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Manly Dam Link Trail - Review of Environmental Factors

Northern Beaches Council

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Project Manager	Geraint Breese
Prepared by	Geraint Breese, Roshan Kalugalage, Carolina Mora and Declan Coman
Reviewed by	Geraint Breese, and Rebecca Ben-Haim
Approved by	Rebecca Ben-Haim
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Template 2.8.1

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Abbreviations

Abbreviation	Description
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BC Act	<i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
BGL	Below Ground Level
CEMP	Construction Environmental Management Plan
CHL	Commonwealth Heritage List
Coastal Management SEPP	<i>State Environmental Planning Policy (Coastal Management) 2018</i>
DAWE	Department of Agriculture, Water and the Environment
DBYD	Dial Before You Dig
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
ELA	Eco Logical Australia
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EP&A Act	<i>Environmental Planning & Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning & Assessment Regulation, 2000</i>
EPL	Environmental Protection Licence
FFA	Flora and Fauna Assessment
FM Act	<i>Fisheries Management Act 1994</i>
KFH	Key Fish Habitat
LEP	Local Environmental Plan
LGA	Local Government Area
NES	National Environmental Significance
NHL	National Heritage List
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NPWS	National Parks and Wildlife Service
NRAR	Natural Resources Access Regulator
NSW	New South Wales
NSW EPA	New South Wales Environmental Protection Authority
OEH	Office of Environment and Heritage
PCT	Plant Community Type
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
REF	Review of Environmental Factors

Abbreviation	Description
RSWMP	Regional Strategic Weed Management Plans
SDS	Safety Data Sheet
SEPP	State Environmental Planning Policy
SHI	State Heritage Inventory
SHR	State Heritage Register
SIS	Species Impact Statement
SoHI	Statement of Heritage Impact
WHL	World Heritage Inventory
WM Act	<i>Water Management Act 2000</i>
WoNS	Weeds of National Significance

Executive Summary

Eco Logical Australia Pty Ltd (ELA) was engaged by Northern Beaches Council to prepare a Review of Environmental Factors (REF) for the proposed Manly Dam Link Trail located within the Manly Warringah War Memorial State Park.

The environmental assessment and determination of the proposal has been undertaken in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). For this proposal, Northern Beaches Council is both a public authority proponent and the determining authority. The REF has been prepared in accordance with Clause 228 of the *Environmental Protection & Assessment Regulation 2000* (EP&A Regulation 2000).

The proposal is required to improve pedestrian safety in the park by removing pedestrians from the existing access road. The link trail is to be approximately 433 m long and will consist of a raised boardwalk traversing through bushland and a short section of coloured concrete path.

Biodiversity and Aboriginal cultural heritage were key environmental considerations in the preparation of this REF. Field studies have been undertaken for each of these studies and have been incorporated into the REF chapters.

Biodiversity

Field survey identified vegetation within the study area as Plant Community Type (PCT), *PCT 1250 Sydney Peppermint - Smooth-barked Apple - Red Bloodwood shrubby open forest on slopes of moist sandstone gullies, eastern Sydney Basin Bioregion (Coastal Sandstone Gully Forest)* and *PCT 1783 Red Bloodwood - Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast (Sydney North Exposed Sandstone Woodland)* weeds / exotics. These PCT do not conform to threatened ecological communities. Furthermore, no threatened flora species or suitable habitat for threatened flora species will be impacted by the proposed works.

The proposed works would impact 0.12 ha of native vegetation,), PCT 1250 and PCT 1783 which may provide habitat for the following threatened species:

- *Cercartetus nanus* (Eastern Pygmy-possum)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)

Tests of Significance in accordance with Section 7.3 of the *Biodiversity Conservation Act 2016* (BC Act) and Significance Assessments in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were undertaken for the above threatened species, which concluded that the proposed works are unlikely to have a significant impact. Therefore, the preparation of a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) is not recommended.

Aboriginal Heritage

An assessment of Aboriginal heritage was undertaken in accordance with the Due Diligence Code of Practice as set out in *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South*

Wales (DECCW 2010). No recorded Aboriginal sites or objects were identified within the study area. However, sandstone surfaces have the potential to contain Aboriginal sites such as art sites, grinding grooves and rock engravings, however no such sites were identified during the site inspection. As the impacts to sandstone surfaces will be minor and conducted with hand tools, impacts to potential art and rock engraving sites can be avoided through the implementation of an unexpected finds policy and a heritage induction prior to the commencement of works as detailed in Section 5 of this report eliminating the need for an ACHA.

Overall, the proposed works are not likely to have a significant impact on any aspect of the environment if the proposed mitigation measures are implemented and a Construction Environment Management Plan is produced.

1. Introduction

Eco Logical Australia Pty Ltd (ELA) was engaged by Thompson Berrill Landscape Designs on behalf of Northern Beaches Council (herein referred to as Council) to prepare a Review of Environmental Factors (REF) for the proposed Manly Dam Link Trail. The trail is located at Manly Warringah War Memorial State Park in the suburb of Manly Vale and Allambie Heights, NSW (**Error! Reference source not found.**). As part of the REF, ELA have undertaken both a Flora and Fauna Assessment and Aboriginal Due Diligence Assessment, which have been included within the REF without the need for standalone reports.

The environmental assessment and determination of the proposal has been undertaken in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). For this proposal, Council is both a public authority proponent (EP&A Act s.4) and the determining authority (EP&A Act s.110). The REF has been prepared in accordance with Clause 228 of the *Environmental Planning & Assessment Regulation (2000)*.

1.1 Project Description and Background

The purpose of the project is to provide a walkway for pedestrians to improve safety by minimising interactions with vehicle traffic. This is to be achieved by creating the link trail, thus removing pedestrians from the existing road. The link trail will aim to enhance the experience of visitors at the reserve with the installation of rest points and a viewing platform, which will include informative and educational signage.

Entry to Manly Warringah War Memorial State Park is through the eastern portion of the Park via King Street in the suburb of Manly Vale. The proposed link trail will be located between the water's edge and the existing access road in the reserve. The link trail is to be approximately 433 m long and will consist of a raised fiberglass reinforced plastic boardwalk on galvanised steel pilings traversing bushland to finish at the northern end with a short section of coloured concrete path at the commencement of the boardwalk at the southern end. This assessment was based on Thompson Berrill Landscape Designs Drawings shown in Appendix A.

1.2 Project Location and Context

The study area is located within the Manly Warringah War Memorial State Park which is located approximately 11 km north of the Sydney Central Business District, NSW. The site (Lot 4 DP1249992) is located within the suburbs of Allambie Heights and Manly Vale in the local government area (LGA) of Northern Beaches Council.

