20 Beauchamp Road, Banksmeadow) situated 449 m north of the project area. The Orica site also operates under an Environment Protection Licence (EPL) No 2148 and is understood to have historically contaminated the underlying aquifer extensively. AECOM reported that this site has been regulated under a Voluntary Management Plan (Approval Number: 20101714) since 2010.

Twenty-eight licensed activities under the *Protection of the Environment Operations Act 1997* (POEO Act) were identified within one kilometre of the project area including chemical storage, petroleum products storage, and hazardous waste storage identified within the project area.

There are two sites that are part of the NSW EPA PFAS investigation program within one kilometre of the project area, comprising the Botany Bay area (including land within the project area) and the Botany Industrial Park (995 m to the north). Airservices Australia National PFAS Management Program includes a site at Sydney Kingsford Smith Airport around 1,120 m west of the project area where PFAS has been confirmed at the fire station and fire training ground.

3.2. Previous Contamination Investigations

The PSI included a review and summary of previous contaminated land investigations undertaken within the project area and in the wider Port Botany area. The Auditor has summarised the previous investigations in **Table 3.1**.

Sediment sample locations within the project area are shown on **Attachment 2**.

Table 3.2: Summary of Previous Contamination Investigations

Investigation	Objective/Area	Data Within Site	Key Findings
Port Botany Expansion Environmental Assessment, URS, 2003	Assessments for ecotoxicology and human health risk associated with surface water and sediment as well as groundwater for the Port Botany Expansion project area, located north of the DP World terminal, closer to Foreshore Road and Penrhyn Estuary located approximately 200 m northeast of the project area.	Nil	Previously a major chemical manufacturing site operated formerly by Institute of Civil Infrastructure (ICI) Australia (now Orica), Botany Industrial Park (located around 500 m north of the project area) has been the focus of extensive remediation to address historical groundwater contamination. Groundwater model findings suggested that active remediation measures have significantly reduced the risk of contaminant plumes impacting Port Botany or Penrhyn Estuary from historical chemical manufacturing to the north. Environmental controls during construction were implemented to minimise sediment disturbance and associated risks to human health and aquatic organisms such as bioaccumulation and contaminant dispersion. Overall, the Port Botany Expansion project's risks to human health and the environment were deemed to be manageable with the application of appropriate mitigation measures.
Bulk Liquids Berth No.2 Environmental Assessment, Sinclair Knight Merz (SKM), 2007	Environmental Assessment for the construction and operation of a second Bulk Liquid Berthing Facility ('BLB2') at Port Botany, located within the project area	Nil	The assessment of potential contamination found that the known contamination plumes, plume paths and groundwater projection zone were located about 1.5 km north of the BLB2 site, and hence, the risk of contamination being encountered during the proposed works was low. However, there were two potential environmental impacts to groundwater and soils from the proposed works. Numerous controls were imposed to ensure that the works minimised potential impacts to the environment. The report did not contain any analytical data.
Site Audit Report for Qenos Port Botany Hydrocarbon	Site contamination audit for part of the Qenos Hydrocarbon Storage Terminal, located about 100 m	Nil	The Auditor concluded that site operations had not contributed to soil contamination, and no evidence of off-site contaminant migration was found. Based on the results, no further soil assessments or remediation

Investigation	Objective/Area	Data Within Site	Key Findings
Storage Terminal, Environ Australia Pty Ltd, 2015	southeast of the project area, to determine whether the site was suitable for use as a commercial/industrial facility.		actions were deemed necessary, confirming the site's suitability for its current and intended use. As there were no significant levels of contaminants detected in groundwater and soils, there was little or no potential for migration of contamination from the site or vertically to groundwater. The risks to human health and the environment from contamination on the Qenos site were classified as low.
Orica Groundwater Treatment Plant – Annual Groundwater and Surface Monitoring Report, WSP, 2024	Assessed the effectiveness of the on-going groundwater remediation and monitoring in the vicinity, and downgradient of the Orica manufacturing facility. The report summarised the results of the August 2024 annual monitoring event conducted under the Groundwater Treatment Plant (GTP) Groundwater and Surface Water Monitoring Program.	Nil	Chemical monitoring focused on chlorinated hydrocarbons (CHCs) in groundwater and surface water across multiple locations. Data trends indicated that CHC concentrations in groundwater continued to stabilise or decline overall. Based on the recent Annual Groundwater and Surface Monitoring Report generated for the Orica Botany site, AECOM considered that the Orica site remediation project is unlikely to interact with the project.
JUHI Pipeline Leak – Post Remediation Targeted Monitoring Program, Ramboll Australia Pty Ltd, 2025	Targeted groundwater monitoring to evaluate the effectiveness of remediation works to address a Jet-A1 aviation fuel leak that released approximately 3,680 litres of fuel on 25 May 2019. The location of this investigation was along the eastern edge of the project area between the Vopak Terminal and BLB2.	Seven groundwater monitoring events (GMEs) between October 2024 and January 2025 from between four and 12 groundwater monitoring wells installed marginally within the project area between the Vopak Terminal and BLB2.	Results showed a significant reduction in light non aqueous phase liquid (LNAPL) across the southern investigation zone (RTZ South), with residual sheen only detected in two of the monitoring wells, suggesting effective remediation in the southern area. In the northern investigation zone (RTZ North), although LNAPL thicknesses generally decreased, its presence in the newly installed extraction well indicated that the extent of the plume may extend further to the north than was previously understood. The investigation concluded that the southern investigation area likely achieved the objective of clean-up to the extent practicable. The thickness of LNAPL significantly reduced, corresponding with a decline in dissolved-phase hydrocarbons, which indicated there was a low and manageable risk to the adjacent marine environment. In contrast, the northern investigation area (closest to BLB2) continued to exhibit residual LNAPL impacts, including in newly identified wells suggesting an incomplete remediation outcome. Impacts in the northern area were considered to still pose a potential risk to marine waters, particularly if site conditions change due to tidal influences or increased infiltration. Additional targeted remediation in the northern zone was recommended to complete the earlier steam-enhanced injection and extraction efforts and to

