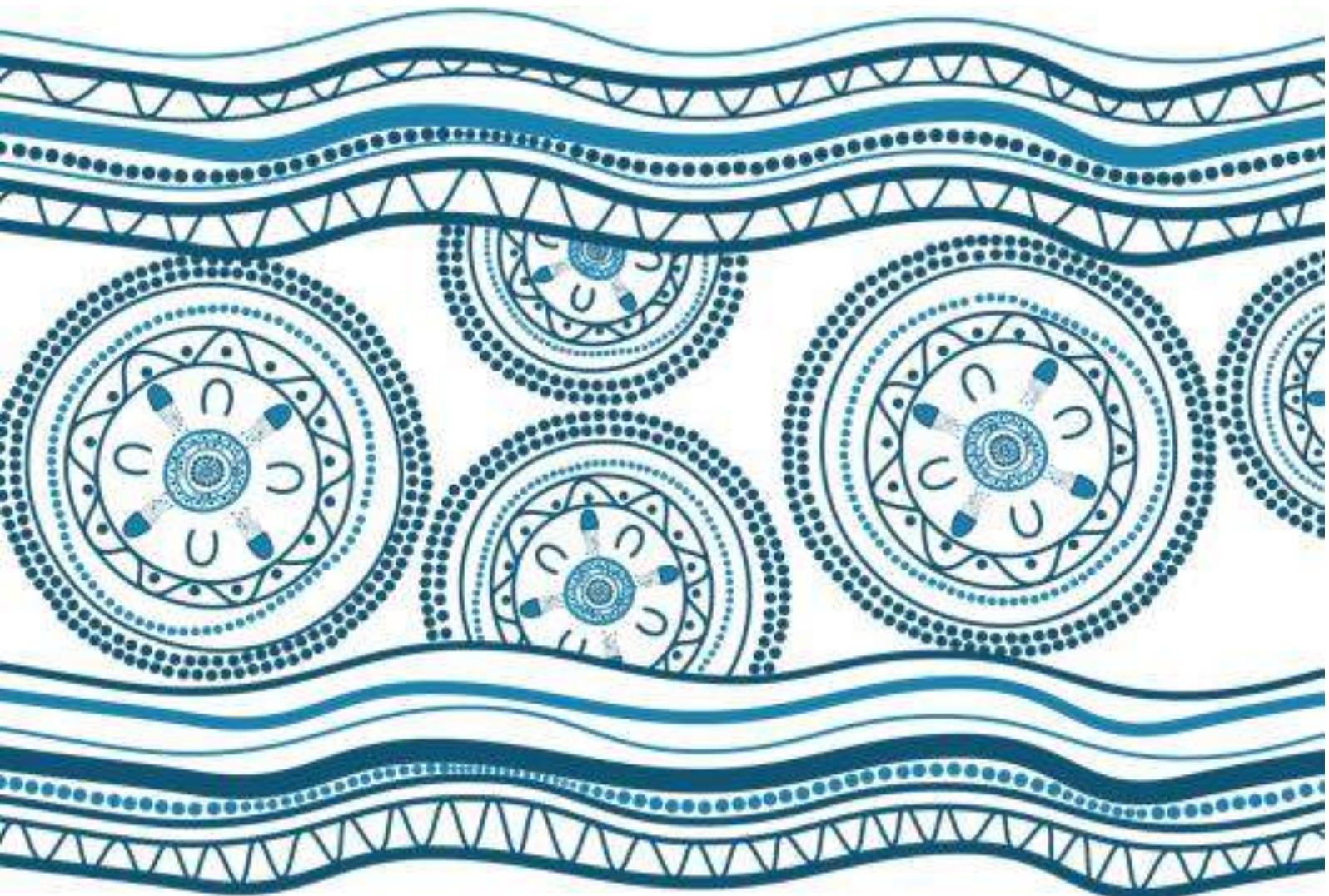
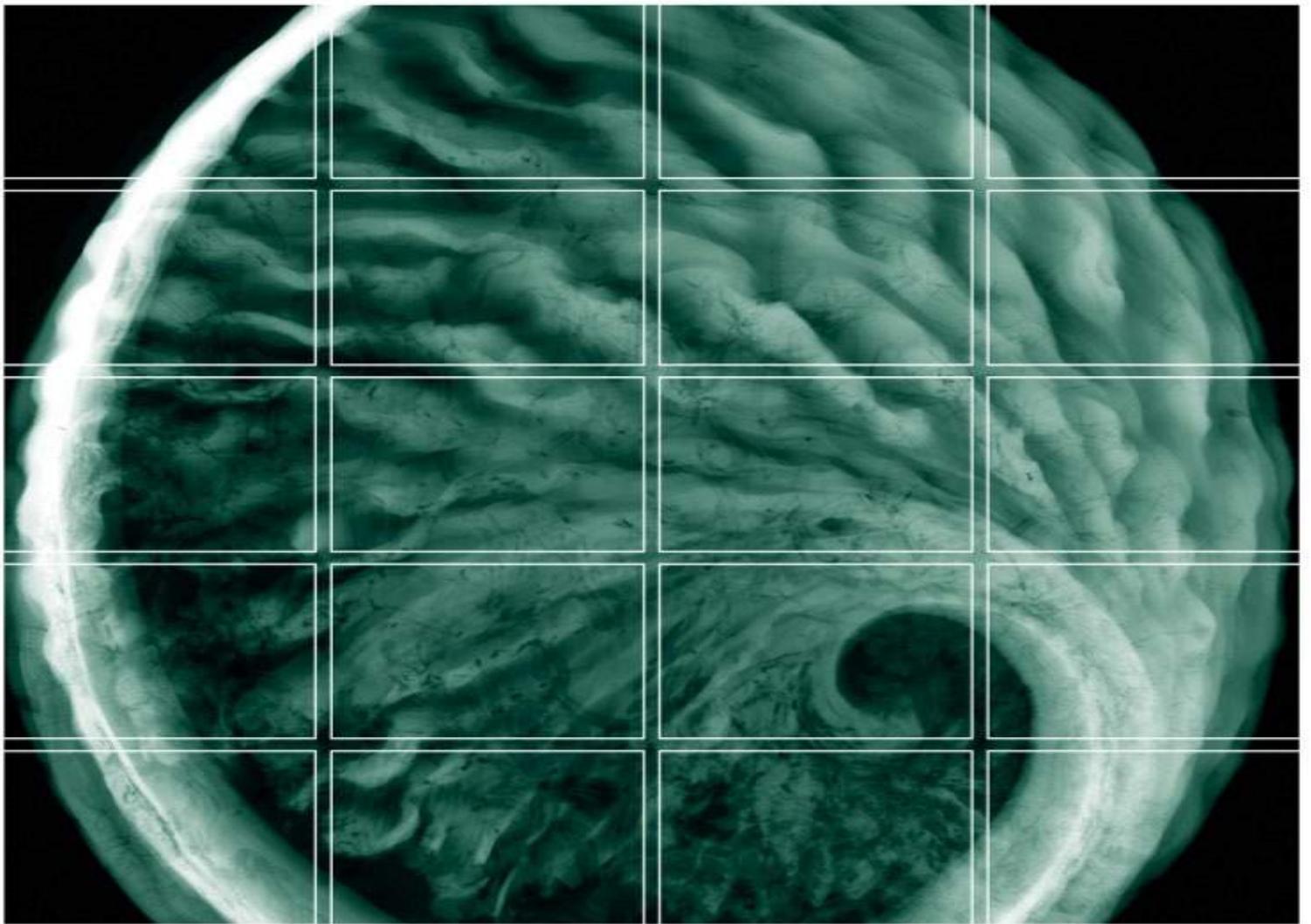


Appendix Q1

Preliminary Site Investigation – La Perouse



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Kamay Wharf Project

Preliminary Site Investigation – La Perouse
Site

2nd December 2020

Project No.: 0564417

Document details	
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2nd December 2020

Kamay Wharf Project

Preliminary Site Investigation – La Perouse Site



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CONTENTS

1.	INTRODUCTION AND OBJECTIVES.....	1
1.1	Objective.....	2
1.2	Scope of Works	2
2.	SITE IDENTIFICATION	3
3.	SITE BACKGROUND REVIEW	4
3.1	Site Setting	4
3.1.1	Aerial Photographs	5
3.1.2	Historical Business Records	6
3.1.3	NSW EPA PFAS Investigation Program	7
3.1.4	NSW EPA Contaminated Lands Records of Notice	7
3.1.5	NSW EPA Contaminated Land Search	7
3.1.6	National Pollutant Inventory Industrial Facilities	7
3.1.7	Licensing under the POEO Act 1997	8
3.1.8	Delicensed Premises still Regulated by EPA, Licenses Surrendered, Clean Up and Penalty Notices	8
3.1.9	Clean up Penalty Notices.....	8
3.1.10	Unexploded Ordnance Area	8
3.1.11	Potentially Contaminating Activities	9
4.	SITE INSPECTION	10
5.	CONCEPTUAL SITE MODEL.....	11
5.1	Potential Sources of Contamination.....	11
5.2	Potential Pathways	12
5.3	Potential Receptors	12
5.4	Conceptual Site Model.....	13
6.	QUALITATIVE EVALUATION OF ENVIRONMENTAL RISK	15
7.	CONCLUSIONS AND RECOMENDATIONS.....	16
APPENDIX A	FIGURES	
APPENDIX B	DESKTOP SEARCH RESULTS	

Acronyms and Abbreviations

Name	Description
ACM	Asbestos Containing Material
AHD	Australian Height Datum
AMG	Australian Map Grid
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
ASS	Acid Sulfate Soils
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CLM	Contaminated Land Management Act 1997
CoPC	Contaminant of Potential Concern
CSM	Conceptual Site Model
DP	Deposited Plan
DPI	Department of Primary Industries
DSI	Detailed Site Investigation
EPL	Environment Protection License
ESA	Environmental Site Assessment
m	Metre
m AHD	Metres Above Australian Height Datum
m bgl	Metres Below Ground Level
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NSW EPA	New South Wales Environment Protection Authority
OCP	Organochlorine Pesticides
OPP	Organophosphorus Pesticides
PAH	Polycyclic Aromatic Hydrocarbons
PFAS	Per and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
POEO Act	Protection of the Environment Operations Act 1997
PSI	Preliminary Site Investigation
RAP	Remedial Action Plan
SAQP	Sampling and Analysis Quality Plan
TBT	Tributyltin
TRH	Total Recoverable Hydrocarbons

1. INTRODUCTION AND OBJECTIVES

Environmental Resources Management Australia Pty Ltd (ERM) was engaged by Arup Australia Pty Ltd (Arup) to undertake a Preliminary Site Investigation (PSI) of the Project Area identified as the Kamay Ferry Wharf Project, located in La Perouse, NSW (the Project Area).

ERM understands Transport for New South Wales (Transport for NSW) is seeking approval to reinstate the ferry wharves at La Perouse and Kurnell in Botany Bay (the project) under Division 5.2 of the Environmental Planning and Assessment Act 1979 (EP&A Act) as State significant infrastructure.

The project would allow for an alternative connection between La Perouse and Kurnell rather than by road. The primary purpose of this infrastructure would be to operate a public ferry service to service visitors to the area and by the local community for cultural and recreational purposes. It would also provide supplementary temporary mooring for tourism-related commercial vessels and recreational boating.

The project provides opportunities for significant cultural and economic benefits to the local Aboriginal community by providing improved access to culturally significant sites.

It is also expected to deliver benefits and opportunities to wider communities on either side of Botany Bay such as investment opportunities in a ferry service and other new visitor/tourist experiences

A concept design has been developed for the proposed redevelopment which includes the following key features:

- Two new wharves, one at La Perouse and one at Kurnell that would include:
 - Berth for ferries (to accommodate vessels up to 40m long);
 - Berth for recreational and commercial vessels (to accommodate vessels up to 20m long);
 - Sheltered waiting areas and associated furniture;
 - Additional space within waiting areas to accommodate other users such as fishing and those using recreational vessels; and
 - Signage and lighting.
- Landside paving, access ramps, seating and landscaping at the entrance to the wharves;
- Reconfiguration of existing car parking areas at La Perouse and Kurnell to increase the number of spaces (including provision of accessible parking and kiss-and-ride bays);
- Reconfiguration of footpaths around the new car parking areas; and
- Provision for bike racks at La Perouse.
- Installation of utilities to service the wharves

Information provided to ERM indicates the total construction period is anticipated to take up to 13 months, starting in early 2022. The construction of the two wharves will occur at the same time with landside and waterside works occurring simultaneously.

A concept design has been developed for the project, which forms the basis of this assessment. This PSI has been prepared to support the Environmental Impact Statement (EIS) prepared for the project

The Project Area location is illustrated on **Figure 1** and the current layout is presented on **Figure 2**.

1.1 Objective

The objective of these works was to undertake a Preliminary Site Investigation (PSI) that refines the current understanding of the Project Area and aids Arup in assessing potential constraints associated with site contamination that may require consideration prior to or during development of the proposed Kamay Ferry Wharf (the Proposal).

1.2 Scope of Works

To meet the project objective, ERM completed the following scope of works:

- Review of background information relating to the Project Area, including:
 - Information relating to surface water discharge conditions and sample results;
 - The NSW Environment Protection Authority (EPA) Contaminated Land Register;
 - Historical aerial photographs;
 - Land titles information;
 - Registered groundwater bore information;
 - Relevant government databases; and
 - Published soil, geology and topographic maps.
- Preparation of this PSI report.

Investigative work was conducted with reference to relevant parts of the following guidelines:

- National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM (1999)) (as amended May 2013) - herein referred to as the ASC NEPM (2013);
- NSW EPA (2017). *Guidelines for the NSW Site Auditor Scheme* (3rd edition); and
- NSW EPA (2020). *Consultants reporting on contaminated land – Contaminated land guidelines*.

2. SITE IDENTIFICATION

The Project Area identification information is presented within the table below:

Table 2.1 – Site Identification Details

Item	Description
Site Address	<ul style="list-style-type: none"> ■ Proposed Kamay Ferry Wharf. Anzac Parade, La Perouse, NSW
Legal Description	<ul style="list-style-type: none"> ■ Lot 5113 DP 752015 ■ Lot 1 DP 934156 ■ Lot 1057 DP 752015 ■ Lot 285 DP752015 ■ Part Lot 2 DP 776343 ■ Part Lot 1 DP 776343 ■ Part Lot 5086 DP 752015 ■ Part Lot 1 DP 862586 ■ Lot 5257 DP 824002 ■ Lot 5253 DP 824002 ■ Lot 5254 DP 824002 ■ Lot 5256 DP 824002 ■ Lot 5255 DP 824002 ■ Lot 1081 DP 752015 ■ Lot 7045 DP 1026891 ■ Lot 7043 DP 1026891 ■ Lot 1 DP 915424 ■ Lot 3 DP 1165618
Local Government Area	<ul style="list-style-type: none"> ■ Randwick Council
Current Zoning	<ul style="list-style-type: none"> ■ E1 – National Parks and Nature Reserves ■ RE1 – Public Recreation ■ SP2 - Infrastructure
Geographical Co-Ordinates	<ul style="list-style-type: none"> ■ 33°59'19"S 151°13'59" E (approximate centre of Site)
Site Location and Site Layout	<ul style="list-style-type: none"> ■ Figure 1 and Figure 2

3. SITE BACKGROUND REVIEW

3.1 Site Setting

The following sections summarise the information obtained during the Project Area background and history review.