The proposed link trail will start from Picnic Area 2, at the southern end, and continue to Picnic Area 3, at the northern end. The link trail will be located between the water's edge and internal access road identified in **Error! Reference source not found.**. The proposed link trail is located on Crown land, which is maintained by Council and zoned for Public Recreation (RE1) as mapped in the Warringah Local Environmental Plan 2011 (LEP).

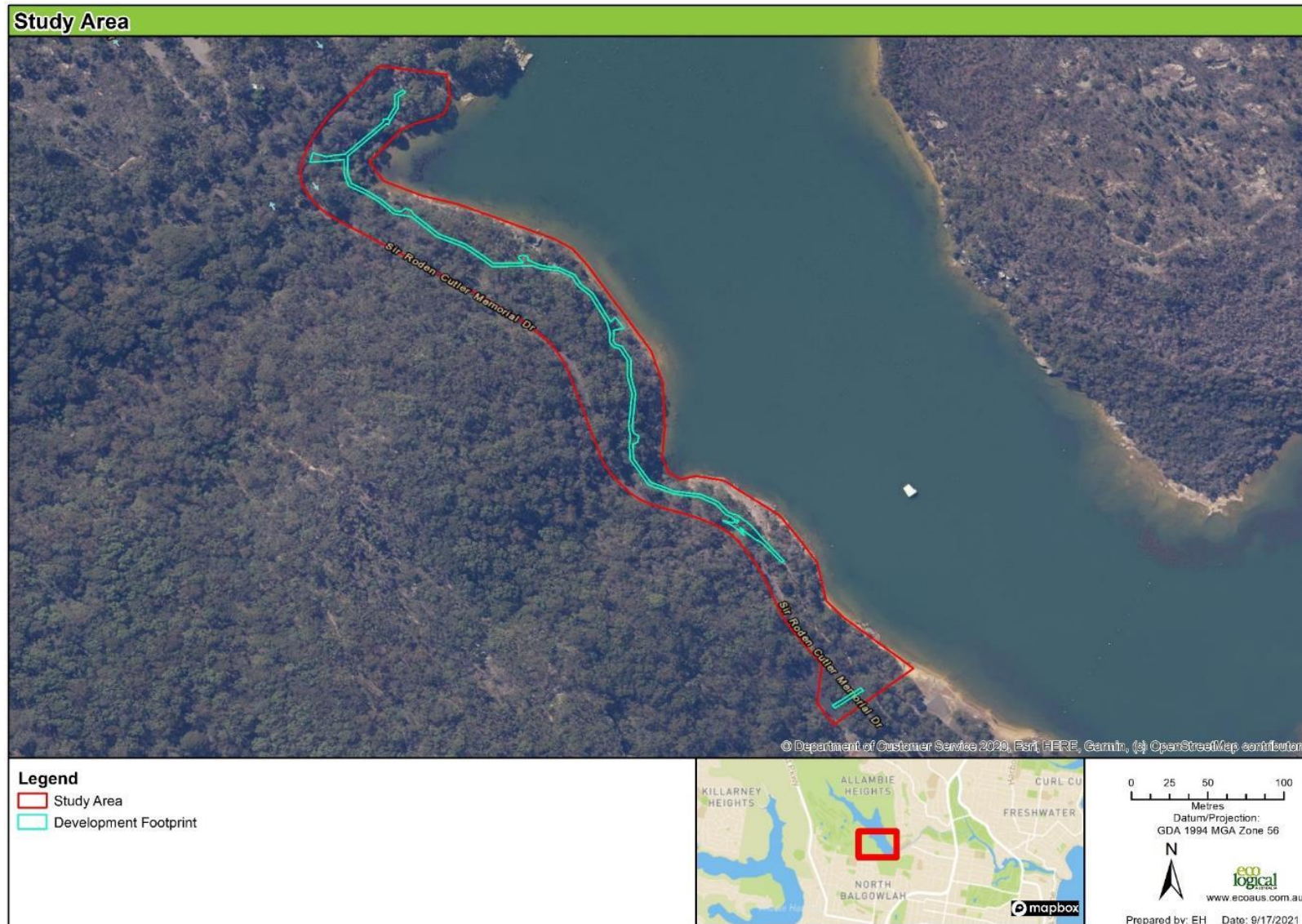


Figure 1 Location of the Proposal

1.3 and Use and Ownership

1.3.1 Land Use

The land on which the link trail will be constructed is Crown land under the care and control of Council. No property acquisition will be required for this proposal. The *Crown Land Management Act 2016* (CLM Act) allows councils to manage Crown land under the provisions of the *Local Government Act 1993* (LG Act) for public land. There is no statutory consultation requirement with Crown Lands under the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) however Council will consult with Crown Lands in line with any requirements in the Manly Warringah War Memorial Park Plan of Management.

The works will be undertaken wholly within land zoned as RE1 Public Recreation according to the Warringah Local Environmental Plan (LEP) 2011. No change in zonings or land use is proposed as part of the works.

Therefore, the following objectives are applied to the site:

RE1 Public Recreation

- *To enable land to be used for public open space or recreational purposes*
- *To provide a range of recreational settings and activities and compatible land uses*
- *To protect and enhance the natural environment for recreational purposes*
- *To protect, manage and restore public land that is of ecological, scientific, cultural or aesthetic value.*
- *To prevent development that could destroy damage or otherwise have an adverse effect on those values*

1.3.2 Land Ownership

The works will occur on lands that are Crown owned and managed by Council. No additional property acquisition will be required for the works to take place.

1.4 Detailed Scope of Works

Concept plans of the link trail and entry path are shown in Appendix A. The link trail will have a total length of approximately 433m long and will 1.8 m. A construction buffer of 2m either side of the trail has been included in the consideration of construction impacts however it is unlikely that the entire width of the buffer will be impacted, particularly for the link trail where there will only be foot access and mainly manual construction methods employed.

1.4.1 Site Set Up

- A Dial Before You Dig Assessment (DBYD) will be undertaken prior to any excavation or construction works to locate any service infrastructure present on site.
- Transport of machinery, equipment and materials to the site and establishment of site storage and parking areas. For formal compound areas and proposed vehicles access track to work site see Appendix B.
- Installation of sediment and erosion protection measures in accordance with the 'Blue Book' Soils and Construction, Managing Urban Stormwater (Landcom, 2004) with reference to Chapter 5 'Erosion Control: Management of Water'.
- Installation of protection and exclusion fencing around vegetation to be protected and to delineate area of works.