Investigation	Objective/Area	Data Within Site	Key Findings
			proactively reduce the likelihood of future contaminant migration into Botany Bay.
Characterisation of Sediment Quality in Port Botany, Geochemical Assessments Pty Ltd, 2020	Characterising sediment quality at two proposed dredging sites in Port Botany: Site A, located in the eastern section of Brotherson Dock, and Site B, situated in the shipping channel entrance at Botany Bay. Site A investigation locations fall within the project area.	Core samples were collected from 25 locations across the two sites (Sites A and B). Twenty sample locations were located within Site A and the project area (A1 to A20). Samples were analysed a range of contaminants including metals, organotin compounds (e.g. tributyltin (TBT), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene, xylene (BTEX), polychlorinated biphenyls (PCBs), total nitrogen, phosphorus, and particle size distribution.	Results were compared to the National Assessment Guidelines for Dredging (2009) (NAGD) screening levels. The investigation concluded that sediments at Site A in Brotherson Dock are characterised by elevated concentrations of TBT, mercury, chlordane, DDE, and some trace metals in the muddy sediment layer, warranting further assessments to evaluate the bioavailability of contaminants and the potential for their release during dredging activities. The underlying sands showed minimal contamination concerns.
Characterisation of Sediment Quality in Brotherson Dock, Geochemical Assessments Pty Ltd, 2020	Characterising sediment quality in the southeastern corner of Brotherson Dock, Port Botany, including the ship lift area	Sediment samples collected from eight locations in the south-eastern corner of the dock (A21 to A28) using a piston coring technique. Samples were analysed for a suite of contaminants (organotins, PAHs, organochlorine pesticides (OCPs), TPHs, BTEX, PCBs, total nitrogen, total phosphorous, and total organic carbon (TOC)).	Results were compared to the NAGD (2009) screening levels. Concentrations of TPH, TBT, total chlordane, DDE and total DDT, antimony, lead, mercury and zinc exceeded their respective NAGD Screening Levels in individual sediment samples collected in southeast Brotherson Dock. The 95 per cent upper confidence limit (95% UCL) of mean concentrations of normalised total TPH, TBT, total chlordane, DDE and total DDT, lead, mercury and zinc also exceeded their respective screening levels in southeast Brotherson Dock. Mean concentrations of zinc, total TPH, total chlordane, DDE, total nitrogen and total phosphorous were higher in the area of investigation in southeast Brotherson Dock compared to surficial sediment in the eastern section of the Dock.
Sediment Contamination Assessment Maintenance Dredging Areas, Port Botany, AECOM, 2024	Characterise the sediments within the proposed maintenance dredging footprint of Port Botany to a depth of 0.2 metres.	Sediment sampling from four locations up to maximum depth of 0.2 metres and analysis of sediments for metals (arsenic, cadmium, chromium, copper, nickel, lead, mercury and zinc), PFAS, total nitrogen, total phosphorus and TOC. One location (NF1) located within the project.	Concentrations of contaminants in sediment at NF1, within the project area, were all below the NAGD screening levels and/or the laboratory practical quantitation limit (PQL). However, concentrations of arsenic and mercury across the larger data set reported a 95% UCL of mean concentrations exceeding the NAGD. Subsequent elutriate analysis indicated that the concentrations of all reported metals were below the NAGD for protection of species in marine waters. The assessment concluded that the low-level exceedances of metals in sediments and the non-exceedances of metals in elutriate analysis indicated effects on organisms in