Copies of all database search results are provided in **Appendix B**.

Table 3.1 – Site Setting

Item	Description
Project Area	Approximately 11.5 ha (including land and water portions of the Project Area)
Current land-use	The Project Area is currently comprised of undeveloped recreational land (open grass parkland), open water (Frenchmans Bay) and public roadways (Anzac Parade).
Proposed Future Use	Re-instatement of public ferry wharves and associated infrastructure.
Surrounding Land use	The land uses surrounding the Project Area include: <ul style="list-style-type: none"> ■ North: Frenchmans Bay, low density residential dwellings and recreational parkland; ■ South: Botany Bay; ■ East: Undeveloped recreational bushland then Botany Bay / Pacific Ocean; and ■ West: Botany Bay followed by industrial land comprising fuel / chemical storage located approximately 1.5 km to the west of the Site.
Site Elevation	Between 0 – 15 m Australian Height Datum (AHD)
Topography	<ul style="list-style-type: none"> ■ Regional topography is generally flat with a slight slope to the south / south east in the direction of the Pacific Ocean. ■ The central portion of the Project Area is located at an elevation of approximately 15 m AHD and slopes to the south, east and west in the direction of Botany Bay.
Hydrology	<ul style="list-style-type: none"> ■ The portion of the Project Area located on land was observed to contain a centralised ring road (Anzac Parade). During periods of rainfall it is anticipated that surface water would either flow into stormwater infrastructure located within Anzac Parade, infiltrate the Project Area surface in unsealed portions of the Project Area or flow offsite to the adjacent Botany Bay.
Geology, Soils and Acid Sulfate Soils	<p>Geology mapping provided by NSW Planning and Environment – resources and energy indicates the Project Area is underlain by an unnamed Mesozoic formation comprising medium to coarse grained quartz and sandstone, very minor shale and laminite lenses and an unnamed Quaternary formation comprising coarse quartz sands and varying amounts of shell fragment.</p> <p>Soils within the Project Area are described as:</p> <ul style="list-style-type: none"> ■ Shallow discontinuous earthy sands and yellow earths on crests and insides of benches. Shallow siliceous sands on leading edges, shallow to deep leached sands, grey sands and gleyed podzolic soils in poorly drained areas and localised yellow podzolic soils associated with shale lenses. <p>Mapping indicated that the western portion of the Project Area was comprised of class 4 and class 5 Acid Sulfate Soils (ASS). Mapping indicated that there was a potential probability of ASS occurring within subtidal marine sediments.</p>
Hydrogeology	<p>Information from NSW Department of Primary Industries' and the Bureau of Meteorology indicated the following:</p> <ul style="list-style-type: none"> ■ A search of registered groundwater bores identified 37 bores within the 2 km search radius. Standing water levels were measured between 0 m below ground level (bgl) to

Item	Description
	<p>143.0 m bgl. The majority of bores identified groundwater at depths of between 3 m and 8 m bgl. Registered bores were utilised for a range of purposes including water supply, domestic, household, monitoring and water supply bores.</p> <ul style="list-style-type: none"> ■ ERM notes that the Project Area is located immediately adjacent to the NSW Office of Water Groundwater Extraction Exclusion Area (GEEA) - Area 2. Mapping indicates the exclusion zone extends from the northern boundary of the Project Area at the intersection of Anzac parade and Endeavour Avenue. ■ Drillers logs indicated that groundwater was identified within unconsolidated sand, clays and sandstone bedrock.

3.1.1 Aerial Photographs

Historical aerial photographs (**Appendix A**) were reviewed to assess potential historical land use practices undertaken within and surrounding the Project Area. A summary of information obtained from the review is presented within the table below. ⁴

Table 3.2 – Aerial Photography

Year	Description
1930 – Black and White	<ul style="list-style-type: none"> ■ Project Area: The Project Area appears to be comprised of undeveloped land with visible rock outcroppings. Anzac parade is visible as an unsealed road bisecting the eastern portion of the Project Area and leading to Bare Island. A small jetty / pier is located on the western boundary of the Project Area into Frenchmans Bay. ■ Surrounding Area: The surrounding area is largely comprised of undeveloped land. Several small residential buildings are located immediately to the north of the Project Area.
1943 – Black and White	<ul style="list-style-type: none"> ■ Project Area: Several buildings appear to have been constructed within the central portion of the Project Area. Based on other historical information, it is the opinion of ERM that these are likely associated with Defence operations in the area. ■ Surrounding Area: Additional low density residential development has occurred to the north of the Project Area.
1951 – Black and White	<ul style="list-style-type: none"> ■ Project Area: Buildings within the northern portion of the Project Area have been demolished. A building structure remains in the location of the existing La Perouse Museum building. ■ Surrounding Area: No significant changes since previous aerial photography.
1953 – Black and White	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.
1961 – Black and White	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: Additional low density residential development has occurred to the north of the Project Area.
1965 – Black and White	<ul style="list-style-type: none"> ■ Project Area: Anzac Parade has been constructed consistent with its current alignment and is sealed. The small building structure on the southern portion of the Project Area appears to have been demolished. ■ Surrounding Area: No significant changes since previous aerial photography
1970 – Black and White	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
1971 – Black and White	<ul style="list-style-type: none"> ■ Project Area: The monument located within the western portion of the Project Area appears to have been constructed. ■ Surrounding Area: No significant changes since previous aerial photography
1975 – Black and White	<ul style="list-style-type: none"> ■ Project Area: the small jetty / pier in the western portion of the Project Area facing Frenchmans Bay has been demolished. ■ Surrounding Area: No significant changes since previous aerial photography

Year	Description
1978 – Black and White	<ul style="list-style-type: none"> ■ Project Area: La Perouse Monument appears to have been constructed within the centre of the Project Area. ■ Surrounding Area: No significant changes since previous aerial photography.
1983 – Black and White	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photograph. ■ Surrounding Area: No significant changes since previous aerial photography.
1986 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
1988– Black and White	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
1990 – Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
1994 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
2002 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.
2004 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
2007 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.
2009 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography
2011 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.
2014 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.
2017 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.
2020 - Colour	<ul style="list-style-type: none"> ■ Project Area: No significant changes since previous aerial photography. ■ Surrounding Area: No significant changes since previous aerial photography.

3.1.2 Historical Business Records

A search of historical business records for the Project Area and surrounding area was undertaken of records held between the 1930s and 2010. The results of the search area summarised below, and a copy of historical business records is provided within **Appendix A**.

Table 3.3 – Historical Business Records

Year	Registered Business Types
1930	<ul style="list-style-type: none"> ■ No records
1940	<ul style="list-style-type: none"> ■ Boat Launches and Hires.
1950	<ul style="list-style-type: none"> ■ Boat Launches and Hires.
1965	<ul style="list-style-type: none"> ■ Boat Launches and Hires; and ■ Electrical Contractors.
1970	<ul style="list-style-type: none"> ■ Boat, Launch and Yacht Builders / Repairers.

Year	Registered Business Types
1975	<ul style="list-style-type: none"> ■ No records.
1980	<ul style="list-style-type: none"> ■ Boats – Hire and Charter; ■ Printing Engineers; and ■ Boat Equipment.
1990	<ul style="list-style-type: none"> ■ Sailboarding Equipment and Supplies; ■ Boat Charter Services; and ■ Printing Engineers.
2005	<ul style="list-style-type: none"> ■ Boat Hire.
2010	<ul style="list-style-type: none"> ■ Boat and Yacht Haulage Services; ■ Boat Charters; and ■ Pest Control Services.

3.1.3 NSW EPA PFAS Investigation Program

A search of the NSW EPA Per and Polyfluoroalkyl Substances (PFAS) investigation program database indicated that the following PFAS investigations had been or were being undertaken at the Project Area nor within the 2 km report buffer area:

Table 3.4 – NSW EPA PFAS Program

Site Name	Description	Source	Distance from Site
Botany Bay area	<ul style="list-style-type: none"> ■ The number of potential sources of PFAS in the area makes it difficult to attribute detections in Botany Bay to individual sources. PFAS was detected in sediment, surface and groundwater. ■ Fishing restrictions were introduced at the end of 2017 for Botany Bay area. None of the reported PFAS concentration data from Botany Bay have been released. 	<ul style="list-style-type: none"> ■ State-wide PFAS investigation program 	<ul style="list-style-type: none"> ■ Onsite

3.1.4 NSW EPA Contaminated Lands Records of Notice

A search of the NSW EPA contaminated land database under the Contaminated Land Management Act 1997 (CLM Act 1997) undertaken for the Project Area and a 1 km buffer did not identify any sites recorded on the NSW EPA contaminated land record of notices.

3.1.5 NSW EPA Contaminated Land Search

A search of the NSW EPA contaminated land database under the CLM Act 1997 undertaken for the Project Area and a 1 km buffer area did not identify any sites that have been notified to NSW EPA.

3.1.6 National Pollutant Inventory Industrial Facilities

A search of the National Pollutant Inventory (NPI) register did not identify any sites recorded within the NPI register to be located within the 500 m search buffer area.

3.1.7 Licensing under the POEO Act 1997

A search of the NSW EPA record of licensed activities under the *Protection of the Environment Operations Act 1997* undertaken for the Project Area and 500 m buffer area did not identify any current EPA licences.

3.1.8 Delicensed Premises still Regulated by EPA, Licenses Surrendered, Clean Up and Penalty Notices

A search of the NSW EPA record of licensed activities under the *POEO 1997* undertaken for the Project Area and 1 km buffer area identified the following sites:

Table 3.5 – Surrendered Licences

License holder	No.	Name	Premise Address ¹	Fee Based Activity	Status	Distance (m)	Direction
State of NSW – Office of Environmental and heritage	6251	Happy Valley in Botany Bay National Park	Anzac Parade, La Perouse	Miscellaneous licenced discharge to waters	Surrendered	23	North East
Ausgrid	13074	Botany Bay Cable Project Dredging	Botany Bay Shipping Channel	Water Based Extractive Activity	Surrendered	Not Mapped	NA
Ausgrid	13312	Botany Bay Cable Project	Botany Bay La Perouse Headland	Miscellaneous licenced discharge to waters	Surrendered	Not Mapped	NA

3.1.9 Clean up Penalty Notices

A search of the NSW EPA cleanup notices issued *Protection of the Environment Operations Act 1997* undertaken for the Project Area and 1 km buffer did not identify at relevant Sites.

3.1.10 Unexploded Ordnance Area

Search results indicated that Botany Bay is recorded as a potential UXO area as a result of mortar shooting by the Australian Department of Defence during World War 2.

- ERM notes that the portion of Botany bay identified as containing potential UXO is located immediately adjacent to the south east of the Project Area within Congwong Bay.

3.1.11 Potentially Contaminating Activities

A search of potentially contaminating land uses within the Project Area and surrounding buffer area identified the following sites:

- Bare Island located 153 m to the south west of the Project Area.
 - Information from records indicates that Bare Island is a heritage-listed islet military fort located in La Perouse NSW. The Island contains former fortification facilities, it was a former war veterans' home and museum.
 - Built from 1881 to 1889, the fort was armed with a few pounder guns, a gun in an armored casemate / fortified gun emplacement, and two five-barreled Nordenfelt guns.
 - In the early 1900s the fort was decommissioned and soon after it became the first war veterans' home in Australia. It was notified as a Reserve for Public Recreation in 1965.
- Frenchmans Bay located 50 m to the north of the Project Area.
 - The area was identified as a derelict mine / quarry utilised for the extraction of foundry / construction sands.

Search results did not identify any of the following land uses within the search buffer area:

- Cattle Dip Sites;
- Dry Cleaners;
- Fire Rescue Sites;
- Gas Terminals;
- Petrol Stations;
- Power Stations;
- Substations;
- Telephone Exchanges;
- Waste Management Facilities; and
- Water Treatment Facilities.

4. SITE INSPECTION

A site inspection to confirm that nature of current land uses was undertaken on 30 July 2020 by Ian Batterley, a suitably qualified and experienced ERM environmental scientist. Observed site features are presented on **Figure 2**.

- The Project Area is accessed via Anzac Parade located within the northern portion of the Project Area. Anzac Parade circles the eastern, southern and western boundaries of the landside portion of the Project Area. During the Project Area inspection, the roadway was noted to be in good condition and free from obvious cracks / staining and other major deformities.
- At the time of the Project Area inspection, the majority of the Project Area was comprised of unsealed land including undeveloped parkland within the landside portion of the Project Area. The La Perouse Museum, La Perouse Tower and monument were located within the central portion of the Project Area. It is the understanding of ERM, that these structures are being retained during any future potential development works.
- During inspection works, the Project Area was generally flat with slope from the central portion of the Project Area to the west, south and east in the direction of Botany Bay.
- ERM notes that during the inspection, natural bedrock outcroppings were noted on the surface of the Project Area which were consistent with exposed rock within surrounding cliffs etc.
- While no surface waters (on the landside portion of the Project Area) were present during the Project Area inspection, during periods of rainfall it is considered likely that surface waters present would either be directed to stormwater infrastructure located along Anzac Parade, infiltrate the Project Area surface (within unsealed portions of the Project Area) or flow towards Botany Bay.
- During the Project Area inspection, no evidence (vents, risers, filler points etc.) of fuel / chemical storage or illegal waste disposal / buried drums etc. was noted.
- There was no evidence of sheen / odours within surface waters (Botany Bay) that indicated the presence of anthropogenic contamination.
- Vegetation surrounding the Project Area appeared to be generally healthy and free from obvious signs of stress.