1.4.2 Construction Work

The following works will be undertaken within the study area:

- Selective removal of native shrubs and where necessary small trees, through the use of hand tools, by qualified bushland management personnel within delineated boardwalk and viewing platform footprint (groundcover vegetation to remain except where steel pilings are located). Where required pruning of larger trees will be undertaken by a qualified arborist.
- Installation of 1.8 m wide Fibre-reinforced plastic (FRP) boardwalk with hot dip (HD) galvanised steel subfloor and posts into earthen subgrade limited to CH-B360 – CH-B392.
- Reinforced bars will be drilled into sandstone, or piles dug into sandstone everywhere else.
- The Deck height above ground-level varies between 300 mm to 2 m.
- Creation of stepped viewing platform and seating on lake foreshore with timber stairs to one side.
- Creation of two rest points with bench seat and manoeuvring space.
- Construction of 1.8 m wide coloured concrete path on grade trail in connecting the boardwalk to Picnic Area 3.
- Relocation or creation of additional picnic facilities such as barbeques, fire pits, seating in Picnic Area 2 as required.
- Construction of stairs to connect the carpark to exiting concrete pathway that leads to Picnic Area 2 to the north and the Park Entrance to the south west.

1.4.3 Post Construction Work

- Remove excess materials as appropriate.
- Monitor natural regeneration of disturbed native vegetation, remove weeds and undertake revegetation works if necessary.

A Construction Environmental Management Plan (CEMP) will be prepared prior to on-ground works. This will specify the location of proposed site compound and stockpiling areas for materials and equipment, and 'no go' zones around environmentally sensitive areas. The CEMP will also prescribe erosion and sediment controls during the construction period and include further mitigation and safeguards in accordance with Section 5.

1.4.4 Machinery, Equipment, Access and Ancillary Works

For the construction of the link trail, access will be on foot and most work will be undertaken using manual tools to ensure that there is minimal detrimental impact caused to the sensitive bushland environment. Native vegetation clearance for the entry trail will be undertaken by a small excavator.

Access to the site will be via King Street for the entry path. The existing internal road located in Manly Dam War Memorial Park at Section 2 and Section 3 picnic areas will be used to access different points of the link trail. The purpose of the works is to provide safe off-road pedestrian access into and within the reserve.

1.4.5 Duration and Working Hours

Work hours will be in accordance with Northern Beaches Council standard work times detailed below which will minimise impacts to residents in proximity to the works:

- Monday to Friday 7.00am to 6.00pm
- Saturday 8.00am to 1.00pm
- No work on Sunday or public holidays

Works are aimed to commence in early 2022.

1.5 Project Justification and Consideration of Alternatives

The Manly Warringah War Memorial State Park is an important regional public recreation area on the Northern Beaches. The link trail will facilitate safe off-road pedestrian access between Picnic Areas 2 and 3 as well as providing a pleasant nature-based recreational experience with outdoor environmental education opportunities.

A 'do nothing' approach would not address the potential traffic safety risk to pedestrians using King Street to access the reserve and the narrow internal road between Sections 2 and 3. The proposal will result in future improvements to recreation facilities and user experience by providing an off road pathway along the entire foreshore of the picnic areas (1 – 3) except during times of high water levels.

Two alternative design options were provided by Thompson Berrill Landscape Design for the proposed upgrades of Manly Dam Link Trail by the Northern Beaches Council. These included:

- Option 2: Edge of road boardwalk or footpath (along the roadway) and (Shown in Appendix A);
- Option 3: a shared zone on the roadway.

A traffic safety assessment by Traffic and Transport Planning Associates (2021) compared the current and alternative design options. On conclusion Traffic and Transport Planning Associates (2021) reported

the present design to be most desirable for pedestrians as it separates them from general vehicular traffic entirely and is considered safer compared to both alternation options.

2. Statutory and Planning Context

Table 2-1 Statutory Framework

Name	Relevance to the Project
Commonwealth	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>The EPBC Act aims to protect Matters of National Environmental Significance (MNES) including wetlands of international importance, threatened species and communities and listed migratory species. An action that may or is likely to have a significant impact on MNES should be referred to the Commonwealth to determine whether it is a Controlled Action that requires approval from the Commonwealth.</p> <p>There are seven MNES that are triggers for Commonwealth assessment and approval. These are:</p> <ol style="list-style-type: none"> 1. World Heritage properties 2. National Heritage places 3. Ramsar wetlands of international importance 4. Nationally threatened species and communities 5. Migratory species 6. Nuclear actions 7. Commonwealth marine environment. <p>Threatened species and ecological communities are listed under Part 13, Division 1, Subdivision A of the EPBC Act. Migratory species are listed under Part 13, Division 2, Subdivision A of the Act.</p> <p>Significant Impact Criteria were applied for MNES identified as likely to occur within the development footprint. It was concluded that a significant impact is unlikely to result from the proposed works.</p>
State	
<i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>The BC Act seeks to conserve biological diversity at bioregional and State scales; to maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations; to assess the extinction risk of species and ecological communities and identify key threatening processes through an independent and rigorous scientific process; and to establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity. Section 7.3 of the Act requires proponents of activities subject to Part 5 of the EP&A Act to determine whether they will have a significant impact on threatened species. The test for significant impact is described in section 7.3 of the Act. A significant impact also occurs if the activity is carried out in an area of outstanding biodiversity value.</p> <p>If a significant impact is likely to occur, the proponent of the activity must prepare a Species Impact Statement (SIS) in accordance with section 7.20 or a Biodiversity Development Assessment Report (BDAR).</p> <p>Tests of Significance were undertaken for species identified as likely to occur within the development footprint. It was concluded that a significant impact is unlikely to result from the proposed works. Therefore, the preparation of a SIS or BDAR is not recommended.</p>
<i>Biosecurity Act 2015</i>	<p>Under this Act, priority weeds have been identified for local government areas and assigned strategies to contain, remove or manage. Occupiers of land (this includes owners of land) have responsibility for taking appropriate action for priority weeds on the land they occupy.</p> <p>The field survey identified seven species listed as other weeds of regional concern in the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022, which was developed under this Act.</p>