Investigation	Objective/Area	Data Within Site	Key Findings
			the water column would not be expected during maintenance dredging. Maintenance dredging across the proposed dredging footprint within Brotherson Dock was considered to pose little to no risk to human health and/or the environment, and no further investigations or remediation of sediments was required.
Brotherson Dock Sediment Contamination Assessment, Port Botany, AECOM, 2024	Characterise the sediments in the general vicinity of the quayline extension and establish a pre-construction and operational baseline contamination dataset Also to evaluate the potential impacts of construction activities, particularly those over water, on the disturbance of sediments within the project area	Collection and analysis of sediment samples from five predetermined sampling locations (BBH101, RBH102, RBH103, DF101 and DF102). Sampling locations were identified within and around the quayline extension and wharf area and the proposed BLB3 and reclamation activities. Samples were obtained using a piston core from surface to up to 4.0 m below surface sediments. Samples were analysed for metals, TRH/TPH, phenols, pesticides, PCBs, PFAS, organotin compounds, dioxins and furans and total nitrogen, phosphorus and TOC.	Concentrations were all below the adopted assessment criteria and/or the laboratory PQL, except for low-level arsenic and mercury exceedances above the ANZECC (2000) and CSIRO (2013) low trigger values at four of five sample locations between the sediment surface and 2.0 m below sediment surface. The report concluded that low-level metal exceedances would pose little to no risk to human health or the environment and are likely attributed to background concentrations of metals in Port Botany/Botany Bay.

3.3. Auditor's Opinion

In the Auditor's opinion, the site history provides an adequate indication of past activities. Potentially contaminating activities within the project area have not been found to require regulation by the EPA although contamination in adjacent land uses has potential to contaminate the sediments proposed to be dredged. Given the regulatory oversight of adjacent notified sites these are considered unlikely to significantly impact on the project area.

Based on the previous sediment investigations conducted, contaminant concentrations that exceeded the NAGD screening levels have been identified for TBT, TPH, arsenic, mercury, lead and zinc. The concentrations reported for the various sediment investigations are generally within the same order of magnitude, with exceedances identified for similar contaminants. PFAS was not detected within the sediments to be dredged during the recent sediment investigations.

Limited elutriate sampling and testing was conducted during the AECOM investigations. AECOM consider that the sampling and testing has indicated that relevant contaminants are unlikely to become bioavailable at concentrations that could significantly adversely affect marine organisms in the water column during dredging. On this basis AECOM expected that dredging across the project area would pose little to no risk to the environment. This conclusion appears reasonable.

4. CONTAMINANTS OF CONCERN

Based on the desktop review and site inspection, AECOM identified Areas of Environmental Interest (AEI) (AEIs) and an associated list of potential contaminants of concern located within and outside the project area, as summarised in **Table 4.1**.

The location of the AEIs are shown in **Attachment 3**.

Table 4.1: Areas of Environmental Interest and Associated Contaminants of Concern

Area	Activity	Potential Contaminants
AEI1	Previous land reclamation within the project area with fill material of unknown origin during its development in the 1970s.	Metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS
AEI2	Industrial land use within the project area including leaks and spills from stored chemicals, infrastructure and vehicles used on-site.	Metals, PAH, TPH, TRH, BTEXN, VOCs, PCBs and PFAS
AEI3	Industrial land use outside the project area including uncontrolled fill, leaks and spills from industrial activities, infrastructure, vehicles, use of firefighting foams containing PFAS.	Metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS
AEI4	Known contaminants in sediments in Brotherson Dock (where dredging is proposed as part of the project).	TBT, total TPH, arsenic, lead, mercury and zinc, OCP
AEI5	Unknown extent of acid sulfate soils (ASS)/ potential acid sulfate soils (PASS) in sediments in Brotherson Dock (where dredging is proposed as part of the project).	Acid sulfate soils
AEI6	Hazardous building materials in infrastructure requiring demolition	Asbestos (bonded/friable), PCBs, lead
AEI7	Import of material to be used for reclamation purposes, comprising potentially contaminated material	Metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS

4.1. Auditor's Opinion

The Auditor considers that the AEIs and the associated potential contaminants identified by AECOM adequately reflect the site history and condition.

5. STRATIGRAPHY AND HYDROGEOLOGY

5.1. Stratigraphy

AECOM reviewed geological maps presented in the Lotsearch report which indicated that the project area is underlain by subaqueous bay sand sheet coastal deposits. The adjacent land areas are reclaimed estuarine areas raised by imported fill material.

The AECOM sediment contamination assessment within Brotherson Dock identified surface sediments and materials generally comprising dark grey, soft, low-high plasticity silty clays from surface to between 0 m and 3.0 m, followed by grey to light brown, loose, medium grain sands between 1.0 to 4.0 m.

The potential for ASS at the site is considered likely due to the coastal setting and the underlying geological conditions. AECOM reported that the *Atlas of Australian Acid Sulfate Soils* dataset, identified that the majority of the project area has a high probability (> 70 per cent) of ASS occurrence. A small area situated beneath the existing dock structure is noted as having a low probability (6 – 70 per cent) of ASS occurring.

5.2. Hydrogeology

AECOM reported that hydrogeological information presented in the Lotsearch report indicated that the regional aquifer onsite and in the areas immediately surrounding the site includes porous, extensive aquifers of high productivity.