5. CONCEPTUAL SITE MODEL

5.1 Potential Sources of Contamination

Based on the Project Area history and background data reviewed and ERMs professional experience, the Contaminants of Potential Concern (CoPC) associated with current and historical land uses undertaken in the general area are considered to include the following:

Potential Source	CoPC	Potentially Affected Media	Comment
Uncontrolled fill	<ul style="list-style-type: none"> Asbestos, total recoverable hydrocarbons (TRH); benzene, toluene, ethylbenzene and xylenes (BTEX); semi-volatile organic compounds (SVOCs), Volatile Organic Compounds (VOCs), heavy metals, polycyclic aromatic hydrocarbons (PAHs), phenols, OCP / OPP 	<ul style="list-style-type: none"> Soil Groundwater Sediments Surface Water 	<ul style="list-style-type: none"> Potential for uncontrolled fill materials to have been imported to the Project Area from adjacent industrial sites / unknown sources during construction of roadways and other minor construction works within the Project Area.
Historical onsite and surrounding land uses	<ul style="list-style-type: none"> Per- and Polyfluoroalkyl Substances (PFAS), Chlorinated Hydrocarbons (CHCs), Tributyltin (TBT), ASS, TRH, BTEX, SVOCs, VOCs, Heavy Metals, Nutrients / Inorganics 	<ul style="list-style-type: none"> Soil Groundwater Sediment Surface Water 	<ul style="list-style-type: none"> Historical use of the Project Area for military purposes resulting in soil contamination from the use and / or storage of military equipment etc within the Project Area. PFAS contamination may be present from surrounding industrial properties and other sites discharging to Botany Bay potentially impacting surface water and sediment. Nutrient / inorganic compounds may be present within sediments located within the intertidal zone. ASS mapping indicates the likely presence of ASS within intertidal sediments
Hazardous building materials	<ul style="list-style-type: none"> Asbestos, PCBs, lead. 	<ul style="list-style-type: none"> Soil Groundwater 	<ul style="list-style-type: none"> While no evidence of illegal dumping was noted during the Project Area inspection, the potential for historically dumped waste materials within portions of the Project Area (particularly bushland areas) should be considered.
Unexploded Ordnance (UXO)	<ul style="list-style-type: none"> UXO 	<ul style="list-style-type: none"> Botany Bay / Congwong Bay 	<ul style="list-style-type: none"> Records indicate the potential for UXO to be present within firing lines located to the east of the Project Area in Congwong Bay associated with firing of mortars.

5.2 Potential Pathways

The primary potential exposure pathways of concern at the Project Area are:

- Inhalation of vapour (from soil and/or groundwater) and contaminated dust (from soils);
- Dermal contact and / or incidental ingestion with contaminated surface water and soils / sediments;
- Transport of contamination through surface water flows;
- Transport of contamination to underlying groundwater aquifers;
- Transport / mobilisation of contaminants through mechanical transport during construction works; and
- ERM notes the potential for UXO to be present to the east of the Project Area and notes a potential risk to human health / surrounding ecology where there is disturbance to sediments within Cowong bay that have the potential to disturb / impact any remnant UXO.

5.3 Potential Receptors

Key receptors have been identified as:

- Current site users (recreational);
- Future site users (recreational and commercial / industrial);
- Potential future users of groundwater;
- Workers carrying out installation or maintenance works within the Project Area;
- Groundwater beneath the Project Area;
- Adjacent sensitive residential receptors; and
- Adjacent sensitive ecological receptors such as surface water bodies including Botany Bay.

5.4 Conceptual Site Model

Based on the results of the desktop assessment, site inspection and the potential sources, pathways and receptors identified above ERM developed the below Conceptual Site Model (CSM).

Table 5.1 – Conceptual Site Model

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
Uncontrolled fill	Dermal contact and / or incidental ingestion with contaminated surface waters / soils.	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the Project Area. 	Low - Moderate	<ul style="list-style-type: none"> ■ Potential for uncontrolled fill materials to have been imported to the Project Area from unknown sources during construction of roadways and other construction works within the Project Area associated within current and historical building structures.
	Transport of contamination through surface water flows.	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the Project Area. 	Low	
	Transport of contamination to underlying groundwater aquifers	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	Low	
	Transport of contaminants through mechanical transport	<ul style="list-style-type: none"> ■ Workers carrying out development, installation or maintenance works within the Project Area. 	Low - Moderate	
Historical onsite and surrounding land uses	Dermal contact and / or incidental ingestion with contaminated surface waters / soils.	<ul style="list-style-type: none"> ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the Project Area. 	Low	<ul style="list-style-type: none"> ■ Potential contamination associated with the use and storage of equipment utilised in the former sand mining undertaken within Frenchmans Bay. ■ Potential groundwater contamination associated with the adjacent groundwater extraction exclusion area (GEAA) ■ The western portion of the Project Area was identified to contain a former pier / jetty area.
	Transport of contamination through surface water flows.	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; ■ Current and future site users; and ■ Workers carrying out development, installation or maintenance works within the Project Area. 	Moderate	
	Transport of contamination to underlying groundwater aquifers	<ul style="list-style-type: none"> ■ Adjacent sensitive receptors; and ■ Future potential on-site users of groundwater. 	Moderate	

Potential Sources	Pathways	Potential Receptors	Risk of Potentially Complete Pollutant Linkage	Comment
	Transport of contaminants through mechanical transport (during excavation of sediments etc)	<ul style="list-style-type: none"> Workers carrying out development, installation or maintenance works within the Project Area. 	High	<ul style="list-style-type: none"> PFAS contamination may be present from industrial properties located in the vicinity and other sites discharging to Botany Bay resulting in potential impact to surface water and sediments. Nutrient / inorganic compound may be present within sediments located within the intertidal zone ASS mapping indicates the likely presence of ASS within intertidal sediments ERM notes that based on the likely saline nature of groundwater within the Project Area, the onsite use of groundwater for beneficial purposes is unlikely.
Hazardous building materials	Inhalation of contaminated dust / fibres.	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the Project Area 	Low - Moderate	<ul style="list-style-type: none"> ERM notes that onsite buildings are scheduled to remain onsite following demolition and remain undisturbed, however it may be prudent to undertake a hazardous materials investigation of onsite structures to assess the potential for surficial impact to be present within the Project Area associated with degrading building materials. While no evidence of illegal dumping was noted during the Project Area inspection, the potential for buried waste materials within portions of the Project Area (particularly bushland areas) should be considered.
	Transport of contaminants through mechanical transport	<ul style="list-style-type: none"> Current and future site users; and Workers carrying out development, installation or maintenance works within the Project Area. 	Low - Moderate	
Unexploded Ordnance	Disturbance during future construction works	<ul style="list-style-type: none"> Workers / site users Ecological receptors 	Low - Moderate	<ul style="list-style-type: none"> ERM notes that UXO mapping indicated the area to the east of the Project Area (outside the Project Area boundary) was utilised for Mortar firing.

6. QUALITATIVE EVALUATION OF ENVIRONMENTAL RISK

As outlined within the CSM presented above, ERM considers there may be a potential risk to human health / ecological receptors due to the following potentially complete pollutant linkages identified at the Project Area:

- Potential uncontrolled fill materials associated with construction of the existing roadways or levelling / site filling for construction of onsite building structures;
- Potential use of hazardous materials within onsite historical and current building structures;
- Historical onsite and surrounding land uses including (but not limited to) former the adjacent Groundwater Extraction Exclusion Area, Defence land uses, sand mining, etc; and
- Potential Unexploded Ordnance located within a former mortar firing area located to the east of the Project Area.

Based on information reviewed as part of this PSI, it is the opinion of ERM that the risk to current onsite human health is generally considered to be low. ERM notes that where the Project Area is to be redeveloped and / or Arup require a greater understanding of liabilities or to inform site management controls a Detailed Site Investigation (DSI) of soil and groundwater conditions should be undertaken to assess the contamination status of the Project Area.

Prior to undertaking investigation works, a Sampling and Analysis Quality Plan (SAQP) detailing the requirements for further investigation should be developed. While the specific requirements of the investigation would be detailed within the SAQP, ERM considers that the DSI should be undertaken on a targeted basis in consideration of the identified contaminants of potential concern (CoPCs) and include an assessment of soil and groundwater as follows:

- a targeted sampling approach to assess potential point sources of contamination such as potential uncontrolled fill and contaminated soils, sediment, surface and groundwater associated with historical onsite and offsite land uses; and
- the collection of background samples to ensure collected results are assessed in consideration of naturally occurring conditions.

While ERM notes that an initial review of records indicated that UXO was likely to be located to the east of the Project Area, where possible additional reviews of Defence records should be undertaken prior to the commencement of any intrusive works excavation / disturbance within the Botany Bay portion of the Project Area to assess the potential risk to the proposed works.

7. CONCLUSIONS AND RECOMENDATIONS

ERM was engaged by Arup to undertake a PSI at the Project Area identified the Kamay Ferry Wharf Proposal located in La Perouse, NSW (the Project Area).

The objective of these works was to undertake a PSI that refines the current understanding of the Project Area and aids Arup in assessing potential constraints associated with site contamination that may require consideration prior to or during development of the proposed Kamay Ferry Wharf.

To meet the above objectives, ERM undertook a PSI including a review of the NSW EPA contaminated land register, historical aerial photographs, groundwater-bore information; relevant government databases, published soil, geology and topographic maps and a site inspection.

The results of the PSI indicated the following:

- The Project Area is located in predominantly public open space comprising beach area, parkland and undeveloped bushland associated with Botany Bay National Park with the northern portion of the Project Area extending into Botany Bay.
- The Project Area is underlain by an unnamed Mesozoic formation comprising medium to coarse grained quartz and sandstone, very minor shale and laminite lenses and an unnamed Quaternary formation comprising coarse quartz sands and varying amounts of shell fragment.
- Groundwater within the surrounding area was identified at depths between 0 m bgl to 143.0 m bgl. The majority of bores identified groundwater at depths of between 3 m and 8 m bgl. Registered bores were utilised for a range of purposes including water supply, domestic, household, monitoring and water supply bores. ERM notes that the Project Area is located immediately adjacent to the NSW Office of Water Groundwater Extraction Exclusion Area (GEEA) - Area 2. Mapping indicates the exclusion zone extends from the northern boundary of the Project Area at the intersection of Anzac parade and Endeavour Avenue.
- Historical records indicate the Project Area has largely been vacant since the 1930s with limited use of the Project Area for Defence purposes in the 1940s. Records from this time indicate the potential for Mortar Firing to have been undertaken in an easterly direction towards Congwong Bay. ERM notes that a small pier was observed in aerial photographs from the 1930's and may be associated with the adjacent historical sand mining in Frenchmans bay. Following closure / demolition of Defence buildings the Project Area has been used for recreational parkland and the La Perouse Museum.

Based on information reviewed as part of this PSI, ERM considers there to be a potential risk to human health / ecological receptors due to the following potentially complete pollutant linkages identified at the Project Area:

- Potential uncontrolled fill materials associated with construction of the existing roadways or levelling / site filling for construction of onsite building structures;
- Potential use of hazardous materials within onsite historical and current building structures;
- Historical onsite and surrounding land uses including (but not limited to) former Defence land uses, sand mining etc; and
- Potential Unexploded Ordnance located within a former Mortar Firing area located to the East of the Project Area.

ERM further notes that based on the proposed construction method, the potential release of contamination within subsurface soils, sediments requires consideration during the design of construction environmental controls.

It is the opinion of ERM that based on the results of this PSI, to provide greater certainty on the potential constraints associated with contamination an intrusive investigation of soil, sediment, surface water and groundwater should be undertaken to more accurately assess the contamination status of the Project Area.

APPENDIX A FIGURES



Data Source:
 Site Boundary : Client Provided
 NSW DFSI, DCDB/DTDB, 2020
 Nearmap Imagery September 2020
 Locality : Esri OpenStreetMap, 2020

Legend

- Project Boundary
- Local Government Area
- Cadastre (Lot)
- National Park
- Nature Reserve
- Road Network



Site Location - La Perouse Wharf Site

F1b

Drawing No: 0564417s_PSI_G002_R0.mxd
 Date: 02/12/2020 Drawing Size: A4
 Drawn By: GC Reviewed By: IB

Preliminary Site Investigation - Kamay Wharf Project
 Kurnell, NSW
 Client: Arup Australia Pty Ltd

Coordinate System: GDA 1994 MGA Zone 56



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





Legend

- ▬ Project Boundary
- ▬ Construction Boundary
- Car Park (Disturbance Areas)
- Landscaping (Disturbance Areas)
- Utilities Trench (Disturbance Areas)
- Cadastre (Lot)
- National Park
- Ferry Design (Concept)
- Car Park Design

Proposed Utilities:

- - - Comms
- - - Electrical
- - - Fire Main
- - - Water

Data Source:
 Site Layout : Client Provided
 NSW DFSI, DCDB/DTDB, 2020
 Nearmap Imagery September 2020

Site Layout - La Perouse Wharf Site

Drawing No: 0564417s_PSI_G004_R1.mxd	Preliminary Site Investigation - Kamay Wharf Project
Date: 02/12/2020	Kurnell, NSW
Drawn By: GC	Reviewed By: IB
Client: Arup Australia Pty Ltd	
Coordinate System: GDA 1994 MGA Zone 56	
0 25 50 75m	
	N
	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

F2b

APPENDIX B DESKTOP SEARCH RESULTS



ATTACHMENT A

Report Maps





- Subject area
 - Transmission Line
 - Stormwater channel
 - Sewer Main
 - Water Main
 - Pipeline
-
- Sensitive Receptors**
- P Parks
 - ▲ Sports and Recreation Activities



SUBJECT AREA AND SENSITIVE RECEPTORS



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Subject area

Land Zoning

B1, Neighbourhood Centre

E1, National Parks and Nature Reserves

R2, Low Density Residential

R3, Medium Density Residential

RE1, Public Recreation

SP1, Special Activities

SP2, Infrastructure

UL, Unzoned Land



PLANNING CONTROLS



MAP 2

Due Diligence Insight



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Subject area

Soils Landscape

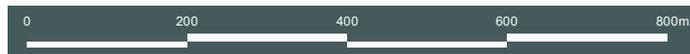
- AEnh/AEtg | AEOLIAN
- AEnp | AEOLIAN
- AEww | AEOLIAN

DTxx | DISTURBED TERRAIN

- ERIa | EROSIONAL
- WATER | WATER

Radon Level (Bq/m³)

<5



SOIL LANDSCAPES AND SALINITY



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Subject area

Acid Sulfate Soil Risk

- Class 4
- Class 5

ASRIS Atlas of Australian Sulfate Soils

- Aa(p-) | ASS in subtidal marine environments
- Bi(p-) | ASS in sandplains and dunes
- Cq(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Cu(-) | unclassified



ACID SULFATE SOILS



MAP 3b

Due Diligence Insight



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GEOLOGY AND TOPOGRAPHY



MAP 4

Due Diligence Insight



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- Subject area
- Protected riparian corridor
- Wetlands
- Drinking Water Catchments
- UPSS Environmentally Sensitive Zone