Name	Relevance to the Project
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)	<p>The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of proposals.</p> <p>As Northern Beaches Council is the proponent, the works are to be assessed as 'development permissible without consent' under Part 5 of the EP&A Act. Accordingly, Northern Beaches Council must satisfy Sections 5.5 and 5.6 of that Act by examining, and taking into account to the fullest extent possible, all matters which are likely to affect the environment. This REF is intended to assist, and ensure compliance, with the EP&A Act including Sections 5.5 and 5.6.</p> <p>Section 3.15 of this report presents how the requirements of s228 of the EP&A Regulation 2000 have been addressed.</p>
<i>Fisheries Management Act 1994</i> (FM Act)	<p>The FM Act provides for the protection, conservation and recovery of threatened species defined under the Act. It also makes provisions for the management of threats to threatened species, populations and ecological communities defined under the Act, as well as the protection of fish and fish habitat in general. In particular, the FM Act has mechanisms for the protection of marine vegetation (mangroves, saltmarsh, seagrass and seaweeds) on public water, land and foreshores. No mangroves, saltmarsh, seagrasses and seaweeds are located within or in close proximity to the site.</p> <p>Although Manly Dam is mapped as Key Fish Habitat the works will involve only minimal excavation on the lake foreshore to install pilings for the proposed viewing/educational platform on the link trail route. A Fisheries Officer from the Department of Primary Industries (DPI) has been consulted and has advised that it is unlikely that a Part 7 Fisheries permit under the FM Act will be required but has recommended that a plan should be forwarded to the DPI for a final determination on this matter.</p>
<i>National Parks and Wildlife Act 1974</i> (NPW Act)	<p>The NPW Act is administered by the Director-General of the National Parks and Wildlife Services, who is responsible for the control and management of all national parks, historic sites, nature reserves, and Aboriginal areas (among others). The main aim of the Act is to conserve the natural and cultural heritage of NSW. The Act aims to conserve the natural and cultural heritage of NSW. Where works will disturb Aboriginal objects, an Aboriginal Heritage Impact Permit (AHIP) is required.</p> <p>A requirement of Clause 16 of the Infrastructure SEPP is for consultation with the National Parks and Wildlife Service (NPWS) where the proposed works occur on or adjacent to National Parks Estate. The proposed works are not within or adjacent to national park and therefore consultation is not required.</p> <p>ELA has undertaken an Aboriginal Heritage Due Diligence Assessment to determine any potential impacts to Aboriginal objects or places. The assessment did not identify any Aboriginal items or objects within the study area. The findings of the assessment are presented section 3.5.</p> <p>There is a small potential for grinding grooves or rock art to be present on sandstone features within the study area. However, no such sites were identified during the site inspection. As the impacts to sandstone surfaces will be minor and conducted with hand tools, impacts to potential art and rock engraving sites can be avoided through the implementation of an unexpected finds policy and a heritage induction prior to the commencement of works as detailed in Section 5 of this report.</p>
<i>Heritage Act 1977</i>	<p>The Heritage Act provides protection of the environmental heritage of the State which includes places, buildings, works, relics, movable objects or precincts that are of State or local heritage significance. A key measure for the identification and conservation of State significant items is listing on the State Heritage Register (SHR) as provided in Part 3A of the Heritage Act.</p> <p>ELA has undertaken a Preliminary Historic Heritage Assessment to determine any potential impacts of the works on Non-Aboriginal heritage, provided in Section 3.6. Historic Heritage</p>

Name	Relevance to the Project
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)	<p>The POEO Act is the key environmental protection and pollution statute. The POEO Act is administered by NSW OEH and establishes a licensing regime for waste, air, water and pollution. Relevant sections of the Act are listed below:</p> <ul style="list-style-type: none"> • Part 5.3 Water Pollution • Part 5.4 Air Pollution • Part 5.5 Noise Pollution • Part 5.6 Land Pollution and Waste <p>Any work potentially resulting in pollution must comply with the POEO Act. Relevant licences must be obtained if required. No licences have been identified as being required including an Environmental Protection Licence (EPL).</p>
<i>Water Management Act 2000</i> (WM Act)	<p>The WM Act's main objective is to manage NSW water in a sustainable and integrated manner that will benefit today's generations without compromising future generations' ability to meet their needs. The WM Act is administered by NSW Department of Primary Industries Water (DPI – Water) (previously NSW Office of Water) and establishes an approval regime for activities within waterfront land.</p> <p>Controlled activity approval is typically required for work within 40 m of the highest bank of a river, lake or estuary. Section 91E of the Act creates an offence for carrying out a controlled activity within waterfront land without approval.</p> <p>Under s41 of the <i>Water Management (General) Regulation 2018</i>, public authorities are exempt from obtaining a controlled activity approval; therefore, no approvals are required under this Act. The objectives of protecting water sources are still relevant.</p>
Planning Instruments	
<i>State Environmental Planning Policy (Infrastructure) 2007</i> (ISEPP)	<p>The aim of this Policy is to facilitate the effective delivery of infrastructure across NSW by identifying whether certain types of infrastructure require consent, can be carried out without consent or are exempt development.</p> <p>Pursuant to Clause 65 (3) of the ISEPP 2007, development may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council for the purpose of:</p> <ul style="list-style-type: none"> (i). roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges, (ii). recreation areas and recreation facilities (outdoors), but not including grandstands (v). landscaping, including landscape structures or features (such as artwork) and irrigation systems, (vi). amenities for people using the reserve, including toilets and change rooms <p>(b) environmental management works,</p> <p>As the works will be undertaken in order to develop a pedestrian pathway, the associated landscaping and viewing platforms and involve environmental management works, the development will be assessed as development without consent.</p> <p>Part 2 of the Infrastructure SEPP contains provisions for public authorities to consult with other agencies prior to the commencement of development, as described in Section 4.</p>
<i>State Environmental Planning Policy (Koala Habitat Protection) 2021</i> (Koala SEPP 2021)	<p>The Koala SEPP 2021 commenced on 17 March 2021. The aim of this policy is “to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline.”</p> <p>This SEPP does not apply to assessments undertaken under Part 5 of the EP&A Act.</p>

Name	Relevance to the Project
Warringah Local Environmental Plan 2011	<p>In accordance with the Warringah LEP 2011, the study area is zoned as the following:</p> <ul style="list-style-type: none"> RE1 (Public Recreation) <p>The proposal is consistent with the object of the zone as it is providing land to be used for recreation. The Infrastructure SEPP overrides the permitted uses prescribed under the LEP so this is not considered.</p>

Plan of Management		
Manly Warringah War Memorial Plan of Management (POM)	2014	<p>A Plan of Management is developed, in consultation with the community, to provide direction for the future management, use, development and maintenance of places such as public open space, parks and bushland reserves.</p> <p>Key Management direction TT1&2 stipulates that the park should maintain a network of safe and sustainably managed recreational tracks and trails. This work is aligned to this management direction as the proposal aim is to improve trails safety.</p>

3. Existing Environment and Impact Assessment

3.1 Landform, Geology and Soils

3.1.1 Existing Environment

The proposed works are located within the Hawksbury and South Lambert soil landscapes as described by Chapman and Murphy (1989). The Sydney 1:100,000 scale Geological series map indicates that the subject site is underlain by Hawkesbury Sandstone, consisting of sedimentary quartz, weakly weathered gravel and coarse sandy loam.

A Geotechnical Investigation undertaken by JK Geotechnics (2017), Appendix H has been utilised to understand the existing environment of the study area. The field work consisted of the drilling of four boreholes (BH) as close as possible to the trail alignment. **Table 3-1** provides a general description of soil horizons found within the study area as determined by JK Geotechnics (2017). It should be noted that variation of the depth of each soil profile will occur throughout the site. For specific details, please refer to the Geotechnical Investigation report.