The Lotsearch information indicated that the subsurface conditions at terrestrial/land portions of the project area are expected to consist of moderate to high permeability (alluvial) soils overlying relatively deep bedrock. Based on the available groundwater borehole data provided in the Lotsearch report, AECOM reported that the nearest functional boreholes vary in total depth from 3 to 160 metres below ground level (mbgl). Salinity varies, reflecting a mix of freshwater and saline conditions, with borehole ID:10041552 (417 m south) showing high salinity at 30,000 mg/L and borehole ID:10018622 (418 m south) at a much lower salinity of 1.6 mg/L. The standing water levels were available for select bores such as ID:10123486 at 1.9 mbgl (459 m northeast) and 10122471 at 4.82 mbgl (517 m northeast). Three monitoring wells were listed in the project area (ID:10131454, ID:10126611 and ID:10117195) however there were no details available pertaining to the groundwater conditions at these specific locations.

The terrestrial/land portion of the project area on the southern side of Brotherson Dock is subject to Area 2 under the Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024. AECOM reported that groundwater in this area is known to be contaminated, including with chlorinated hydrocarbons and other solvents, petroleum hydrocarbons (such as petrol and diesel), and some heavy metals such as chromium, nickel, lead and arsenic. Groundwater abstraction is prohibited in Area 2. The location of the waterside construction compounds (WSCC01 and WSCC02) on the northern side of Brotherson Dock are not similarly restricted. The Temporary Water Restriction (Botany Sands Groundwater Source) Order 2024 does not place restrictions on the marine parts of the project area.

5.3. Auditor's Opinion

The Auditor considers that the underlying stratigraphy and hydrogeological conditions within the project area have been adequately characterised for the purposes of the audit. Characterisation of ASS/PASS will be required and has been identified as a data gap in the PSI.

6. EVALUATION OF PRELIMINARY CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a representation of the contaminant source, pathway and receptor (SPR) linkages at a site. AECOM developed a preliminary CSM in the PSI, as presented in **Table 6.1** following. The CSM identifies potentially complete exposure pathways (potentially complete SPR linkages) for the construction and operation periods and defines a risk rating assuming that mitigation measures were not undertaken.

Table 6.1: SPR Linkages and Risk Ratings (Source: PSI)

ID	AEI	Source, contaminants of concern and media	Pathway	Receiver	Potentially complete exposure pathway	Risk rating (without mitigation)
AEI1	Previous land reclamation within the project area with fill material of unknown origin during its development in the 1970s.	Metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS	Direct contact, inhalation, dust, leaching of soil and sediment contaminants into groundwater and surface water through excavation and stockpiling activities	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium
AEI2	Industrial land use (within the project area) including leaks and spills from stored chemicals, infrastructure and vehicles used on-site.	Metals, PAH, TPH, TRH, BTEXN, VOCs, PCBs, PFAS	Direct contact, inhalation, leaching of soil and sediment contaminants into groundwater and surface water through excavation, transport and stockpiling activities	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: Yes	Low
AEI3	Industrial land use (outside the project area) including uncontrolled fill, leaks and spills from industrial activities	Metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS	Direct contact, inhalation, leaching of soil and sediment contaminants into groundwater and surface water through excavation and/or dredging	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium
AEI4	Known contaminants in sediments in Brotherson Dock (where dredging is proposed as part of the project).	TBT, total TPH, arsenic, lead, mercury and zinc, organochlorine pesticides.	Direct contact during dredging and dewatering, leaching of sediment contaminants into surface water	Workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium

ID	AEI	Source, contaminants of concern and media	Pathway	Receiver	Potentially complete exposure pathway	Risk rating (without mitigation)
AEI5	Unknown extent of PASS in sediments in Brotherson Dock (where dredging is proposed as part of the project).	acid sulfate soils	Oxidation of acid sulfide bearing minerals and organic material in seabed sediments during dredging and onshore handling. Release of sulfuric acid (H ₂ SO ₄) followed by lateral and vertical migration of trace metals and nutrients to the groundwater/marine water interface.	Workers, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	High
AEI6	Hazardous building materials in infrastructure requiring demolition	asbestos (bonded/friable), PCBs, lead	Direct exposure via consumption and/or uptake by aquatic flora and fauna. Direct contact and leaching of acid into surface water	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: No	Medium
AEI7	Import of material to be used for reclamation purposes, comprising potentially contaminated material	Metals, PAH, TPH, TRH, BTEXN, VOCs, SVOCs, phenols, OCPs, nutrients, asbestos (bonded/friable), PCBs, PFAS	Direct contact, inhalation, leaching of soil contaminants into groundwater and run-off into surface water through demolition and transport activities	Workers and visitors, intrusive maintenance workers, recreational users of surface water bodies and tributaries, terrestrial soil biota, terrestrial and aquatic sediment biota and aquatic flora and fauna	Construction: Yes Operation: Yes	Low

Based on the findings of the PSI, AECOM considered that no further investigations (such as a detailed site investigation (DSI)) were necessary under the environmental risk management framework outlined in NEPM (2013). However, based on the preliminary CSM summarised in **Table 6.1**, above, AECOM identified the following data gap:

- Sampling and analysis of sediments for PASS and ASS has not been carried for the full extent and depth of proposed dredging works. The potential presence of ASS or PASS materials has been conservatively assumed and mitigation and management measures developed on that basis.