Groundwater bores



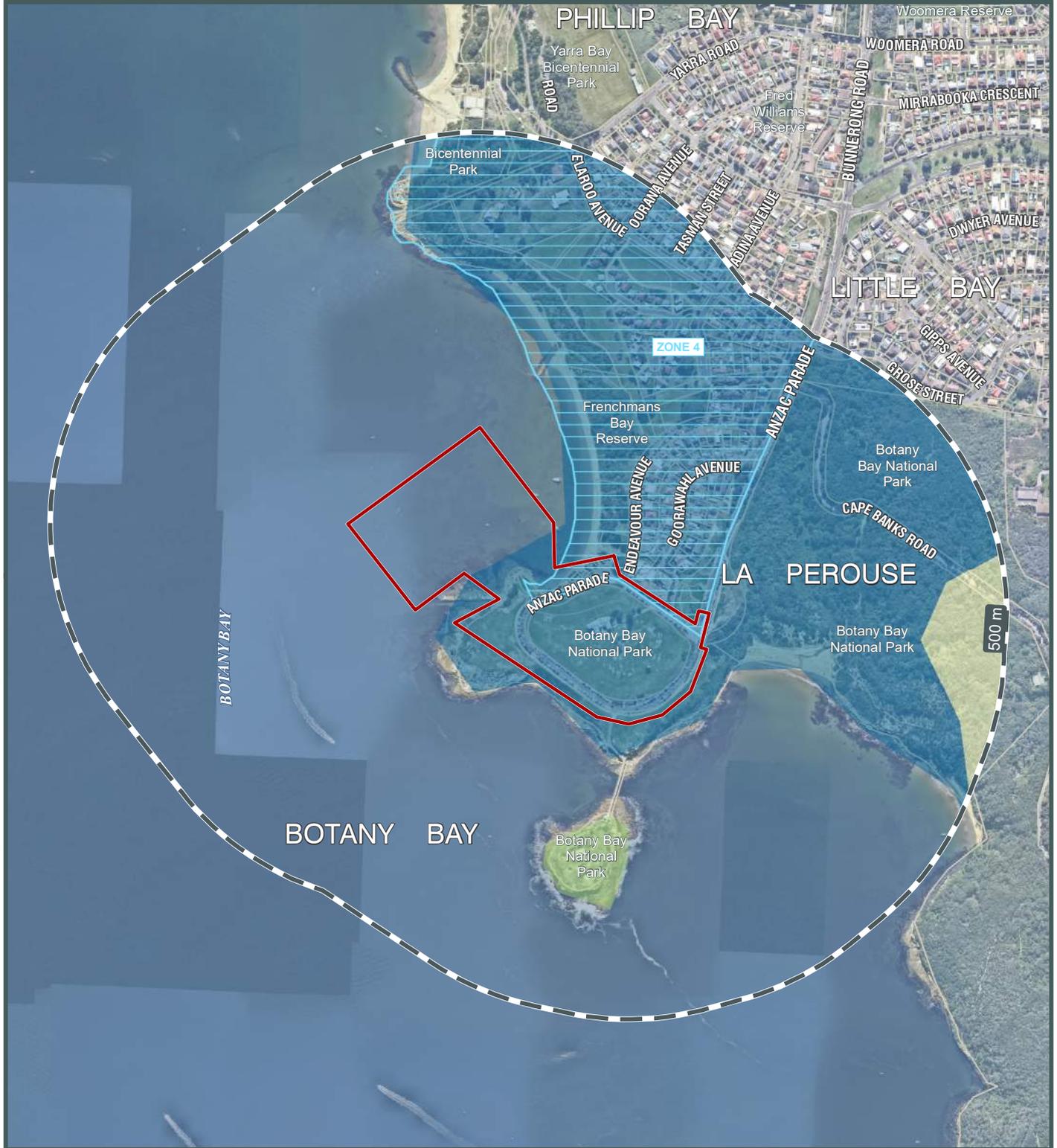
HYDROGEOLOGY AND GROUNDWATER BORES



MAP 5a

Due Diligence Insight





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HYDROGEOLOGY AND OTHER BOREHOLES



MAP 5b

Due Diligence Insight



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Subject area

Contaminated Land Register (EPA)

- Current - Sites notified as contaminated
- Former - Sites notified as contaminated
- Contaminated Land Record of Notices

Potentially Contaminated Areas

- Defence Sites
- Former Gasworks Sites
- PFAS Sites



CONTAMINATED LAND REGISTER AND POTENTIALLY CONTAMINATED AREAS



MAP 6

Due Diligence Insight



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- Subject area
- POEO Register** NPI Facilities
- POEO licences
- Surrendered Licences still Regulated by EPA
- Clean Up and Penalty Notices



ENVIRONMENTAL REGISTER & LICENCES AND NPI FACILITIES



MAP 7

Due Diligence Insight





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- Subject area
- Cattle dip/ saleyards
- Gas terminals
- Petrol stations
- Telephone exchanges
- Dry cleaners
- Liquid fuel depots / terminals
- Power stations
- Waste management facilities
- Fire Rescue sites
- Mine/quarry
- Substation locations
- Wastewater Treatment Facility

Current: business that are operational on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 5 years will be reported in the historical business section in this report.



POTENTIALLY CONTAMINATING ACTIVITIES



MAP 8a

Enviro-Screen



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Subject area

Commercial & Trade Directory

- Other potentially contaminating activities
- Former potentially contaminating activities

Tanks

- Aboveground Storage Tank - Current
- Aboveground Storage Tank - Former



Underground Storage Tank - Current



Underground Storage Tank - Former/Unknown



Unknown

*This is not an exhaustive list of all tanks.



CURRENT COMMERCIAL AND TRADE DATA



MAP 8b

Due Diligence Insight





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Subject area

Contaminated Legacy Areas

- Contaminated Legacy Areas
- Derelict Mines and Quarries
- Historical (Legacy) Landfills

Unexploded Ordnance (UXO) Areas

- Defence Controlled Area
- UXO Area: Substantial Occurrence
- UXO Area: Slight Occurrence
- UXO Area: Other



FORMER POTENTIALLY CONTAMINATED LAND



MAP 8c

Due Diligence Insight



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- Subject area

- Federal, State and Local Heritage**
- Heritage conservation Area (LEP)
- Non-Aboriginal heritage item (Local)
- Non-Aboriginal heritage item (SHR)
- Register of the National Estate (RNE)
- Commonwealth Heritage List (CHL)
- National Heritage List (NHL)
- World Heritage Area (WHA)



HERITAGE



MAP 9

Due Diligence Insight



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 Subject area

Fire
 Fire History

Flood Hazard
 Flood Prone Land (EPI)

Coastal Management
 Coastal Environment Area Map
 Coastal Use Area Map



NATURAL HAZARDS



MAP 10

Due Diligence Insight





ATTACHMENT A

Report Maps





- Subject area
 - Transmission Line
 - Stormwater channel
 - Sewer Main
 - Water Main
 - Pipeline
-
- Sensitive Receptors**
- 🌲 Parks
 - ⚽ Sports and Recreation Activities



SUBJECT AREA AND SENSITIVE RECEPTORS



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Subject area

Land Zoning

B1, Neighbourhood Centre

E1, National Parks and Nature Reserves

R2, Low Density Residential

R3, Medium Density Residential

RE1, Public Recreation

SP1, Special Activities

SP2, Infrastructure

UL, Unzoned Land



PLANNING CONTROLS



MAP 2

Due Diligence Insight



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Subject area

Soils Landscape

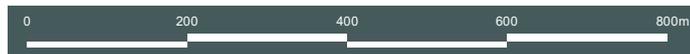
- AEnh/AEtg | AEOLIAN
- AEnp | AEOLIAN
- AEww | AEOLIAN

DTxx | DISTURBED TERRAIN

- ERIa | EROSIONAL
- WATER | WATER

Radon Level (Bq/m³)

<5



SOIL LANDSCAPES AND SALINITY



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Subject area

Acid Sulfate Soil Risk

- Class 4
- Class 5

ASRIS Atlas of Australian Sulfate Soils

- Aa(p-) | ASS in subtidal marine environments
- Bi(p-) | ASS in sandplains and dunes
- Cq(p4) | ASS in inland lakes, waterways, wetlands and riparian zones
- Cu(-) | unclassified



ACID SULFATE SOILS



MAP 3b

Due Diligence Insight



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GEOLOGY AND TOPOGRAPHY



MAP 4

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- Subject area
- Protected riparian corridor
- Wetlands
- Drinking Water Catchments
- UPSS Environmentally Sensitive Zone

Groundwater bores



HYDROGEOLOGY AND GROUNDWATER BORES

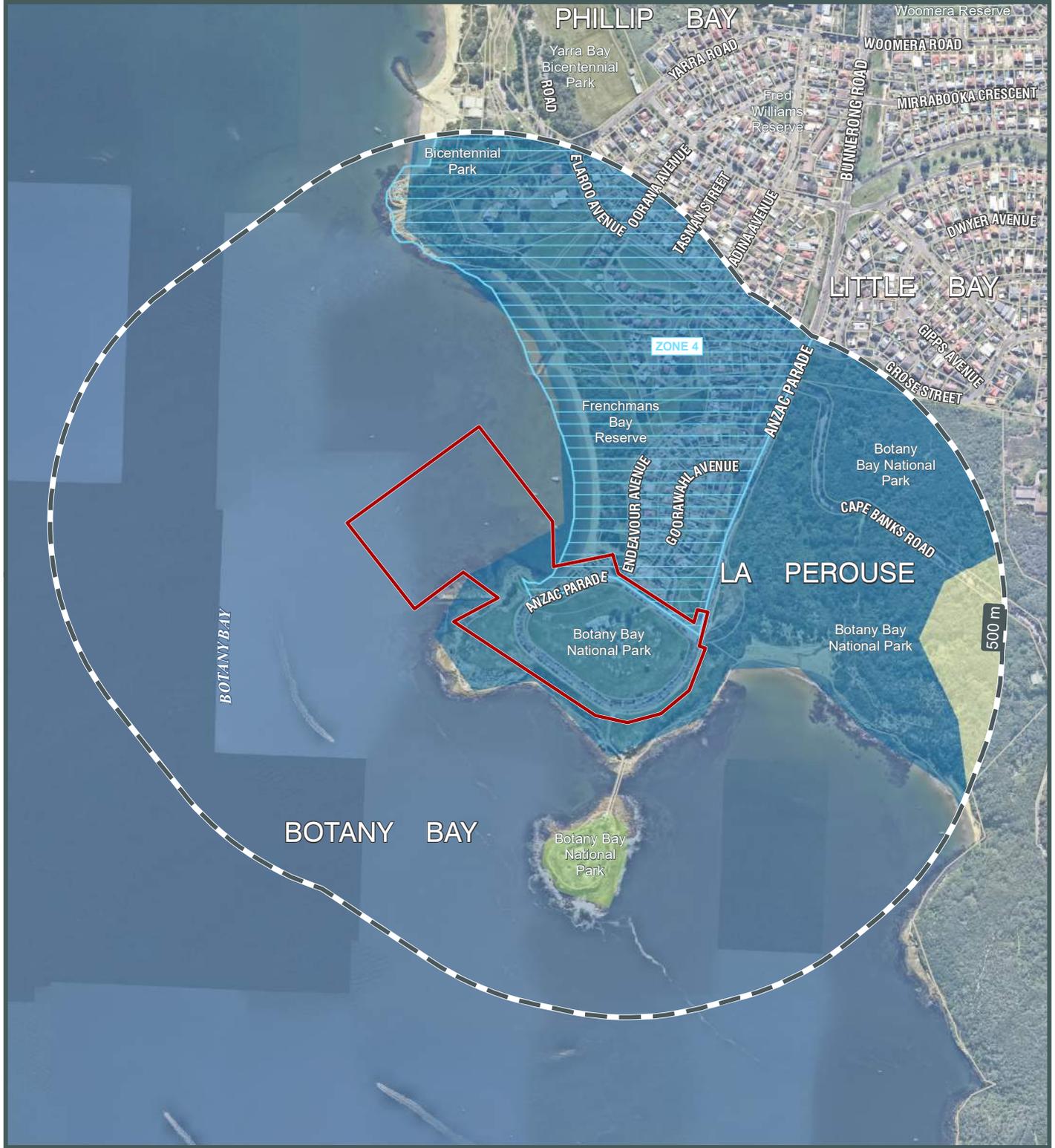


MAP 5a

Due Diligence Insight



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Subject area

Botany Groundwater Management Zone 4

Other borehole/monitoring well location

Hydrogeologic Unit

Surficial Sediment Aquifer (porous media - unconsolidated)

Mesozoic Sediment Aquifer (porous media - consolidated)

Late Permian/Triassic sediments (porous media - consolidated)



HYDROGEOLOGY AND OTHER BOREHOLES



MAP 5b

Due Diligence Insight



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Subject area

Contaminated Land Register (EPA)

- Current - Sites notified as contaminated
- Former - Sites notified as contaminated
- Contaminated Land Record of Notices

Potentially Contaminated Areas

- Defence Sites
- Former Gasworks Sites
- PFAS Sites



CONTAMINATED LAND REGISTER AND POTENTIALLY CONTAMINATED AREAS



MAP 6

Due Diligence Insight



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- Subject area
- POEO Register** ■ NPI Facilities
- POEO licences
- Surrendered Licences still Regulated by EPA
- Clean Up and Penalty Notices



ENVIRONMENTAL REGISTER & LICENCES AND NPI FACILITIES



MAP 7

Due Diligence Insight





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- Subject area
- Cattle dip/ saleyards
- Gas terminals
- Petrol stations
- Telephone exchanges
- Dry cleaners
- Liquid fuel depots / terminals
- Power stations
- Waste management facilities
- Fire Rescue sites
- Mine/quarry
- Substation locations
- Wastewater Treatment Facility

Current: business that are operational on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 5 years will be reported in the historical business section in this report.



POTENTIALLY CONTAMINATING ACTIVITIES



MAP 8a

Enviro-Screen



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 Subject area

Commercial & Trade Directory

-  Other potentially contaminating activities
-  Former potentially contaminating activities

Tanks

-  Aboveground Storage Tank - Current
-  Aboveground Storage Tank - Former



Underground Storage Tank - Current



Underground Storage Tank - Former/Unknown



Unknown

*This is not an exhaustive list of all tanks.