Table 3-1: Soil profile horizons (JK Geotechnics 2017)

Depth (m)	Soil Profile
0 – 0.2	Fill comprising of silty sand and igneous gravel
0.2 – 0.6	Alluvial and residual soils comprising sand, sandy clay, silty sand and clayey sand
0.6 – 0.8	Extremely weathered sandstone bedrock of extremely low strength
0.8 – 2.5	Sandstone bedrock

3.1.2 Impact Assessment

The proposed works will require the selective removal of native vegetation and topsoil, excavation to subgrade levels (0.6 m) and the construction of a walkway path. In addition, the works will require some soil disturbance from the movement of earthmoving machinery within the disturbance footprint.

The works have the potential to impact on soil stability and result in soil erosion and sedimentation of adjacent areas unless safeguards and mitigation measures are in place. These impacts are expected to be mitigated through the use of strict sediment and erosion controls during the construction phase. Furthermore, the use of a core drilling wet vacuum system is proposed where a core drill is used with running water to suppress any dust or sedimentation plumes. This then forms a wet slurry which is vacuumed into containers and disposed of offsite.

The risk of soil erosion and sedimentation during the works will therefore be low if the mitigation measures described in Section 5 are implemented.

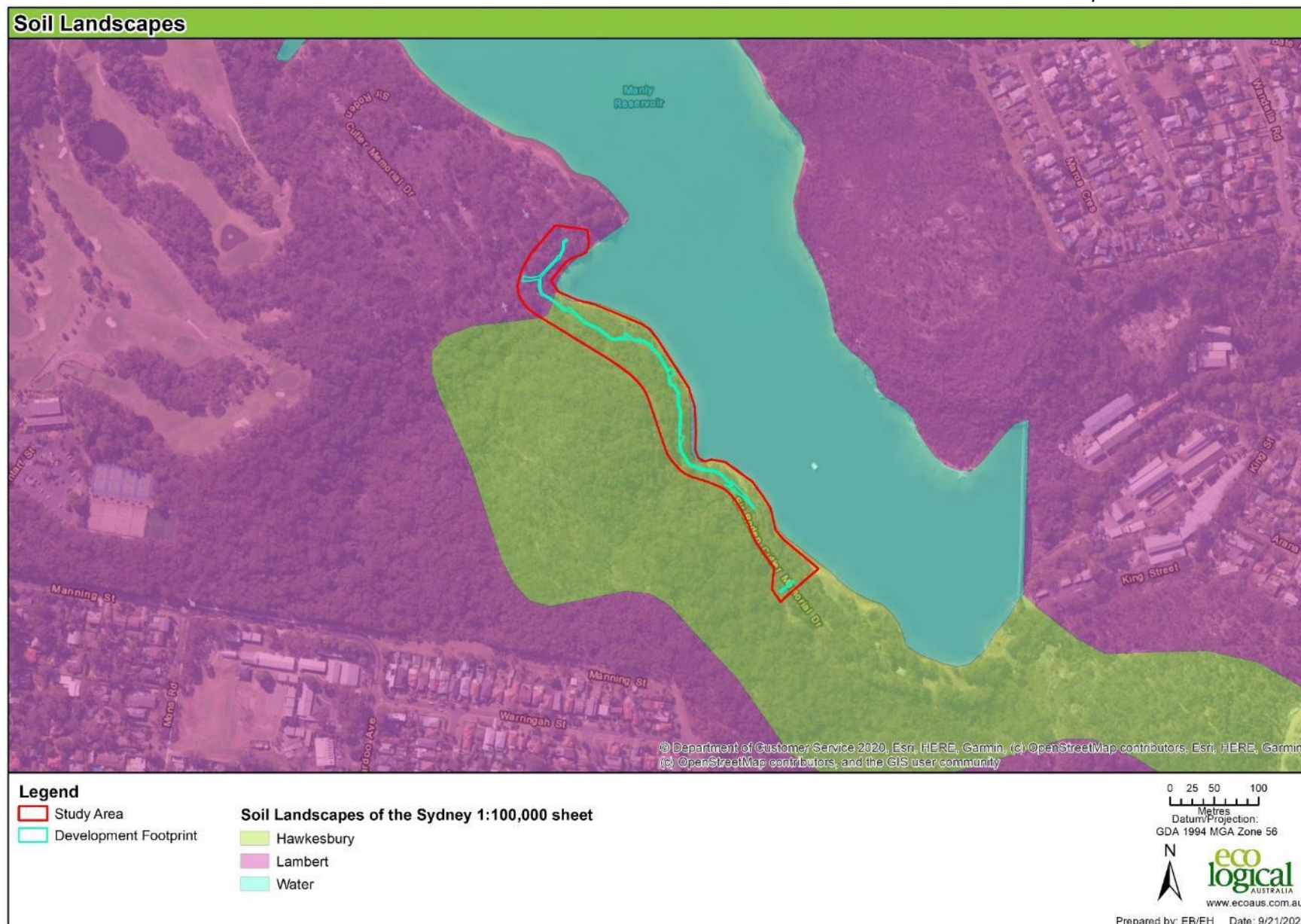


Figure 2 Soil Landscapes of the Sydney 1:100,000 Sheet (Department of Planning, Industry and Environment, 2

3.2 Contaminated Land and Acid Sulphate Soils

3.2.1 Existing Environment

The NSW EPA Contaminated Land Register (NSW EPA 2016) of contaminated land or potential contamination risk within the suburb of Manly Vale did not identify any current or previous notices that apply to the site. There was also no obvious indication of gross contamination (i.e. staining, odours or distressed vegetation) noted on the soil surface during the field survey. It is considered unlikely that gross contamination exists or that any existing contamination would pose a risk to human health or the environment.

A review of both the LEP and the Office of Environment and Heritage (OEH) Acid Sulfate Soils Planning Map (2017) indicated that the site is located in an environment where 'no known occurrence of acid sulphate soils' occurs and are therefore unlikely to be impacted.

3.2.2 Impact Assessment

No known contamination is recorded within the development site. This does not eliminate the risk of contaminated soils occurring within the site. Based on current site condition, there is low potential for some contamination to exist on site. If contaminated soils are suspected, further surveys should be undertaken to assess the risk. If any excess soils are to be taken offsite for disposal or reuse, material should be tested to ensure they are safe for their end use or disposed of in accordance with EPA (2014) Waste Classification Guidelines.

The potential environmental impacts associated with the proposed works that relate to contaminated soils include:

- Pollution of soil from chemical spills (e.g. fuel or oil from machinery).

Mitigation measures have been provided in Section 5 to address and mitigate any impacts associated with the incidental discovery of soil contamination or potential for chemical spills during construction.

3.3 Waterways and Aquatic Habitat

3.3.1 Existing Environment

The work area will occur adjacent to Manly Dam, a waterbody approximately 30 ha in area within the Memorial Reserve. Manly Dam was formed by the construction of a dam across Curl Curl Creek.