Strategies and mitigation measures were recommended in the PSI to address this data gap and associated uncertainty.

AECOM identify that the nature of contaminants within the sediment has been assessed from the investigations completed and from review of previous investigations. Characterisation for contaminants is not identified in the PSI as a data gap, however, AECOM has recommended (refer **Table 7.1**) that sampling and elutriate analysis of sediments be carried out prior to construction to confirm existing findings and further inform handling of dredge spoil and management procedures to be implemented during construction.

6.1. Auditor's Opinion

The Auditor is of the opinion that the preliminary CSM was a reasonable representation of the contamination at the site and is an adequate basis for determining mitigation measures during the construction and operation periods. The identified risk ratings (without mitigation) are considered reasonable.

The PSI includes a detailed discussion of potential impacts from the project and proposed mitigation measures as discussed in **Section 7**.

7. EVALUATION OF PROPOSED MITIGATION MEASURES

7.1. Construction Impacts

AECOM identified the main potential contamination impact from construction activities that may interact with the identified AEIs as follows:

- Dredged sediments and soils may contain sulfide bearing minerals and organic matter (detritus) that can generate sulfuric acid when exposed to air (AEI5). If saturated seabed sediments are disturbed, oxidation of sulfide bearing minerals can lead to the generation of latent soil acidity and the release of metals, nutrients and salts into the surrounding surface, surface waters and local aquifer.

Other potential impacts generated by construction activities of the project were identified as:

- Leaks and spills from plant and machinery on-site during site establishment works
- Surface soil disturbance for laydown areas, although excavation would be minimal (AEI1)
- Generation of waste materials during demolition and decommissioning works, that are not handled appropriately
- Leaks and spills of residual product in pipelines being flushed and cleared during decommissioning of BLB1 pipeline, as well as some pipelines along Fishburn Road and Charlotte Road, potentially leaking into surrounding soils and groundwater (AEI2)
- Handling of potentially impacted media during demolition and decommissioning works at BLB1 and piling/excavation works at BLB3, resulting in exposure to workers and/or discharge/leaching to the receiving environment (AEI1)

- Cross-contamination associated with the incorrect handling or disposal of spoil/unexpected finds and discharge/leaching to the receiving environment (AEI4 and AEI5)
- Demolition of BLB1 infrastructure that may contain hazardous building materials (AEI6)
- Import of material of unknown origin, used in extension of the quayline (AEI7).

The risk of contamination impacts from the above construction activities would be medium if there are no mitigation measures in place. Proposed mitigation and management measures were detailed in Section 7 of the PSI and are detailed in **Section 7.4** below.

An ASS management plan (ASSMP) is proposed to minimise impacts from the disturbance of PASS and ASS during dredging of sediments from Brotherson Dock, and subsequent placement in the reclamation area. An unexpected finds procedure would be prepared to provide guidance on how to handle unexpected contamination or hazardous materials during construction works.

In addition, a Construction Environmental Management Plan(s) (CEMP(s)) and associated sub-plans would be produced to document and communicate the mitigation and management measures required to manage potential construction impacts. AECOM noted that these documents and measures are proposed in the project environmental impact statement (EIS). The subplans would include provisions for erosion and sediment control to minimise impacts on water quality, for reduction and reuse of waste materials, where possible, and the management and disposal of waste to appropriately licensed landfills if required.

7.2. Operational Impacts

At the completion of construction, remaining operational elements of the project would include an extended quayline and around five hectares of new wharf area (hardstand) and a new bulk liquids berth (BLB3) and associated pipelines and bulk liquids handling infrastructure.

For the extended quayline and wharf area, AECOM considered that there are unlikely to be potential operational contamination impacts, given this area would not be actively used until the separate development of a facilitated container terminal on the site. For BLB3, potential contamination impacts that would be associated with the operation of the project would be similar to those currently experienced at the two existing BLBs.

7.3. Cumulative Impacts

In addition to impacts that are wholly and directly related to its construction and operation, the project has the potential to directly contribute to cumulative impacts with other developments or activities that coincide spatially or temporally with the project and indirectly contribute to facilitated impacts as a consequence of enabling or encouraging subsequent development or activities.

Following the adoption of the proposed mitigation and management measures, effective and compliant management of potential contamination risks would be achieved. As such, AECOM considered that residual impacts to human or environmental health associated with contaminated land are not anticipated during construction or operation of the project.

7.4. Mitigation and Management of Impacts

Mitigation and management measures for potential contamination and soils impacts during construction and operation of the project were outlined by AECOM and have been summarised by the Auditor in **Table 7 1**.

The potential for leaks and spills of fuel from new pipelines and connections to existing pipelines during operation of the BLB3 are considered as part of operational hazards and risks. AECOM reported that these are assessed in detail in a Technical report appended to the EIS.