CURRENT COMMERCIAL AND TRADE DATA



MAP 8b

Due Diligence Insight



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Subject area

Contaminated Legacy Areas

- Contaminated Legacy Areas
- Derelict Mines and Quarries
- Historical (Legacy) Landfills

Unexploded Ordnance (UXO) Areas

- Defence Controlled Area
- UXO Area: Substantial Occurrence
- UXO Area: Slight Occurrence
- UXO Area: Other



FORMER POTENTIALLY CONTAMINATED LAND



MAP 8c

Due Diligence Insight





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- Subject area
- Federal, State and Local Heritage**
- Heritage conservation Area (LEP)
 - Non-Aboriginal heritage item (Local)
 - Register of the National Estate (RNE)
 - Non-Aboriginal heritage item (SHR)
 - Commonwealth Heritage List (CHL)
 - National Heritage List (NHL)
 - World Heritage Area (WHA)



HERITAGE



MAP 9

Due Diligence Insight



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 Subject area

Fire
 Fire History

Flood Hazard
 Flood Prone Land (EPI)

Coastal Management
 Coastal Environment Area Map
 Coastal Use Area Map



NATURAL HAZARDS



MAP 10

Due Diligence Insight





DUE DILIGENCE *INSIGHT* REPORT

Property Details

Proposed Wharf Site, La Perouse NSW

Search Date: 12 August 2020

Executive Summary

Dataset	Identified	Not identified
Sensitive Receptors	▲	
Planning Controls	▲	
Soil Landscape	▲	
Salinity		▲
Radon	▲	
Acid Sulfate Soil	!	
Geology	▲	
Naturally Occurring Asbestos Potential (NOA)		▲
Topography	▲	
Hydrogeology	▲	
Groundwater Bores	▲	
Groundwater Dependent Ecosystems		▲
Other Bores		▲
Environmental Registers, Licences and Incidents		
Contaminated Land Record of Notices		▲
Sites Notified as Contaminated to the NSW EPA		▲
Potentially Contaminated Areas		
<i>Defence Sites (current, former and RCIP)</i>	!	
<i>Former Gasworks Sites</i>		▲
<i>PFAS Sites</i>	!	
Licensing under the POEO Act		
<i>Licences</i>		▲
<i>Surrendered Licences still Regulated by EPA</i>	!	
<i>Clean Up and Penalty Notices</i>		▲
NPI Industrial Facilities		▲
Public Register of Properties Affected by Loose-Fill Asbestos Insulation		▲
Other Potentially Contaminating Activities		
<i>Contamination Legacy Areas</i>		▲
<i>Derelict Mines and Quarries</i>	!	
<i>Historical Landfills</i>		▲
<i>Unexploded Ordnance (UXO) Sites - Department of Defence (DoD)</i>	!	
<i>Aviation Fuel Depots/Terminals</i>		▲
<i>Cattle Dip Sites</i>		▲
<i>Dry Cleaners</i>		▲
<i>Liquid Fuel Depots/Terminals</i>		▲
<i>Fire and Rescue Sites</i>		▲
<i>Gas Terminals</i>		▲
<i>Mines and Quarries</i>		▲
<i>Power Stations</i>		▲
<i>Service Stations</i>		▲
<i>Substation/Switching Station</i>		▲
<i>Telephone Exchanges</i>		▲
<i>Waste Management Facilities</i>		▲
<i>Wastewater Treatment Facilities</i>		▲
Current Commercial & Trade Directory Data		▲
Historic Commercial & Trade Directory Data	!	
Other Environmental Constraints		
Federal, State and Local Heritage	!	
Natural Hazards		▲
State Environmental Planning Policy (Coastal Management)	!	

Understanding your Report

Your Report has been produced by Land Insight and Resources (LI Resources).

Your Report is based on information available from public databases and sources at the date of reporting. The information gathered relates to land that is within a **200 to 2000 m radius** (buffer zone) from the boundaries of the Property. A smaller or larger radius may be applied for certain records (as listed under records and as shown in report maps).

While every effort is made to ensure the details in your Report are correct, LI Resources cannot guarantee the accuracy or completeness of the information or data provided.

The report provided by LI Resources includes data listed on page 3 (table of contents). All sources of data and definitions are provided on the report maps and as listed in the Product Guide (Attached). For a full list of references, metadata, publications or additional information not provided in this report, please contact LI Resources at info@liresources.com.au.

The report does not include title searches; dangerous good searches or; property certificates (unless requested); or information derived from a physical inspection, such as hazardous building materials, areas of infilling or dumping/spilling of potentially contaminated materials. It is important to note that these documents and an inspection can contain information relevant to contamination that may not be identified by this Report.

This Report, and your use of it, is regulated by LI Resources Terms and Conditions (See LIR Product Guide).

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INDEX

Section 1 - Property Setting	4
1.1 <i>SITE LOCATION MAP AND SENSITIVE RECEPTORS Map 1 (200m Buffer)</i>	4
1.2 <i>PLANNING CONTROLS Map 2 (onsite)</i>	4
Zoning	4
Environmental Planning Instruments	4
1.3 <i>SOIL AND LAND USE INFORMATION Map 3a/3b (onsite)</i>	4
Soil Landscape	4
Salinity	5
Radon	5
Acid Sulfate Soil	5
1.4 <i>GEOLOGY AND TOPOGRAPHY Map 4 (onsite)</i>	6
Geology	6
Naturally Occurring Asbestos Potential (NOA)	6
Topography	6
Section 2 - Hydrogeology	7
2.1 <i>HYDROGEOLOGY AND GROUNDWATER BORES Map 5a (500m - 2000m Buffer)</i>	7
2.2 <i>HYDROGEOLOGY AND OTHER BOREHOLES Map 5b (500m Buffer)</i>	14
Groundwater Dependent Ecosystems	14
Section 3 – Environmental Registers, Licences and Incidents	15
3.1 <i>CONTAMINATED LAND PUBLIC REGISTER Map 6 (1000m Buffer)</i>	15
Contaminated Land Record of Notices	15
Sites Notified as Contaminated to the EPA	15
3.2 <i>POTENTIALLY CONTAMINATED AREAS Map 6 (1000m Buffer)</i>	16
Defence Sites	16
Former Gasworks Sites	16
PFAS Sites	16
3.3 <i>LICENSING UNDER THE POEO ACT Map 7 (500m Buffer)</i>	17
Licences	17
Surrendered Licences still Regulated by EPA	17
Clean Up and Penalty Notices	17
3.4 <i>NATIONAL POLLUTANT INVENTORY (NPI) Map 7 (500m Buffer)</i>	17
3.5 <i>PUBLIC REGISTER OF PROPERTIES AFFECTED BY LOOSE-FILL ASBESTOS INSULATION Map 7 (onsite)</i>	17
Section 4 – Other Potentially Contaminating Activities	18
4.1 <i>POTENTIALLY CONTAMINATING ACTIVITIES Map 8a (500m Buffer)</i>	18
Cattle Dip Sites	18
Dry Cleaners	18
Fire Rescue Sites	18
Gas Terminals	18
Liquid Fuel Depots/Terminals	18
Mines and Quarries	18
Petrol Stations	18
Power Stations	19
Substation / Switching Stations	19
Telephone Exchanges	19
Waste Management Facilities	19
Wastewater Treatment Facilities	19
4.2 <i>CURRENT COMMERCIAL AND TRADE DATA Map 8b (200m Buffer)</i>	20
Current Commercial and Trade Data	20
Tanks (AST/UST)	20
4.3 <i>FORMER POTENTIALLY CONTAMINATED LAND Map 8c (500m Buffer)</i>	20
Contaminated Legacy Areas	20
Derelict Mines and Quarries	20
Historical Landfills	20
Unexploded Ordnance (UXO) Areas	20

4.4 HISTORICAL COMMERCIAL AND TRADE DATA (not mapped)	21
1930 Historical Commercial & Trade Directory Data	21
1940 Historical Commercial & Trade Directory Data	21
1950 Historical Commercial & Trade Directory Data	21
1965 Historical Commercial & Trade Directory Data	21
1970 Historical Commercial & Trade Directory Data	21
1975 Historical Commercial & Trade Directory Data	21
1980 Historical Commercial & Trade Directory Data	22
1990 Historical Commercial & Trade Directory Data	22
2005 Historical Commercial & Trade Directory Data	22
2010 Historical Commercial & Trade Directory Data	22
Section 5 - Other Environmental Constraints	24
5.1 FEDERAL, STATE AND LOCAL HERITAGE Map 9 (200m Buffer)	24
Local Environment Plan (LEP) Heritage	24
National Heritage List (NHL)	24
Register of the National Estate (RNE)	24
Non-Aboriginal heritage item (Local)	24
Non-Aboriginal heritage item (SHR)*	24
Commonwealth Heritage List (CHL)	25
World Heritage Area (WHA)	25
5.2 NATURAL HAZARDS Map 10 (500m Buffer)	25
Bush Fire Prone Land (BLP)	25
Fire History	25
Flood Hazard	25
5.3 COASTAL MANAGEMENT (STATE ENVIRONMENTAL PLANNING POLICY) Map 10 (500m Buffer)	25
ATTACHMENTS	
Attachment A - Report Maps	
Attachment B - Historical Imagery	
LIR Product Guide and Terms and Conditions	

Section 1 - Property Setting

1.1 SITE LOCATION MAP AND SENSITIVE RECEPTORS

Map 1 (200m Buffer)

Sensitive recep	Category	Distance (m)*	Direction
Sydney Pistol Club Ltd	Sports and Recreation Activities	0	onsite
Botany Bay National Park	Parks and reserves	0	onsite
Timbery Reserve	Parks and reserves	0	onsite
Cann Park	Parks and reserves	15	North-east
Frenchmans Bay Reserve	Parks and reserves	85	South

*Distance from the sensitive receptor point feature to the site boundary centroid.

1.2 PLANNING CONTROLS

Map 2 (onsite)

Zoning

Code	Classification
E1 RE1 SP2	National Parks and Nature Reserves Public Recreation Infrastructure - Classified Road

Environmental Planning Instruments

Type	Local Environmental Plan	Classification
Not identified	-	-

1.3 SOIL AND LAND USE INFORMATION

Map 3a/3b (onsite)

Soil Landscape

Soil Landscape	ER1a	LAMBERT	Soil Group	EROSIONAL
Description	<p>Landscape- undulating to rolling rises and low hills on Hawkesbury Sandstone. Local relief 20-120 m, slopes 20%. Rock outcrop >50%. Broad ridges, gently to moderately inclined slopes, wide rock benches with low broken scarps, small hanging valleys and areas of poor drainage. Open and closed heathland, scrub and occasional low eucalypt open-woodland.</p> <p>Soils- shallow (<50 cm) discontinuous <i>Earthy Sands (Uc5.11, Uc5.22)</i> and <i>Yellow Earths (Gn2.2)</i> on crests and insides of benches; shallow (<20 cm) <i>Siliceous Sands/Lithosols (Uc1.2)</i> on leading edges; shallow to moderately deep (<150 cm) <i>Leached Sands (Uc2.21)</i>, <i>Grey Earths (Gn2.81)</i> and <i>Gleyed Podzolic Soils (Dg4.21)</i> in poorly drained areas; localised <i>Yellow Podzolic Soils (Dy4.1, Dy5.2)</i> associated with shale lenses.</p> <p>Limitations- very high soil erosion hazard, rock outcrop, seasonally perched watertables, shallow, highly permeable soil, very low soil fertility.</p>			

Salinity

Salinity Hazard	-	Not identified
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Radon

Radon Level	Bq/m3	4
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Typical radon levels in Australia are low and the values shown are the average values for each census district. For specific location, factors such as the local geology and house type could lead to different values. (ARPANSA).

Acid Sulfate Soil

ASS Risk Maps (Table 1.3.1)	On the Property?		Within Buffer?	
Class	Class 5		Class 4 / Class 5	
Atlas of Australian Acid Sulfate Soil (Table 1.3.2)	Aa(p-)	ASS in subtidal marine environments	Probability of Occurrence	Potential ASS
	Cq(p4)	ASS in inland lakes, waterways, wetlands and riparian zones		Extremely low probability of occurrence
	Cu(--)	unclassified		Extremely low probability of occurrence

Table 1.3.1. Classification scheme in the ASS Planning Maps

Class of Land as shown on ASS Planning Maps	
1	Acid sulfate soils in a class 1 area are likely to be found on and below the natural ground surface.
2	Acid sulfate soils in a class 2 area are likely to be found below the natural ground surface.
3	Acid sulfate soils in a class 3 area are likely to be found beyond 1 metre below the natural ground surface.
4	Acid sulfate soils in a class 4 area are likely to be found beyond 2 metres below the natural ground surface.
5	Acid sulfate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1,2,3 or 4 land.

For each class of land, the maps identify the type of works likely to present an environmental risk if undertaken in the particular class of land. If these types of works are proposed, further investigation is required to determine if ASS are actually present and whether they are present in such concentrations as to pose a risk to the environment.

Table 1.3.2. Atlas of Australian Acid Sulfate Soils¹ (ASRIS) (CSIRO/NatCASS)

Code	Distinguishing soil/sediment properties, vegetation, landforms, or other characteristics
Probability of Occurrence of ASS¹	
A	High Probability of occurrence - (>70% chance of occurrence in mapping unit)
B	Low Probability of occurrence - (6-70% chance of occurrence in mapping unit)
C	Extremely low probability of occurrence - (1-5% chance of occurrence in mapping unit)
D	No probability of occurrence - (<1% chance of occurrence in mapping unit)
x	Disturbed ASS¹ terrain - (ASS ¹ material present below urban development).
u	Unclassified - (Insufficient information to classify map unit)
Zones	
a	Potential acid sulfate soil material and/or Monosulfidic Black Ooze (MBO).
b, c	Potential acid sulfate soil generally within upper 1 m.
c, d, e	ASS ¹ generally within upper 1 m.
f	ASS ¹ generally below 1 m from the surface
g	ASS ¹ , generally below 3 m from the surface.

Code	Distinguishing soil/sediment properties, vegetation, landforms, or other characteristics
Probability of Occurrence of ASS¹	
h	ASS ¹ generally within 1 m of the surface.
i, j	ASS ¹ generally below 1 m of the surface.
k	ASS ¹ material and/or Monosulfidic Black Ooze (MBO).
l, m, n, o, p, q	ASS ¹ generally within upper 1 m in wet / riparian areas.
Subscripts to codes	
(a)	Actual acid sulfate soil (AASS) = sulfuric material.
(p)	Potential acid sulfate soil (PASS) = sulfidic material.
(q)	Monosulfidic Black Ooze (MBO) is organic ooze enriched by iron monosulfides.
Confidence levels	
(1)	All necessary analytical and morphological data are available
(2)	Analytical data are incomplete but are sufficient to classify the soil with a reasonable degree of confidence
(3)	No necessary analytical data are available, but confidence is fair, based on a knowledge of similar soils in similar environments
(4)	No necessary analytical data are available, and classifier has little knowledge or experience with ASS, hence classification is provisional

¹Acid Sulfate Soils (ASS) are all those soils in which sulfuric acid may be produced, is being produced, or has been produced in amounts that have a lasting effect on main soil characteristics (Pons 1973). Acid sulfate soil (ASS) may include PASS or AASS + PASS. Potential acid sulfate soil (PASS) = sulfidic material. Actual acid sulfate soil (AASS) = sulfuric material.