Two second order streams (Strahler Stream Order) mapped in the north western portion of the dam. The mapped water courses converge in the middle of the dam and form a third order stream, see Figure 3. This stream is identified as Manly Creek and it flows through the dam and flows for approximately 5km through an urbanised catchment till it reaches the ocean at Queenscliff Beach.

No Ramsar or wetlands mapped under *State Environmental Planning Policy (Coastal Management) 2018* have been identified in close vicinity to the site.

The fish stock in Manly Dam comprises of native and exotic species. Since 2020 the dam is being regularly stocked with Australian Bass fingerlings. The proposal will have a negligible impact on fish species.

Manly Dam is mapped as Key Fish Habitat under the FM Act. This means that any activity that involves dredging and reclamation work, the temporary or permanent obstruction of fish passage or the harming of any marine vegetation requires a Part 7 FM Act permit.



3.3.2 Impact Assessment

The potential environmental impacts associated with the proposal relate to:

- Introduction of sediment into the waterbody from earth disturbing activities.
- Pollution of water from chemical spills (e.g. fuel or oil from machinery).

The proposed link trail will be designed to avoid trees where possible to minimise impacts to native vegetation, some trees will require removal. For the construction of the link trail, selective removal of shrubs and small trees will be undertaken by qualified bushland management personnel through the use of hand tools. In addition, native ground cover disturbance will be limited to the locations of the galvanised steel pilings where localised excavation through the use of a hand auger will also be required. Given the groundcover is dense there is not likely to be a substantial risk of erosion and sedimentation of the dam waterbody, nonetheless this risk will be further mitigated with appropriate soil and erosion control measures.

For the entry path, native vegetation will be removed by a small excavator. The site is relatively flat and vegetation removal will be confined as far as possible to the footprint of the 1.8 m wide path, although a 4 m construction buffer has been assessed impacts will be minimised in this area with implementation of mitigation measures. There is a low to moderate risk that this activity will result in sedimentation of the dam if the appropriate soil and erosion measures are not in place.

In terms of adverse impacts to water quality, the works will not include disposing of wastewater or solid waste. Chemicals such as fuel and petrol will be used during the construction works, however these will be used in small amounts and no storage of these chemicals is proposed within the site. The risk of a chemical spill is low. Sedimentation also has a moderate risk of impact on the water quality.

Erosion control measures will be in place to reduce any impacts to the waterbody. In addition, natural revegetation of the site will occur post construction, which will help stabilise the areas adjacent to the waterbody.

The use and storage of chemicals such as petrol or oil will be required to service the machinery as part of the construction works. Safeguards have been provided to ensure the likelihood of chemical spills and environmental damage is low.

Early consultation with DPIE fisheries officers have determined that a Part 7 Permit is unlikely to be required as the works will not involve the dredging or reclamation of the foreshore. Minor excavation works will occur; however, this is not likely to restrict fish passage. However, it was advised that a plan of works should be forwarded to a fisheries officer from the Department of Primary Industries for a final determination on the need for a Part 7 Permit.

Mitigation measures have been specified in Section 5 to minimise any unintentional water quality and aquatic fauna impact.

3.4 Biodiversity

3.4.1 Existing Environment

3.4.1.1 *Vegetation Communities*

Previous vegetation mapping identified the following plant community types (PCTs) and non-native vegetation types within the development footprint (OEH 2016) (Figure 4):

- PCT 1250: Sydney Peppermint - Smooth-barked Apple - Red Bloodwood shrubby open forest on slopes of moist sandstone gullies, eastern Sydney Basin Bioregion (Coastal Sandstone Gully Forest)
- PCT 1783: Red Bloodwood - Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast (Sydney North Exposed Sandstone Woodland)
- PCT 1824: Mallee - Banksia - Tea-tree - Hakea heath-woodland of the coastal sandstone plateaus of the Sydney basin (Coastal Sandstone Heath-Mallee)
- Urban Exotic/Native.

There are no threatened ecological communities (TECs) associated with the above PCTs.

Field survey within the study area and surrounds was originally undertaken as part of the Manly Dam Entry Path and Link Trail REF (ELA 2017). Following amendments to the proposed development footprint, additional survey was undertaken for this REF. ELA ecologist Carolina Mora conducted a field survey on 3 September 2021. The field survey focused on validation of existing vegetation mapping, determining type and extent within the development footprint. Field survey confirmed the presence of PCT 1250 and PCT 1783 as mapped by OEH (2016) and confirmed by ELA (2017), with minor changes in extent. Validated vegetation is presented in Figure 5. Descriptions of both PCTs are provided in Table 3-2 and Table 3-6. A complete species list of species identified during 2017 and 2021 surveys is provided in Appendix C.

Table 3-2: PCT 1250 description

PCT 1250: Sydney Peppermint - Smooth-barked Apple - Red Bloodwood shrubby open forest on slopes of moist sandstone gullies, eastern Sydney Basin Bioregion (Coastal Sandstone Gully Forest)	
Associated TEC(s)	None
Conservation Status	N/A
Vegetation Description	PCT 1250 was present in the northern end of the development footprint (Figure 5). The canopy consisted of native <i>Eucalyptus piperita</i> (Sydney Peppermint), <i>Angophora costata</i> (Smooth-barked Apple) and <i>Glochidion ferdinandi</i> (Cheese Tree). The midstorey included <i>Elaeocarpus reticulatus</i> (Blueberry Ash), <i>Pittosporum undulatum</i> (Native Daphne) and <i>Gahnia</i> sp. Groundcover was dominated by <i>Pteridium esculentum</i> (Common Bracken), <i>Entolasia marginata</i> (Bordered Panic) and <i>Gleichenia dicarpa</i> (Pouched Coral Fern). Exotic species included <i>Asparagus aethiopicus</i> (Asparagus Fern) and <i>Ageratina adenophora</i> (Crofton Weed).
Area within development footprint (ha)	0.01