In addition, existing operational environmental management systems will be updated post construction to specify the management and mitigation measures for known and potential contamination including, but not limited to, leak and spill management process/procedures, waste management, monitoring, inspection and reporting requirements, intrusive works, hazardous materials registers, periodic inspections, maintenance requirements, unexpected finds procedures and safety controls. AECOM noted that these measures are likely to be similar to those currently applied to operation of the existing BLB1

Table 7.1: Summary of AECOM Mitigation and Management Measures – Contamination and Soils

ID	Issue	Mitigation Measure	Timing
SC01	Unknown existing contamination in soil, groundwater, seepage water, sediment and surface water	An unexpected finds procedure will be developed and implemented as part of the CEMP. The procedure will include a process for addressing unexpected contamination and provisions for: - Cessation of works within the affected area until inspection of the suspected contamination by a qualified contamination specialist (verification by a certified contaminated land practitioner) - Collection of soil, sediment, water samples for analysis based on observations - Assessment of results against applicable land use or waste classification criteria in accordance with statutory guidelines - Management of the contamination in accordance with applicable statutory guidelines.	During construction
SC02	Known existing contamination in sediments in Brotherson Dock material within dredging footprint	The CEMP(s) will include task-specific measures including: - Managing dredging and / or excavation to reduce exposure of potentially contaminated sediments to workers and surrounding environment - Sediment and erosion controls in place and monitoring for dredged material - Staff involved in dredging to wear suitable PPE and follow applicable management procedures to reduce exposure to potentially contaminated sediments - Sediment incident response plan to be developed and implemented in response to accidental leakages or spills of potentially contaminated sediments.	Construction
SC03	Known existing contamination in sediments in Brotherson Dock material within dredging footprint	Sampling and elutriate analysis of sediments will be carried out prior to construction to confirm existing findings and further inform handling of dredge spoil and management procedures to be implemented during construction. The sampling and analysis will consider whether contaminants are bound to particles and their bioavailability. A Sampling Analytical Quality Plan (SAQP) will be prepared for the sampling and analysis.	Prior to construction
SC04	Extent of PASS and ASS in sediment to be dredged	Sampling and analysis of sediments will be carried out prior to construction to inform the development of PASS/ASS management as part of an ASSMP. A SAQP will be prepared for the sampling and analysis.	Prior to construction and during construction
SC05	Management of PASS and ASS	An ASSMP will be prepared and implemented to manage risks associated with acid sulfide materials during construction, including but not limited to: Sediment investigations across the dredge area footprint	Construction

ID	Issue	Mitigation Measure	Timing
		- Minimising the disturbance of ASS where possible - Use of appropriate dredging methods to limit exposure of seabed sediments to air which can trigger acid formation - Application of neutralising agents such as lime to the materials exposed to minimise impact to surface waters - Management and monitoring of water systems including reclamation area pond, groundwater beneath the reclamation area and marine waters within the harbour. - Processes to slow and/or stop work if monitoring indicates that acidity of receiving water systems is or has the potential to be unacceptable.	
SC06	Demolition of potentially contaminated structures	A hazardous material building survey of BLB1 will be conducted prior to the demolition works to identify the presence of asbestos, lead based paints, PCBs etc. If detected, then an appropriately licensed contractor will be engaged to conduct the demolition works with appropriate controls in place to manage risks associated with handling these materials.	Construction
SC07	Import of material for reclamation purposes, comprising potentially contaminated material	Materials imported for the construction of the reclaimed area will comprise excavated natural material (ENM) or virgin excavated natural material (VENM), or other material assessed and approved for use under the <i>Protection of the Environment (Waste) Regulation 2014</i> (NSW).	Construction

7.5. Auditor's Opinion

In the Auditor's opinion, the proposed mitigation measures are appropriate. If adequately implemented, the mitigation measures should reduce risks and assist with the protection of human health and the environment during construction disturbances. It is recommended that the Auditor review the SAQP(s) for SC03 and SC04 prior to implementation. In addition, it is recommended that an imported material validation protocol be developed to support SC07.

8. CONCLUSIONS AND RECOMMENDATIONS

The project area is situated within a heavily industrialised port setting at Port Botany. A review of available information indicates that there is potential for complete source, pathway, receiver linkages from unknown existing, known existing and potential new contamination in soil, sediment, surface water and groundwater during construction and operation of the project. Based on the findings presented in the PSI, AECOM concluded that *".....no further investigations (such as a DSI) are considered necessary under the environmental risk management framework of the ASC NEPM (2013).*

It is recommended that contamination management measures are developed and implemented through a CEMP(s) for the Project. While the assessed risk is low, to inform and support tailoring of management measures to site conditions and construction activities, further targeted sampling and analysis of sediments would be completed prior to construction. This supplementary investigation work would include additional elutriate analysis in line with the NADG (sic) (DCCEEW, 2009) guidance and further investigation into the presence of PASS and ASS in line with ASS Assessment Guidelines (ASSMAC, 1998).