1.4 GEOLOGY AND TOPOGRAPHY

Map 4 (onsite)

Geology

Map Sheet	Symbol	Formation	Group	Era	Period	Description
Sydney 1:100 000 Geological Map	Rh	-	-	Mesozoic	Triassic	Medium to coarse grained quartz sandstone, very minor shale and laminite lenses
	Qhb	-	-	Cainozoic	Quaternary	Coarse quartz sand, varying amounts of shell fragment

Naturally Occurring Asbestos Potential (NOA)

Category	On the Property?	Within Buffer?
Not identified	-	-

Topography

Topography	2-18mAHD
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Section 2 - Hydrogeology

2.1 HYDROGEOLOGY AND GROUNDWATER BORES

Map 5a (500m - 2000m Buffer)

	On the Property?	Within Buffer? ¹
Aquifer Type	Porous, extensive highly productive aquifers	Porous, extensive highly productive aquifers
Drinking Water Catchments	Not identified	Not identified
Protected Riparian Corridor	Not identified	Not identified
UPSS Environmentally sensitive zone	Yes	Yes
Wetlands	Botany Bay	Botany Bay
Groundwater Bores	Not identified	Yes, see 2.1.1 and 2.1.2

¹ - Groundwater bore buffer size will change depending on the number of GW bores found within buffer; if there are less than 7 bores within buffer, buffer will increase to max 2km until bores are found.

Table 2.1.1. Groundwater Bore Details

Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity	Yield (L/s)	Distance (m)	Direction
GW109514	Monitoring	19-07-07	0.00	7.00	0.00		0.00	555.48	north
GW109513	Monitoring	19-07-07	0.00	7.00	0.00		0.00	593.64	north
GW109021	Household	10-07-08	0.00	4.00	0.00		0.00	943.22	north-east
GW028816	Manufacturing and industry	01-10-68	21.40	21.40	0.00		0.00	1008.18	north
GW114312	Monitoring	08-12-10	3.50	3.50	0.00		0.00	1063.63	north
GW069143	Recreation	28-08-92	95.00	0.00	9.61		1.90	1107.61	south-east
GW114308	Monitoring	08-12-10	2.90	2.90	0.00		0.00	1113.13	north-east
GW100005	Monitoring	20-04-06	246.00	246.00	8.00		0.45	1114.59	south-east
GW114311	Monitoring	08-12-10	6.00	6.00	0.00		0.00	1156.83	north
GW114309	Monitoring	08-12-10	6.00	6.00	0.00		0.00	1171.78	north-east
GW114310	Monitoring	08-12-10	4.80	4.80	0.00		0.00	1175.54	north
GW100016	Recreation	16-03-95	150.50	150.50	0.00	480.00 mg/L	0.80	1203.00	north-east

Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity	Yield (L/s)	Distance (m)	Direction
GW100461	Unknown	02-09-95	0.00	6.10	0.00		0.00	1215.56	north-east
GW105111	Household	01-Jan-1800	4.00	4.00	0.00		0.00	1268.52	north-east
GW103837	Household	08-07-01	6.00	6.00	0.00		0.00	1319.76	north-east
GW109705	Monitoring	12-11-02	163.20	163.20	0.00		0.16	1321.78	north-west
GW109706	Monitoring	15-11-02	53.20	53.20	0.00		0.16	1322.81	north-west
GW108724	Household	21-05-07	4.88	4.88	2.75	Good	0.50	1348.82	north-east
GW108260	Monitoring	01-04-06	199.00	199.00	0.00		0.50	1445.31	north-east
GW028573	Irrigated agriculture	01-11-66	13.10	13.10	2.10		1.52	1570.01	north-east
GW111793	Industrial, Irrigation, Recreation (Groundwater)	11-07-12	200.00	200.00	0.00		4.40	1602.79	north-east
GW110526	Monitoring	27-04-09	2.00	2.00	1.75		0.00	1652.66	north
GW113184	Monitoring	12-07-13	2.20	2.20	1.24		0.00	1720.79	north
GW111327	Monitoring	03-05-04	160.20	160.20	0.00		0.00	1729.91	north-west
GW108799	Monitoring	12-04-07	3.70	3.70	1.20		0.00	1731.87	north
GW108798	Monitoring	11-04-07	6.00	6.00	1.00		0.00	1739.51	north
GW113183	Monitoring	12-07-13	7.60	7.60	6.70		0.00	1741.42	north
GW108797	Monitoring	11-04-07	6.00	6.00	1.00		0.00	1749.39	north
GW113185	Monitoring	15-07-13	3.80	3.80	2.14		0.00	1749.73	north
GW111328	Monitoring	21-05-04	86.00	86.00	0.00		0.00	1766.61	north-west
GW113182	Monitoring	12-07-13	3.90	3.90	0.00		0.00	1786.73	north
GW111325	Monitoring	14-04-04	143.40	143.40	0.00		0.00	1823.99	north-west
GW111326	Monitoring	15-04-04	83.00	83.00	0.00		0.00	1862.68	north-west
GW114335	Monitoring	28-06-11	5.80	5.80	0.00		0.00	1942.56	north-west
GW114336	Monitoring	27-06-11	3.00	3.00	0.00		0.00	1989.67	north-west

Groundwater Bore ID	Authorised Purpose	Completion Date	Drilled Depth (m)	Final Depth (m)	SWL (m)	Salinity	Yield (L/s)	Distance (m)	Direction
GW114337	Monitoring	27-06-11	4.00	4.00	0.00		0.00	1989.71	north-west
GW114338	Monitoring	27-06-11	4.00	4.00	0.00		0.00	1994.69	north-west
GW110525	Monitoring	27-04-09	11.70	11.70	6.40		0.00	1996.36	north

Table 2.1.2. Groundwater Bore Driller Lithology Details

Groundwater Bore ID	From Depth (m)	To Depth (m)	Lithology	Description	Distance (m)	Direction
GW028816	0.00	1.82	TPSL	Topsoil sandy	1008.18	north
GW028816	1.82	5.48	SAND	Sand grey	1008.18	north
GW028816	5.48	12.80	SAND	Sand white grey	1008.18	north
GW028816	12.80	19.20	SAND	Sand white yellow	1008.18	north
GW028816	19.20	21.03	SAND	Sand white	1008.18	north
GW028816	21.03	21.42	SAND	Sand white clayey	1008.18	north
GW069143	0.00	2.50	<Null>	Silty sand	1107.61	south-east
GW069143	2.50	19.00	<Null>	Sandstone grey with seams of shale	1107.61	south-east
GW069143	19.00	95.00	<Null>	White sandstone with bands of shale	1107.61	south-east
GW100005	0.00	4.80	<Null>	Sand	1114.59	south-east
GW100005	4.80	14.00	<Null>	Soft sandstone	1114.59	south-east
GW100005	14.00	24.00	<Null>	Sadstone with shale bands	1114.59	south-east
GW100005	24.00	147.00	<Null>	White sandstone	1114.59	south-east
GW100005	147.00	150.00	<Null>	Shale	1114.59	south-east
GW100005	150.00	153.00	<Null>	White sandstone	1114.59	south-east
GW100005	153.00	158.00	<Null>	Shale	1114.59	south-east
GW100005	158.00	163.00	<Null>	White sandstone	1114.59	south-east
GW100005	163.00	244.00	<Null>	Shale	1114.59	south-east
GW100005	244.00	246.00	<Null>	Bald hill clay	1114.59	south-east
GW100016	0.00	2.80	<Null>	Sand/loam	1203.00	north-east
GW100016	2.80	5.10	<Null>	Grey f/grain sandstone	1203.00	north-east
GW100016	5.10	6.00	<Null>	Red f/grain s/stone	1203.00	north-east
GW100016	6.00	7.20	<Null>	L/grey f/grain sandstone	1203.00	north-east
GW100016	7.20	18.90	<Null>	L/grey s/stone clay matrix	1203.00	north-east
GW100016	18.90	51.00	<Null>	Grey med. grain sandstone	1203.00	north-east
GW100016	51.00	58.00	<Null>	L/grey m/grain s/stone	1203.00	north-east
GW100016	58.00	62.50	<Null>	L/grain c/grain s/s quartz matrix	1203.00	north-east
GW100016	62.50	63.20	<Null>	D/grey shale	1203.00	north-east
GW100016	63.20	66.90	<Null>	Dark/grey f/grain s/stone	1203.00	north-east
GW100016	66.90	71.50	<Null>	L/grey med grain s/stone	1203.00	north-east
GW100016	71.50	81.50	<Null>	L/grey m/grain cemented s/stone	1203.00	north-east
GW100016	81.50	82.60	<Null>	D/grey, shale	1203.00	north-east
GW100016	82.60	96.00	<Null>	L/g med. grain cemented s/stone	1203.00	north-east
GW100016	96.00	98.70	<Null>	L/grey m/grain cemented s/s	1203.00	north-east
GW100016	98.70	123.40	<Null>	L/g m/grain cemented s/stone	1203.00	north-east
GW100016	123.40	128.60	<Null>	L/grey m/grain s/stone	1203.00	north-east

GW100016	128.60	138.20	<Null>	L/g med grain s/stone	1203.00	north-east
GW100016	138.20	139.70	<Null>	D/grey f/grain s/stone	1203.00	north-east
GW100016	139.70	150.50	<Null>	L/grey m/grain s/stone	1203.00	north-east
GW105111	0.00	4.00	SAND	Sand	1268.52	north-east
GW103837	0.00	6.00	SAND	Sand	1319.76	north-east
GW109705	0.00	0.10	SDLC	Sand med, grey brown coloured	1321.78	north-west
GW109705	0.10	0.20	FILL	Fill, basalt fragments	1321.78	north-west
GW109705	0.20	2.20	SAND	Sand,grey,beige	1321.78	north-west
GW109705	2.20	2.40	CRBN	Carbonaceous material white grey	1321.78	north-west
GW109705	2.40	14.20	SDLC	Sand and carbonaceous material white,grey	1321.78	north-west
GW109705	14.20	18.20	SDLC	Sand and carbonaceous material white,grey	1321.78	north-west
GW109705	18.20	22.00	SDSN	Sandstone,white grey sand sized grains	1321.78	north-west
GW109705	22.00	22.20	SDSN	Sandstone and carbonaceous material	1321.78	north-west
GW109705	22.20	26.30	SDSN	Sandstone and carbonaceous material,60%sandstone	1321.78	north-west
GW109705	26.30	32.00	SDSN	Sandstone and carbonaceous material 70%sandtone	1321.78	north-west
GW109705	32.00	34.10	SDSN	Sandstone and carbonaceous material as above	1321.78	north-west
GW109705	34.10	34.30	HMTT	Hard sandstone	1321.78	north-west
GW109705	34.30	39.90	SDSN	Sandstone	1321.78	north-west
GW109705	39.90	48.00	HMTT	Hard sandstone fine grey	1321.78	north-west
GW109705	48.00	49.10	HMTT	Hard sandstone	1321.78	north-west
GW109705	49.10	51.10	SDSN	Sandstone/ fine grained sand	1321.78	north-west
GW109705	51.10	52.50	SDSN	Sandstone/ fine grained sand	1321.78	north-west
GW109705	52.50	55.10	SDSN	Sandstone.silt and sand/small pebbles	1321.78	north-west
GW109705	55.10	59.90	SDSN	Sandstone,small rock chips	1321.78	north-west
GW109705	59.90	69.00	SDSN	Sandstone mostly sand sized	1321.78	north-west
GW109705	69.00	70.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	70.00	71.00	SHLE	Shale	1321.78	north-west
GW109705	71.00	72.00	SDSN	Sandstone	1321.78	north-west
GW109705	72.00	73.00	SHLE	Shale	1321.78	north-west
GW109705	73.00	80.00	SDSN	Sandstone	1321.78	north-west
GW109705	80.00	80.10	SDSN	Sandstone,pale grey	1321.78	north-west
GW109705	80.10	87.10	SDSN	Sandstone,pale grey sand grains	1321.78	north-west
GW109705	87.10	88.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	88.00	89.00	SDSN	Sandstone	1321.78	north-west
GW109705	89.00	90.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	90.00	102.00	SDSN	Sandstone,sand grains and chips	1321.78	north-west
GW109705	102.00	110.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	110.00	113.00	SHLE	Shale,silt sized,dark grey	1321.78	north-west
GW109705	113.00	118.00	SDSN	Sandstone	1321.78	north-west
GW109705	118.00	120.00	SHLE	Shale	1321.78	north-west
GW109705	120.00	126.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	126.00	134.00	SDSN	Sandstone,sands grainds with black flecks	1321.78	north-west
GW109705	134.00	139.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	139.00	145.00	SDSN	Sandstone mostly sand sized grains	1321.78	north-west
GW109705	145.00	150.00	SDSN	Sandstone	1321.78	north-west
GW109705	150.00	153.00	SDSN	Sandstone,silt and sand sized grains	1321.78	north-west
GW109705	153.00	156.00	SHLE	Shale,fragments from sand sized to 10mm	1321.78	north-west
GW109705	156.00	159.00	SDSN	Sandstone	1321.78	north-west