Photo

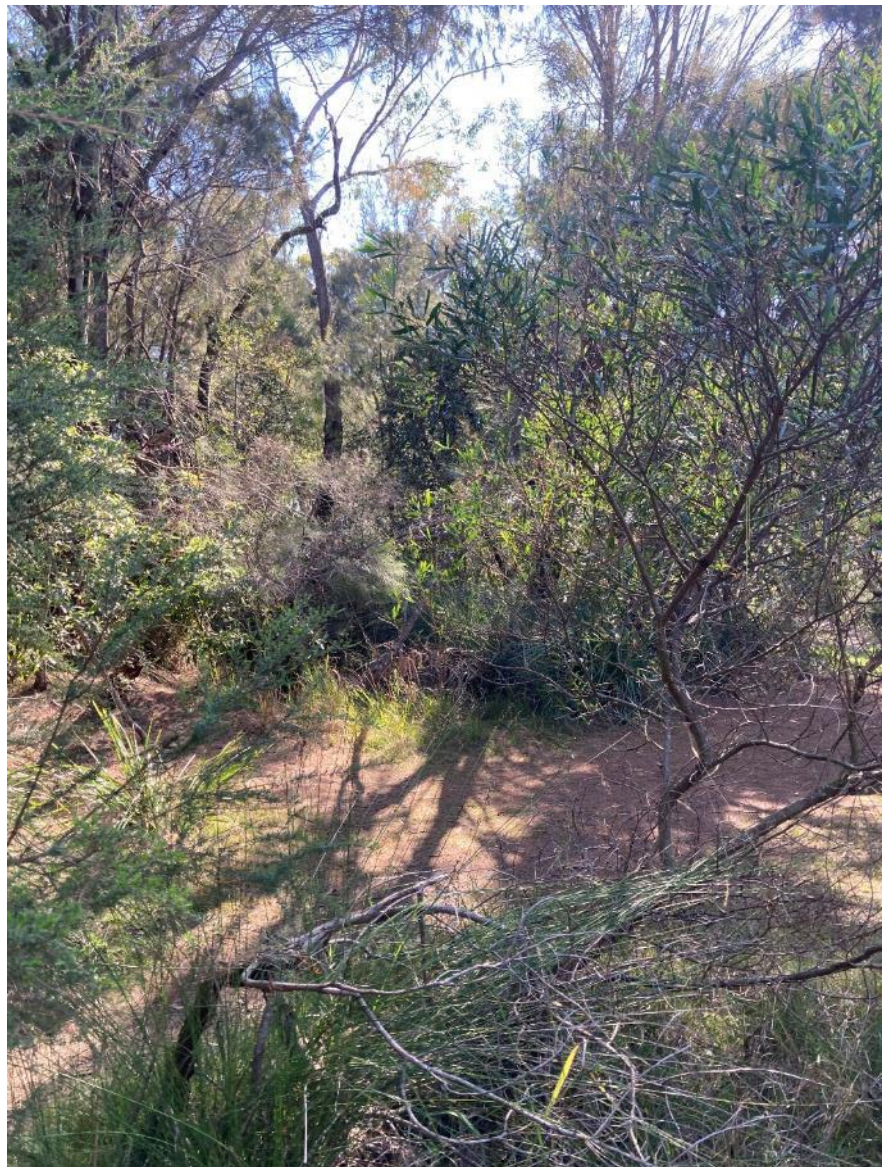


Table 3-3: PCT 1783 description

PCT 1783: Red Bloodwood - Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast (Sydney North Exposed Sandstone Woodland)

Associated TEC(s) None

Conservation Status N/A

Vegetation Description PCT 1783 was dominant throughout the development footprint (Figure 5). The canopy contained the native species *Eucalyptus punctata* (Grey Gum) and *Corymbia gummifera* (Red Bloodwood). The mid-storey contained a diverse mix of native shrubs including *Banksia serrata* (Old man-banksia), *Grevillea buxifolia* (Grey Spider Flower), *Hakea gibbosa*, *Lambertia formosa* (Mountain devil), *Gompholobium grandiflorum* (Large Wedge Pea), *Kunzea ambigua* (Tick Bush) and *Leptospermum* spp. The ground layer was dominated by native sedge species including *Lomandra* spp. (Matrush), and *Imperata cylindrica* (Blady Grass). Exotic groundcover species, including *Ehrharta erecta* (Vasey Grass), *Passiflora* sp. and *Cenchrus clandestinus* (Kikuyu), were also present. Some new plantings were present within this PCT.

Area within development footprint (ha) 0.11

Photo



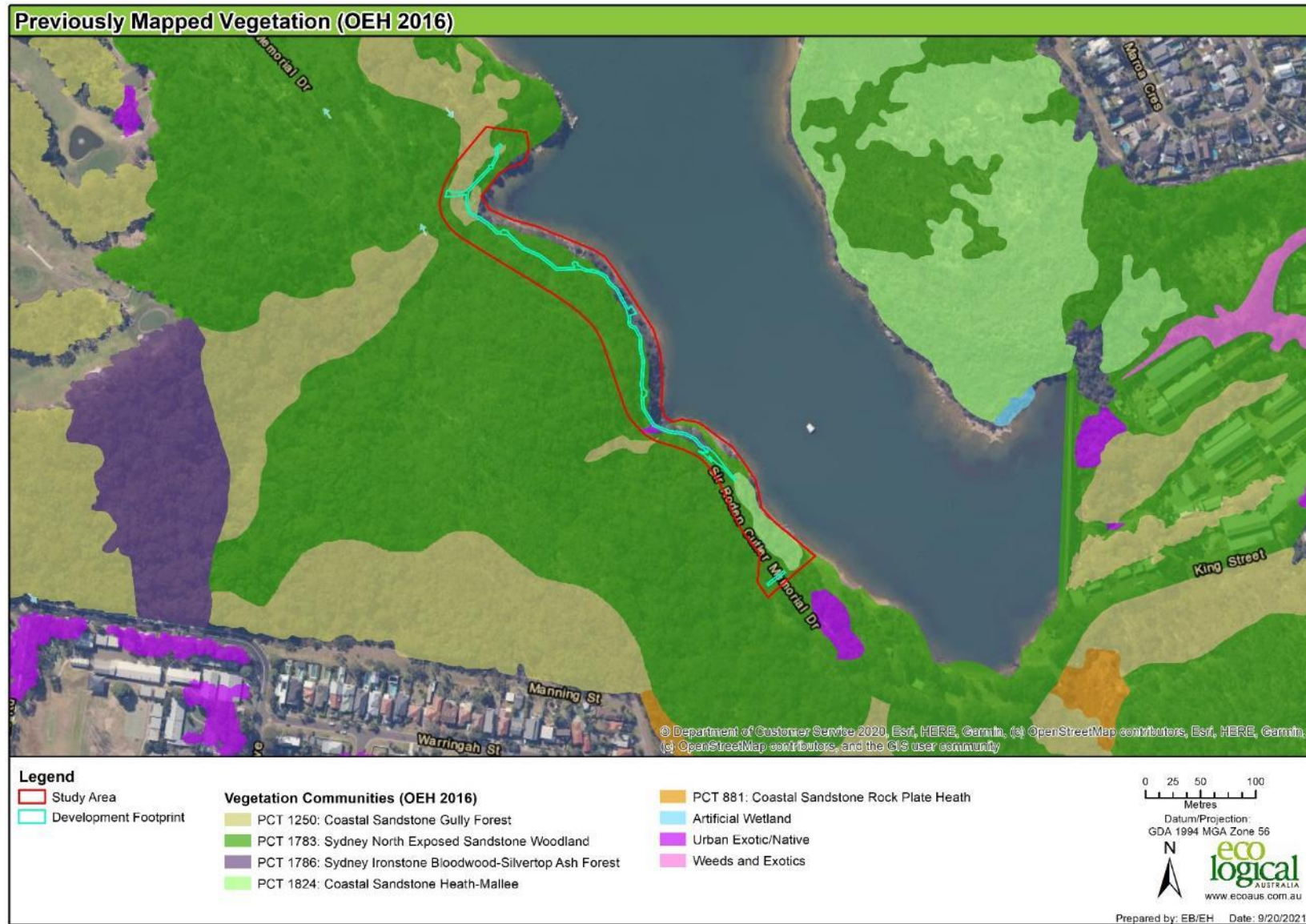


Figure 4: Mapped vegetation communities within the study area (OEH 2016)