Following adoption of this recommended approach through a CEMP(s) for the Project, the desired performance outcomes would be achieved, which is to:

- *Help ensure that human and environmental health is protected from risks arising from the disturbance of potential contamination, and*
- *Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.”.*

The Auditor agrees with AECOM's conclusions and recommendations.

The identified future tasks in relation to management of contamination are, in summary:

- Preparation of SAQP(s) for ASS investigation and additional contamination investigation. Auditor review of the SAQP(s) is recommended prior to implementation
- Completion of additional investigation programs
- Preparation of ASSMP
- Preparation of CEMP(s) including unexpected finds protocol
- Hazardous material building survey of buildings to be demolished and controlled demolition as appropriate
- Preparation of imported material validation protocol.

The PSI has been completed in accordance with NSW EPA (2020) 'Contaminated Land Guidelines, Consultants Reporting on Contaminated Land' and following the process outlined in SEPP Resilience & Hazards 2021 (Chapter 4 – Contamination of Land). The PSI has adequately assessed past and present activities that may have caused contamination at the site and is considered appropriate to support the EIS for the development.

9. LIMITATIONS

This interim audit advice was conducted on behalf of NSW Ports for the purpose of assessing the suitability and appropriateness of a preliminary site investigation (PSI). This summary report may not be suitable for other uses.

The Auditor has relied on the documents referenced in **Section 1** in preparing the Auditor's opinion. The consultants included limitations in their reports. This interim audit advice must also be subject to those limitations. The Auditor has prepared this document in good faith but is unable to provide certification outside of areas over which the Auditor had some control or is reasonably able to check. If the Auditor is unable to rely on any of those documents, the conclusions of this interim audit advice could change.

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

* * *

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

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

Yours faithfully
Ramboll Australia Pty Ltd



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Attachments: 1 Site Locality Plan
2 Previous Sediment Investigation Locations
3 Identified Areas of Environmental Interest