GW109705	159.00	161.00	SHLE	Shale and sandstone	1321.78	north-west
GW109705	161.00	163.20	SHLE	Shale,silt sized grains to fragments up to 15mm	1321.78	north-west
GW109706	0.00	0.10	SAND	Sand	1322.81	north-west
GW109706	0.10	0.20	FILL	Fill,basalt fragments	1322.81	north-west
GW109706	0.20	3.00	SAND	Sand,grey,beige	1322.81	north-west
GW109706	3.00	5.00	CRBN	Carbonaceous material,dark brown	1322.81	north-west
GW109706	5.00	7.50	SDLC	Sand and carbonaceous material	1322.81	north-west
GW109706	7.50	9.50	SDLC	Sand and carbonaceous material,white grey	1322.81	north-west
GW109706	9.50	13.00	CRBN	Carbonaceous material, soft to hard	1322.81	north-west
GW109706	13.00	18.00	CRBN	Carbonaceous material,clay and shells	1322.81	north-west
GW109706	18.00	19.00	CLSD	Clayey sand with shells	1322.81	north-west
GW109706	19.00	20.00	SAND	Sand	1322.81	north-west
GW109706	20.00	21.00	CRBN	Carbonaceous material,sand and clay	1322.81	north-west
GW109706	21.00	24.00	CRBN	Carbonaceous materialsand,shells and clay	1322.81	north-west
GW109706	24.00	26.00	BSLT	Black clay	1322.81	north-west
GW109706	26.00	28.80	CRBN	Carbonaceous materialsand,shells and clay	1322.81	north-west
GW109706	28.80	29.30	CRBN	Carbonaceous materialsand,shells and clay	1322.81	north-west
GW109706	29.30	33.00	SDCY	Sandy clay	1322.81	north-west
GW109706	33.00	34.30	<Null>	Weathered sandstone	1322.81	north-west
GW109706	34.30	35.30	<Null>	Weathered sandstone,fine sand grains	1322.81	north-west
GW109706	35.30	39.90	<Null>	Weathered sandstone coarse	1322.81	north-west
GW109706	39.90	41.00	SDSN	Sandstone coarse sand grains	1322.81	north-west
GW109706	41.00	42.00	SDSN	Sandstone coarse sand grains	1322.81	north-west
GW109706	42.00	44.00	SDSN	Sandstone black particles	1322.81	north-west
GW109706	44.00	46.20	SDSN	Sandstone sand sized and grain	1322.81	north-west
GW109706	46.20	53.20	SDSN	Sandstone,soft pale to mid grey	1322.81	north-west
GW108724	0.00	4.88	SAND	Sand	1348.82	north-east
GW108260	0.00	5.00	SAND	Sand	1445.31	north-east
GW108260	5.00	36.00	SDSN	Sandstone, fine	1445.31	north-east
GW108260	36.00	48.00	SHLE	Shale	1445.31	north-east
GW108260	48.00	82.00	SDSN	Sandstone,	1445.31	north-east
GW108260	82.00	90.00	SHLE	Shale	1445.31	north-east
GW108260	90.00	140.00	SDSN	Sandstone,	1445.31	north-east
GW108260	140.00	199.00	SLSN	Siltstone	1445.31	north-east
GW028573	0.00	2.26	CLAY	Clay sandy made ground	1570.01	north-east
GW028573	2.26	12.80	SAND	Sand white clean water supply	1570.01	north-east
GW028573	12.80	13.10	SDSN	Sandstone very soft weathered	1570.01	north-east
GW111793	0.00	2.00	Soil	SOIL,LIGHT BROWN	1602.79	north-east
GW111793	2.00	4.00	Sandstone	SANDSTONE RED	1602.79	north-east
GW111793	4.00	47.00	Sandstone	SANDSTONE,MEDIUM GRAIN	1602.79	north-east
GW111793	47.00	54.00	Shale	SHALE	1602.79	north-east
GW111793	54.00	140.00	Sandstone	SANDSTONE,M/GRAIN W/SHALE 77-81	1602.79	north-east
GW111793	140.00	200.00	Siltstone	SILTSTONE INTERBEDDED,SHALE L/GREY	1602.79	north-east
GW110526	0.00	1.20	FILL	Fill	1652.66	north
GW110526	1.20	1.90	SAND	Sand,loose,grey	1652.66	north
GW110526	1.90	2.00	ROCK	Cemented rock	1652.66	north
GW111327	0.00	1.50	SCBN	Sand clean	1729.91	north-west
GW111327	1.50	2.00	SDSN	Sandstone fill,large	1729.91	north-west
GW111327	2.00	11.00	SAND	Sand,clean	1729.91	north-west
GW111327	11.00	12.00	SCBN	Sand and carbonaceous material	1729.91	north-west

GW111327	12.00	16.00	SCBN	Sand and carbonaceous material,shell fragments	1729.91	north-west
GW111327	16.00	21.00	SAND	Sand,light brown,shell frags. and pebbles	1729.91	north-west
GW111327	21.00	22.00	SAND	Sand,clean silver quartz sand	1729.91	north-west
GW111327	22.00	24.00	SCBN	Sand and carbonaceous material,shell frags.	1729.91	north-west
GW111327	24.00	29.00	SCBN	Sand and carbonaceous material,silty from 26m	1729.91	north-west
GW111327	29.00	32.00	SAND	Sand,medium to coarse sand	1729.91	north-west
GW111327	32.00	34.00	SAND	Sand,medium to coarse sand,silty from 33m	1729.91	north-west
GW111327	34.00	36.00	SCBN	Sand and carbonaceous material	1729.91	north-west
GW111327	36.00	41.00	SAND	Sand,shell fragments	1729.91	north-west
GW111327	41.00	44.00	SAND	Sand,clean quartz,	1729.91	north-west
GW111327	44.00	49.00	SDSN	Sandstone clean sand,1-3mm	1729.91	north-west
GW111327	49.00	49.00	COAL	Commence coring at 49 m	1729.91	north-west
GW111327	49.00	66.10	SDSN	Sandstone	1729.91	north-west
GW111327	66.10	67.00	SHLE	Shale,fine grained,dark grey	1729.91	north-west
GW111327	67.00	84.70	SDSN	Sandstone	1729.91	north-west
GW111327	84.70	85.10	SDSN	Sandstone medium to coarse	1729.91	north-west
GW111327	85.10	86.20	SHLE	Shale,fine grained,dark grey	1729.91	north-west
GW111327	86.20	90.40	SDSN	Sandstone fine to medium grained	1729.91	north-west
GW111327	90.40	105.40	SHLE	Shale,fine grained,dark grey	1729.91	north-west
GW111327	105.40	123.30	SDSN	Sandstone medium to coarse,pale grey	1729.91	north-west
GW111327	123.30	124.20	SHLE	Shale dark grey,with pale grey sandstone	1729.91	north-west
GW111327	124.20	125.30	SDSN	Sandstone fine grained,pale grey	1729.91	north-west
GW111327	125.30	125.40	SHLE	Shale fine grained,dark grey	1729.91	north-west
GW111327	125.40	160.20	SDSN	Sandstone,fine to medium,grained pale grey,quartz	1729.91	north-west
GW108799	0.00	3.20	FILL	Fill	1731.87	north
GW108799	3.20	3.70	SDSN	Sandstone	1731.87	north
GW108798	0.00	0.34	<Null>	Made ground	1739.51	north
GW108798	0.34	0.50	FILL	Fill	1739.51	north
GW108798	0.50	0.60	SDSN	Sandstone	1739.51	north
GW108797	0.00	0.27	<Null>	Floor slab	1749.39	north
GW108797	0.27	1.60	<Null>	Made ground	1749.39	north
GW108797	1.60	2.80	SAND	Sand	1749.39	north
GW108797	2.80	6.00	SDSN	Bed rock ,sandstone	1749.39	north
GW111328	0.00	11.00	SCBN	Sand clean	1766.61	north-west
GW111328	11.00	14.00	SCBN	Sand and carbonaceous material	1766.61	north-west
GW111328	14.00	17.00	SCBN	Sand and carbonaceous material fine to medium grained	1766.61	north-west
GW111328	17.00	21.00	SAND	Sand,quartz fine to medium grained	1766.61	north-west
GW111328	21.00	24.00	SCBN	Sand fine quartz , minor shell frags.	1766.61	north-west
GW111328	24.00	26.00	SCBN	Sand and carbonaceous material,no shell frags	1766.61	north-west
GW111328	26.00	28.00	SAND	Sand, fine to medium,grained quartz	1766.61	north-west
GW111328	28.00	41.00	SCBN	Sand and carbonaceous material	1766.61	north-west
GW111328	41.00	44.00	SCBN	Sand medium to coarse quartz	1766.61	north-west
GW111328	44.00	49.00	SDSN	Sandstone grey and orange	1766.61	north-west
GW111328	49.00	49.00	COAL	Commence coring at 49m	1766.61	north-west
GW111328	49.00	51.10	SDSN	Sandstone fine to medium grained,grey	1766.61	north-west
GW111328	51.10	85.00	SDSN	Sandstone fine to coarse grained,grey	1766.61	north-west
GW111328	85.00	86.00	SDSN	Sandstone fine to coarse,grained,grey,gravel	1766.61	north-west
GW111325	0.00	0.13	TPSL	Topsoil,dark brown	1823.99	north-west

GW111325	0.13	0.36	TPSL	Topsoil red brown	1823.99	north-west
GW111325	0.36	1.20	FILL	Fill,sandstone	1823.99	north-west
GW111325	1.20	1.80	FILL	Fill,crushed sandstone	1823.99	north-west
GW111325	1.80	2.20	CLLM	Clay sandy,gravelly	1823.99	north-west
GW111325	2.20	4.90	SAND	Sand,orange,minor clay	1823.99	north-west
GW111325	4.90	7.00	CBSD	Carbonaceous material,minor sand	1823.99	north-west
GW111325	7.00	8.40	SCBN	Sand medium grained	1823.99	north-west
GW111325	8.40	9.40	SCBN	Sand and carbonaceous material	1823.99	north-west
GW111325	9.40	9.70	SAND	Sand,pale grey	1823.99	north-west
GW111325	9.70	10.40	SCBN	Sand and carbonaceous material	1823.99	north-west
GW111325	10.40	12.40	SCBN	Sand and carbonaceous material,fine grained	1823.99	north-west
GW111325	12.40	13.40	SCBN	Sand medium to fine grained	1823.99	north-west
GW111325	13.40	22.40	SCBN	Sand and carbonaceous material	1823.99	north-west
GW111325	22.40	26.80	SCBN	Sand and carbonaceous material,less shells	1823.99	north-west
GW111325	26.80	32.42	SDSN	Sandstone	1823.99	north-west
GW111325	32.42	56.00	SDSN	Sandstone,fine to coarse grained	1823.99	north-west
GW111325	56.00	56.20	SDSN	Interbedded sandstone and siltstone	1823.99	north-west
GW111325	56.20	60.00	SHLE	Shale,dark grey	1823.99	north-west
GW111325	60.00	66.00	SDSN	Sandstone fine to medium grained	1823.99	north-west
GW111325	66.00	68.20	SDSN	Sandstone fine to medium grained,grey	1823.99	north-west
GW111325	68.20	69.00	SHLE	Shale,dark grey	1823.99	north-west
GW111325	69.00	70.00	SDSN	Sandstone,fine medium grained,grey	1823.99	north-west
GW111325	70.00	75.00	SDSN	Sandstone fine to coarse grained	1823.99	north-west
GW111325	75.00	78.40	SDSN	Sandstone fine to medium grained,grey banded	1823.99	north-west
GW111325	78.40	79.20	SDSN	Sandstone fine grained,grey banded	1823.99	north-west
GW111325	79.20	81.20	SDSN	Sandstone light grey	1823.99	north-west
GW111325	81.20	103.00	SDSN	Sandstone fine to medium grained light grey	1823.99	north-west
GW111325	103.00	112.50	SHLE	Shale,dark grey thinly laminated	1823.99	north-west
GW111325	112.50	120.10	SDSN	Sandstone interbedded and siltstone	1823.99	north-west
GW111325	120.10	121.00	SDSN	Sandstone fine to coarse grained	1823.99	north-west
GW111325	121.00	121.20	SDSN	Sandstone interbedded and siltstone	1823.99	north-west
GW111325	121.20	123.50	SHLE	Shale dark grey	1823.99	north-west
GW111325	123.50	143.40	SDSN	Sandstone,medim to coarse grained,gravel	1823.99	north-west
GW111326	0.00	7.00	FILL	Fill	1862.68	north-west
GW111326	7.00	8.00	SAND	Sand,clean quartz medium brown	1862.68	north-west
GW111326	8.00	9.00	SAND	Sand m/brown 0.5-1mm	1862.68	north-west
GW111326	9.00	12.00	SCBN	Sand and carbonaceous material	1862.68	north-west
GW111326	12.00	13.00	SCBN	Sand and carbonaceous material,wood fragments	1862.68	north-west
GW111326	13.00	16.00	SCBN	Sand and carbonaceous material,shell frags.	1862.68	north-west
GW111326	16.00	20.00	SCBN	Sand dark brown	1862.68	north-west
GW111326	20.00	21.00	SCBN	Sand and carbonaceous material	1862.68	north-west
GW111326	21.00	22.00	SAND	Sand,medium brown	1862.68	north-west
GW111326	22.00	23.00	SCBN	Sand light brown	1862.68	north-west
GW111326	23.00	27.50	SCBN	Sand light brown,shell fragments	1862.68	north-west
GW111326	27.50	32.50	SDSN	Sandstone	1862.68	north-west
GW111326	32.50	36.20	SDSN	Sandstone,fine to coarse grained	1862.68	north-west
GW111326	36.20	37.50	SDSN	Sandstone orange brown,massive	1862.68	north-west
GW111326	37.50	48.00	SDSN	Sandstone,fine to coarse grained,orange brown	1862.68	north-west
GW111326	48.00	53.20	SDSN	Sandstone,fine to coarse	1862.68	north-west
GW111326	53.20	53.40	SDSN	Sandstone fine to medium	1862.68	north-west

GW111326	53.40	55.30	SDSN	Sandstone fine to coarse	1862.68	north-west
GW111326	55.30	55.40	SHLE	Shale, fine grained, black	1862.68	north-west
GW111326	55.40	59.50	SDSN	Sandstone, fine to medium	1862.68	north-west
GW111326	59.50	60.00	SHLE	Shale, fine to grained, black	1862.68	north-west
GW111326	60.00	62.50	SDSN	Sandstone, fine to medium grained, grey	1862.68	north-west
GW111326	62.50	68.10	SDSN	Sandstone, fine to medium grained, grey	1862.68	north-west
GW111326	68.10	69.10	SDSN	Sandstone interbedded with shale	1862.68	north-west
GW111326	69.10	76.00	SDSN	Sandstone, fine grained, grey, some shale	1862.68	north-west
GW111326	76.00	81.50	SDSN	Sandstone fine to medium grained, grey	1862.68	north-west
GW111326	81.50	83.00	SDSN	Sandstone, fine to medium grained, grey, massive	1862.68	north-west
GW110525	0.00	1.20	FILL	Fill	1996.36	north
GW110525	1.20	9.50	SAND	Sand	1996.36	north
GW110525	9.50	10.00	ROCK	Rock	1996.36	north
GW110525	10.00	11.70	SDLC	Sand medium	1996.36	north

2.2 HYDROGEOLOGY AND OTHER BOREHOLES

Map 5b (500m Buffer)

	On the Property?	Within Buffer?
Groundwater Vulnerability	Not identified	Not identified
Groundwater Exclusion Zones^{1,2}	Not identified	Not identified
Hydrogeologic Unit	Late Permian/Triassic sediments (porous media - consolidated)	Late Permian/Triassic sediments (porous media - consolidated) Mesozoic Sediment Aquifer (porous media - consolidated) Surficial Sediment Aquifer (porous media - unconsolidated)
Other known borehole investigations	Not identified	Not identified

¹ - Botany Groundwater Management Zones (BGMZ): Zone 1 – the use of groundwater remains banned; Zones 2 to 4 – domestic groundwater use is banned, especially for drinking water, watering gardens, washing windows and cars, bathing, or to fill swimming pools.