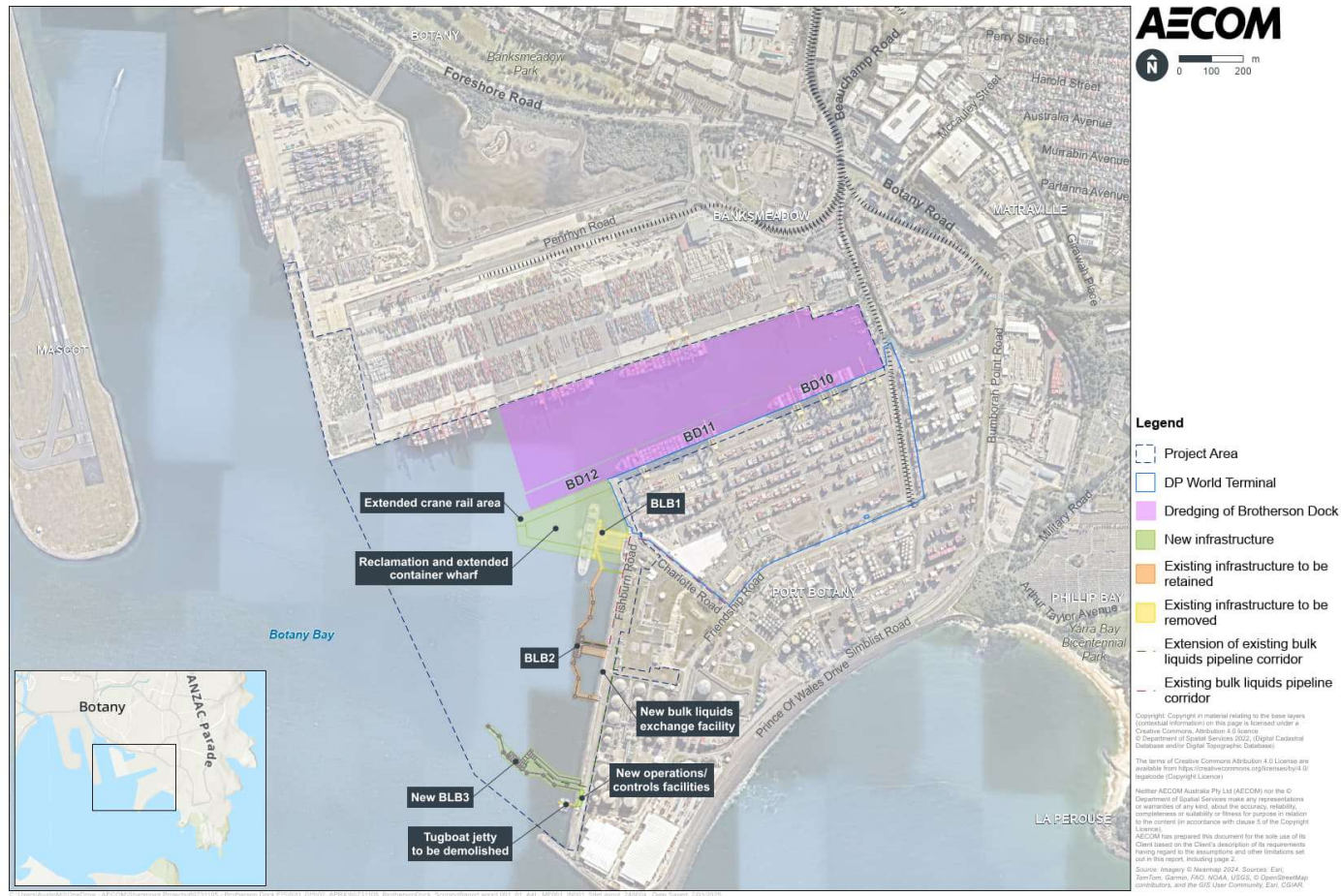


Figure 1-1 Project overview

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Prepared for – NSW Ports Pty Limited – ABN: 25 855 834 182



Figure 3-5 Previous sediment investigation locations at Brotherson Dock

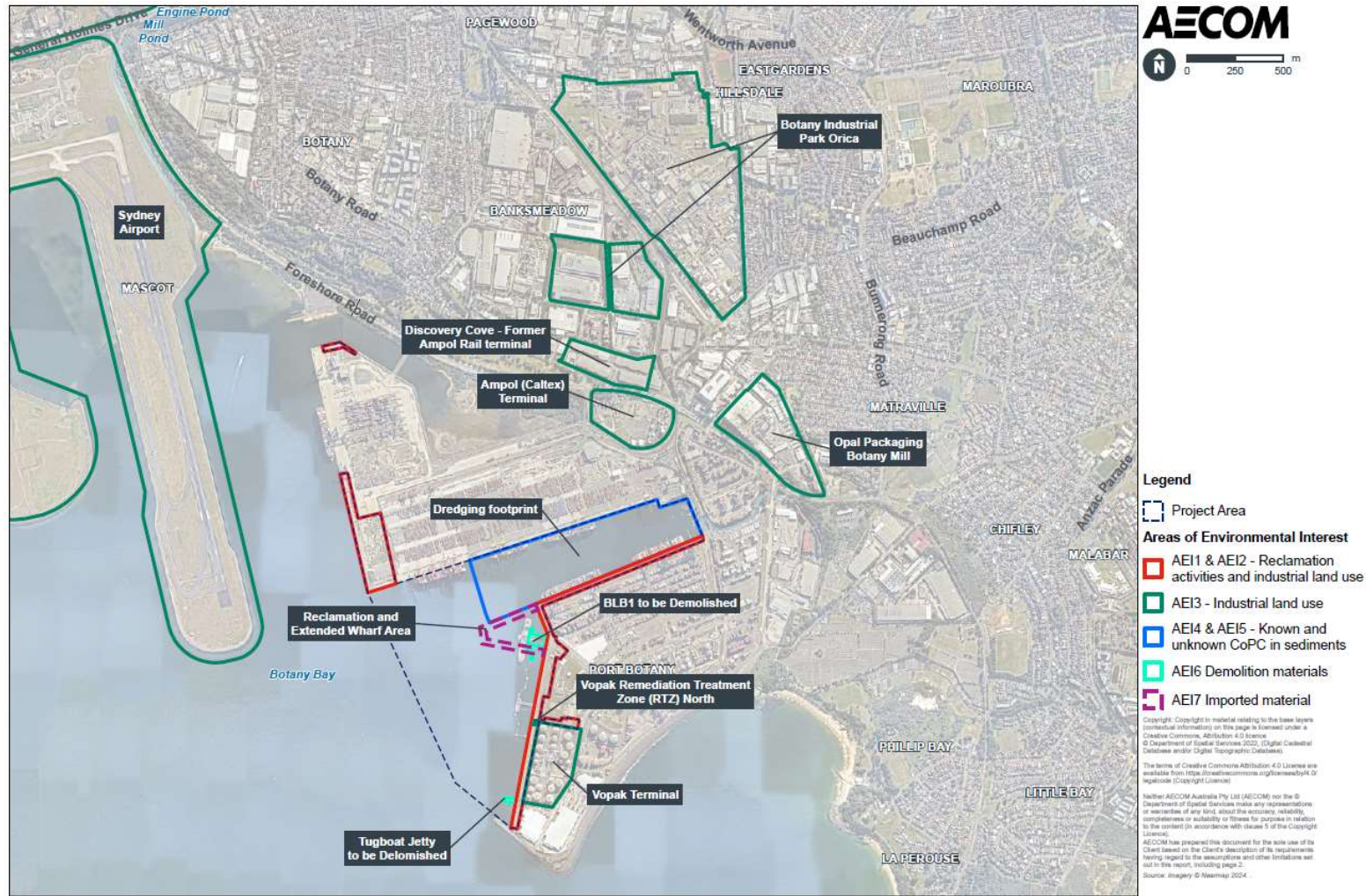


Figure 3-6 Identified Areas of Environmental Interest (AEI)