² - Williamtown Groundwater Management Zones (WGMZ): Primary Management Zone – this area has significantly higher levels of PFAS detected and therefore, the strongest advice applies. Secondary Management Zone – this area has some detected levels of PFAS; Broader Management Zone – the topography and hydrology of the area means PFAS detections could occur now and into the future.

Groundwater Dependent Ecosystems

Site	On the Property?	Within Buffer?
Ecosystems that rely on the Surface expression of Groundwater	Not identified	Not identified
Ecosystems that rely on Subsurface presence of Groundwater	Not identified	Not identified

Table 2.2.1. Other known borehole investigations (Coal Seam Gas (CSG), Petroleum Wells and Other Boreholes) (500m buffer)

Borehole ID	Purpose	Project	Client/License	Date Drilled	Depth (m)	Distance (m)	Direction
Not identified	-	-	-	-	-	-	-

Section 3 – Environmental Registers, Licences and Incidents

3.1 CONTAMINATED LAND PUBLIC REGISTER

Map 6 (1000m Buffer)

Contaminated Land Record of Notices

Site Name ²	Area n ⁰	Address ¹	Notices	Distance (m)	Direction
Not identified	-	-	-	-	-

1. Some addresses do not contain specific street numbers. Records identified as being in the surrounding area have been added for information.

2. Former NSW EPA sites. These sites have been removed from the Record of Notices and/or the Sites Notified lists and are kept here for information purposes only.

Sites Notified as Contaminated to the EPA

Site Name ²	Address ¹	Activity that caused Contamination	EPA Site Management Class ³	Distance (m)	Direction
Not identified	-	-	-	-	-

1. Some addresses do not contain specific street numbers. Records identified as being in the surrounding area have been added for information.

2. Former NSW EPA sites. These sites have been removed from the Record of Notices and/or the Sites Notified lists and are kept here for information purposes only.

3. The EPA maintains a record of sites that have been notified to the EPA by owners or occupiers as contaminated land. The sites notified to the EPA and recorded on the register are at various stages of the assessment and/or remediation process. Table 5 outlines the possible management status that can be attributed to a registered contaminated site.

Table 3.3.1. EPA Site Management Class Explanation

EPA Site Management Class	
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.
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.
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.
Contamination currently regulated under the 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.
Contamination currently regulated under the 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 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 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 by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).

EPA Site Management Class

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.

3.2 POTENTIALLY CONTAMINATED AREAS

Map 6 (1000m Buffer)

Defence Sites

Site name	RCIP*	Description	Source	Distance (m)	Direction
Bare Island	-	Bare Island is a heritage-listed islet military fort located in La Perouse NSW. The Island contains former fortification facilities, it was a former war veterans' home and museum. It was built from 1881 to 1889, the fort was armed with a few pounder guns, a gun in an armoured casemate, and two five-barreled Nordenfelt guns. In the early 1900s the fort was decommissioned and soon after it became the first war veterans' home in Australia. It was notified as a Reserve for Public Recreation in 1965.	Various	153	South-west

*RCIP (Regional Contamination Investigation Program)

Former Gasworks Sites

Site name	Description	Source	Distance (m) *	Direction
Not identified	-	-	-	-

PFAS Sites

Site name	Description	Source	Distance (m) *	Direction
Botany Bay Area	The number of potential sources of PFAS in the area makes it difficult to attribute detections in Botany Bay to individual sources. PFAS was detected in sediment, surface and groundwater. Fishing restrictions were introduced at the end of 2017 for Botany Bay Area. None of the contamination readings from Botany Bay have been released.	State-wide PFAS investigation program	0	onsite

*2km search. If the site is not within 1km buffer, it will not be shown on the map.

3.3 LICENSING UNDER THE POEO ACT

Map 7 (500m Buffer)

Licences

EPL Number	Licence holder	Location Name	Premise Address ¹	Fee Based Activity	Distance (m)	Direction
Not identified	-		-	-	-	

¹. Some sites do not contain specific addresses. Records identified as being in the surrounding area have been added for information.

Surrendered Licences still Regulated by EPA

Licence N ^o	Licence holder	Location Name	Premise Address ¹	Fee Based Activity	Status	Distance (m)	Direction
6251	STATE OF NEW SOUTH WALES (OFFICE OF ENVIRONMENT AND HERITAGE)	HAPPY VALLEY IN BOTANY BAY NATIONAL PARK	ANZAC PARADE , LA PEROUSE, NSW 2036	Miscellaneous licensed discharge to waters (at any time)	Surrendered	23	North-east
13074	AUSGRID	Botany Bay Cable Project Dredging	Botany Bay Shipping Channel, BOTANY, NSW 2019	Water-based extractive activity	Surrendered	Not mapped	onsite
13112	AUSGRID	Botany Bay Cable Project HDD	Botany Bay, La Perouse Headland, BOTANY, NSW, 2019	Other activities Miscellaneous licensed discharge to waters (at any time)	Surrendered	Not mapped	onsite

¹. Some sites do not contain specific addresses. Records identified as being in the surrounding area have been added for information.

Clean Up and Penalty Notices

Location ID	Notice N ^o	Notice Type	Licence holder	Location Name	Premise Address ¹	Distance (m)	Direction
-	Not identified	-	-	-	-	-	-

¹. Some sites do not contain specific addresses. Records identified as being in the surrounding area have been added for information.

3.4 NATIONAL POLLUTANT INVENTORY (NPI)

Map 7 (500m Buffer)

Facility name	Address	Primary ANZSIC Class	Latest report	Distance (m)	Direction
Not identified	-		-	-	-

3.5 PUBLIC REGISTER OF PROPERTIES AFFECTED BY LOOSE-FILL ASBESTOS INSULATION

Map 7 (onsite)

Address	Match Found
Not identified	-

Section 4 – Other Potentially Contaminating Activities

4.1 POTENTIALLY CONTAMINATING ACTIVITIES

Map 8a (500m Buffer)

Cattle Dip Sites

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Dry Cleaners

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Fire Rescue Sites

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Gas Terminals

Site name	Operator	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Liquid Fuel Depots/Terminals

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Mines and Quarries

Deposit Name	Method	Description	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Petrol Stations

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Power Stations

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Substation / Switching Stations

Site name	Owner	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Telephone Exchanges

Site name	Location	Status*	Distance (m)	Direction
Not identified	-	-	-	-

Waste Management Facilities

Site name	Owner	Class	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

Wastewater Treatment Facilities

Site name	Operator	Class	Status*	Distance (m)	Direction
Not identified	-	-	-	-	-

*Status:

Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

Current: business that are operational on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 2 years will be reported in the 'Historical commercial and trade data' section in this report.

4.2 CURRENT COMMERCIAL AND TRADE DATA

Map 8b (200m Buffer)

Current Commercial and Trade Data

Site name ¹	Category	Location	Status ²	Distance (m)	Direction
Not identified	-		-	-	-

¹ Data includes categories associated with potentially contaminating activities. All negligible risk data is not reported.

² Status: Data is current as when this report was created. However due to the turnover of business locations, some addresses may be former.

Current: business that are operational on the day this report was issued.

Former: business that have been closed or discontinued 1 to 2 years from the day this report was issued. All former sites older than 2 years will be reported in the historical business section in this report.

Tanks (AST/UST)

ID	Tank type	Description	Status	Distance (m)	Direction
Not identified	-		-	-	-

Note: This is not an exhaustive list of all existing tanks.

4.3 FORMER POTENTIALLY CONTAMINATED LAND

Map 8c (500m Buffer)

Contaminated Legacy Areas

Site Name	Description	Source	Distance (m)	Direction
Not identified	-	-	-	-

Note: This section includes known contaminated areas such as James Hardies Asbestos waste legacy areas, Pasmenco Smelter and Uranium processing site.

Derelict Mines and Quarries

Site name	Method	Description	Source	Distance (m)	Direction
Frenchmans Bay (approx location)	pit(s)	Pit 63 in GS1974/432 shown on plan 7744. Both foundry sand and construction sand extracted	The Geological Survey of New South Wales	50	north

Historical Landfills

Site name	Description	Source	Distance (m)	Direction
Not identified	-		-	-

Unexploded Ordnance (UXO) Areas

Site name	Category	Description	Source	Distance (m)	Direction
Botany Bay	UXO Area: Other	This site was used for a Mortar Shoot during WWII.	Australian Government Department of Defence	33	South-east

4.4 HISTORICAL COMMERCIAL AND TRADE DATA

(not mapped)

1930 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1940 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Boats & Launches - For Hire	Fisher C A M	La Perouse Sydney NSW Australia	suburb		onsite

1950 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Boats & Launches - For Hire	Dorbie W	Aborigine Avenue (now Endeavour Avenue) La perouse NSW Australia	street	102	north-east
Boats & Launches - For Hire	Fisher C A M	La Perouse NSW Australia	suburb		onsite

1965 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Electrical Contractors	Harvey D J	11 GoorawahAv NSW La Perouse Australia	address	185	north-east
Boats & Launches For Hire	Fisher C A M	NSW La Perouse Australia	suburb		onsite
Boats & Launches For Hire	Dorbie W	AborigineAv NSW La Perouse Australia	suburb		onsite

1970 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
BOAT, LAUNCH & YACHT BUILDERS &/OR REPAIRERS	Fisher Bros.,	On Beach, La Perouse NSW Australia	street		east
BOATS, LAUNCHES & YACHTSâ€”FOR HIRE	Fisher Bros.,	On Beach, La Perouse NSW Australia	street		east

1975 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Not identified	-	-	-	-	-

1980 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Boats - For Hire or Charter	First Fleet Marine Pty Ltd	1609 Anzac Parade La Perouse NSW Australia	address	0	onsite
Printing Engineers	Yates Arthur	15 Goorawah Avenue La Perouse NSW Australia	address	171	north-east
Boat Equipment	Hobson Marine	Cnr Anzac Parade and Goorawahl Avenue La Perouse NSW Australia	suburb		onsite

1990 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Sailboarding Equipment & Supplies	Bird's Boatshed	1609 Anzac Parade La Perouse NSW Australia	address	0	onsite
Boat Charter Services	First Fleet Marine Pty Ltd	1609 Anzac Parade La Perouse NSW Australia	address	0	onsite
Boat Charter Services	La Perouse Sail Board Centre	1609 Anzac Parade La Perouse NSW Australia	address	0	onsite
Printing Engineers	Yates Arthur	15 Goorawahl Street La Perouse NSW Australia	address	171	north-east
Sailboarding Equipment & Supplies	Sea Leavel Sailboard Centre	43 Endeavour Avenue La Perouse NSW Australia	address	73	north-east

2005 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Boat Hire--Drive Yourself	First Fleet Marine Pty Ltd	1609 Anzac Pde, LA PEROUSE,NSW 2036,Australia	address	0	onsite

2010 Historical Commercial & Trade Directory Data

Activity	Name	Address	Positional accuracy	Distance (m)	Direction
Boat & Yacht Haulage Services	La Perouse Sailboard Centre	1609 Anzac Pde LA PEROUSE 2036 NSW	address	0	onsite
Boat Charters	First Fleet Marine Pty Ltd	1609 Anzac Pde LA PEROUSE 2036 NSW	address	0	onsite
Pest Control Services	Hoo Roo Pest Control	14 Goorawahl Ave LA PEROUSE 2036 NSW	address	142	north

Historical data positional accuracy and georeferencing results explanation

Positional accuracy	Georeferenced	Description
Address	Located to the address level	When street address and names fully match.
Street	Located to the street centroid	When street names match but no exact address was found. Location is approximate.
Place	Located to the structure, building or complex	When building, residential complex or structure name match but no exact address was found. Location is approximate.
Suburb	Located to the suburb area	When suburb name match but no exact address was found. Location is approximate.
Not georeferenced	Not found	When it was not georeferenced, and address could not be found.

Land Insight and Resources use a number of different address georeferencing methods and characterised them according to the following criteria: completeness (match rates) and positional accuracy. When address do not contain specific street numbers or a match is not found, records identified as being in the surrounding areas are included for reference.

Section 5 - Other Environmental Constraints

5.1 FEDERAL, STATE AND LOCAL HERITAGE

Map 9 (200m Buffer)

Local Environment Plan (LEP) Heritage

Site ID	Site Name	Class	Significance	Distance (m)*	Direction
C5	Botany Bay (Botany Bay National Park, La Perouse Headland, Yarra & Frenchman's Bay)	Conservation Area - General	State	0	onsite
I166	Macquarie Watchtower	Item - General	Local	0	onsite
I167	Tomb of Pere le Receveur	Item - General	Local	0	onsite
I168	La Perouse Museum (former Cable Station)	Item - General	Local	0	onsite
I169	La Perouse Memorial	Item - General	Local	0	onsite
I170	Jessie Stuart Broomfield Fountain	Item - General	Local	17	North-east
I173	1920s bungalow	Item - General	Local	64	North-east

National Heritage List (NHL)

Site ID	Site Name	Class	Status	Distance (m)	Direction
106162	Kamay Botany Bay: botanical collection sites	Historic	Listed place	0	onsite

Register of the National Estate (RNE)

Site ID	Site Name	Class	Status	Distance (m)	Direction
1736	La Perouse Memorial Group	Historic	Registered	0	onsite
1737	The Watch Tower	Historic	Registered	0	onsite
1765	La Perouse Monuments Historic Site	Historic	Registered	0	onsite
1734	Botany Bay Entrance	Historic	Indicative Place	17	North-east
1758	Bare Island Fort	Historic	Registered	153	South-west

Non-Aboriginal heritage item (Local)

Site ID	Site Name	Class	Status	Distance (m)	Direction
106162	Kamay Botany Bay	Historic	Nominated place	0	onsite

Non-Aboriginal heritage item (SHR)*

Site ID	Site Name	Listing n ^o	Plan n ^o	Distance (m)	Direction
5061543	Kamay Botany Bay National Park and Towra Point Reserve	01918	2565	0	onsite
5045621	Bare Island Fort	00978	2490	153	South-west

*State Heritage Register

Commonwealth Heritage List (CHL)

Site ID	Site Name	Class	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

World Heritage Area (WHA)

Site ID	Site Name	Inscribed	Status	Distance (m)	Direction
Not identified	-	-	-	-	-

5.2 NATURAL HAZARDS

Map 10 (500m Buffer)

Bush Fire Prone Land (BLP)

Category	On the Property?	Within Buffer?
Not identified	-	-

Fire History

Category	On the Property?	Within Buffer?
Not identified	-	-

Flood Hazard

Category	On the Property?	Within Buffer?
Not identified	-	-

5.3 COASTAL MANAGEMENT (STATE ENVIRONMENTAL PLANNING POLICY)

Map 10 (500m Buffer)

Type	On the Property?	Within Buffer?
Coastal Wetlands Proximity Area	-	-
Coastal Wetlands	-	-
Coastal Environment Area Map	Yes	Yes
Coastal Use Area Map	Yes	Yes



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