Figure 5: Plant community types and habitat features within the development footprint (ELA 2021)

3.4.1.2 Priority Weeds and Weeds of National Significance (WoNS)

The *Biosecurity Act 2015* and regulations provide specific legal requirements for State level priority weeds. Under the Act, all exotic plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Specific legal requirements apply to State determined priorities under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022. Weeds listed as 'other weeds of regional concern' under the plan warrants resources for local control or management programs and are a priority to keep out of the region. Inclusion in this list may assist Local Control Authorities and/or land managers to prioritise action in certain circumstances where it can be demonstrated the weed poses a threat to the environment, human health, or agriculture.

Seven priority weeds including two also listed as Weeds of National Significance (WoNS) were recorded within the development footprint (Table 3-4).

Table 3-4: Priority weeds and Weeds of National Significance (WoNS) recorded within the development footprint

Scientific Name	Common Name	WoNS	Management Objective
State level priority weeds			
<i>Asparagus aethiopicus</i>	Asparagus Fern	Yes	Asset protection
<i>Senecio madagascariensis</i>	Fireweed	Yes	Asset protection
Other priority weeds			
<i>Ageratina adenophora</i>	Crofton Weed	No	Other weeds of regional concern
<i>Cinnamomum camphora</i>	Camphor Laurel	No	Other weeds of regional concern
<i>Ochna serrulata</i>	Mickey Mouse Plant	No	Other weeds of regional concern
<i>Paspalum quadrifarium</i>	Tussock Paspalum	No	Other weeds of regional concern
<i>Senna pendula</i>	Senna	No	Other weeds of regional concern

3.4.1.3 Threatened Flora and Fauna

A search for threatened species using DPIE BioNet Atlas and Australian Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool identified 26 threatened flora species and 38 threatened or migratory fauna species listed under the BC and / or EPBC Acts, which may have the potential to occur within a 5 km radius of the study area or have been recorded within this radius since 1990. These searches were used to update the assessment of the likelihood of occurrence of threatened species within the study area originally undertaken by ELA in 2017 and is provided in Appendix D. The BioNet Atlas database records are shown in Figure 6 and Figure 7. It should be noted that some sensitive species cannot be displayed at this resolution due to licence conditions.

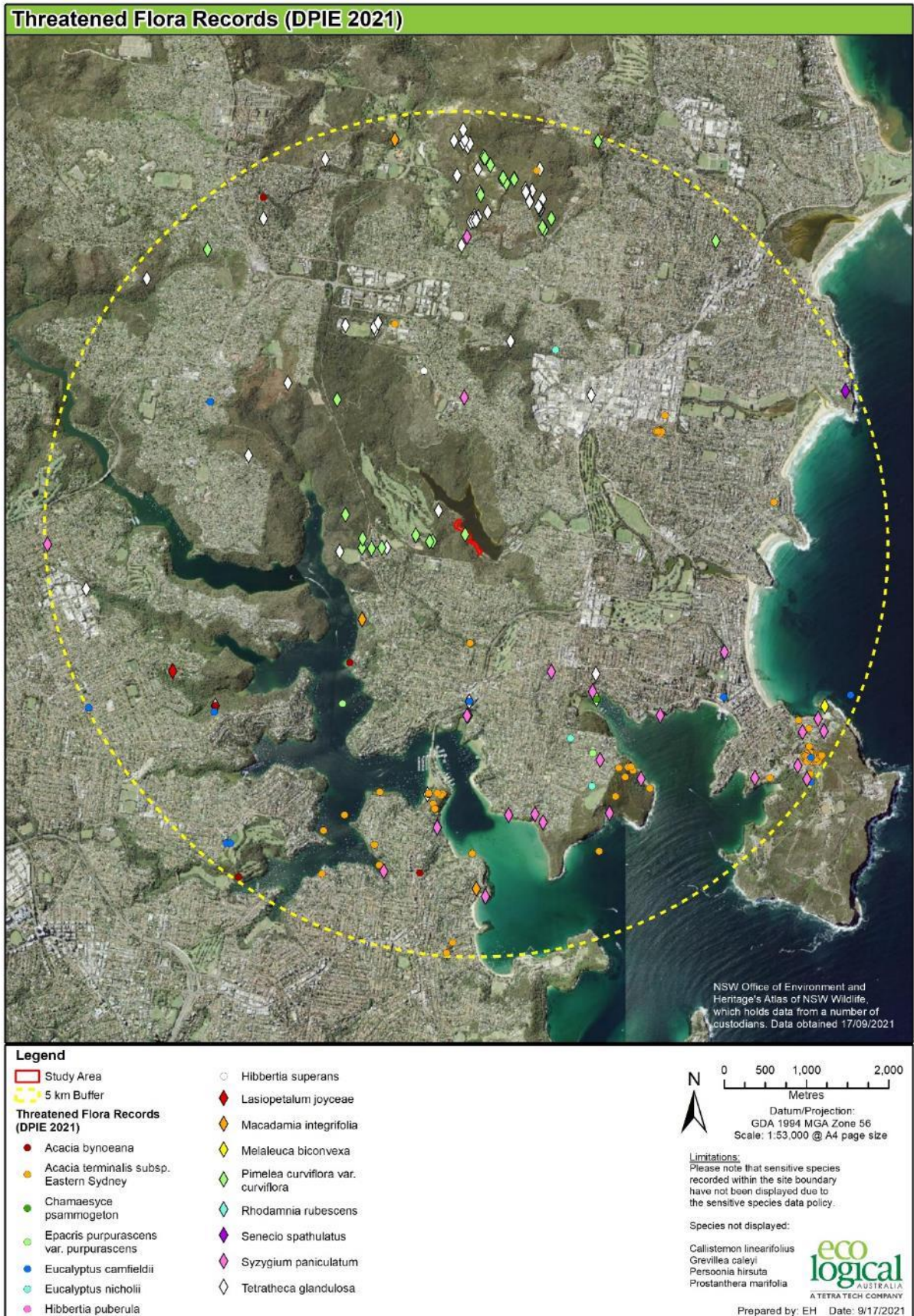


Figure 6: Threatened flora species recorded within 5 km of study area (DPIE 2021)

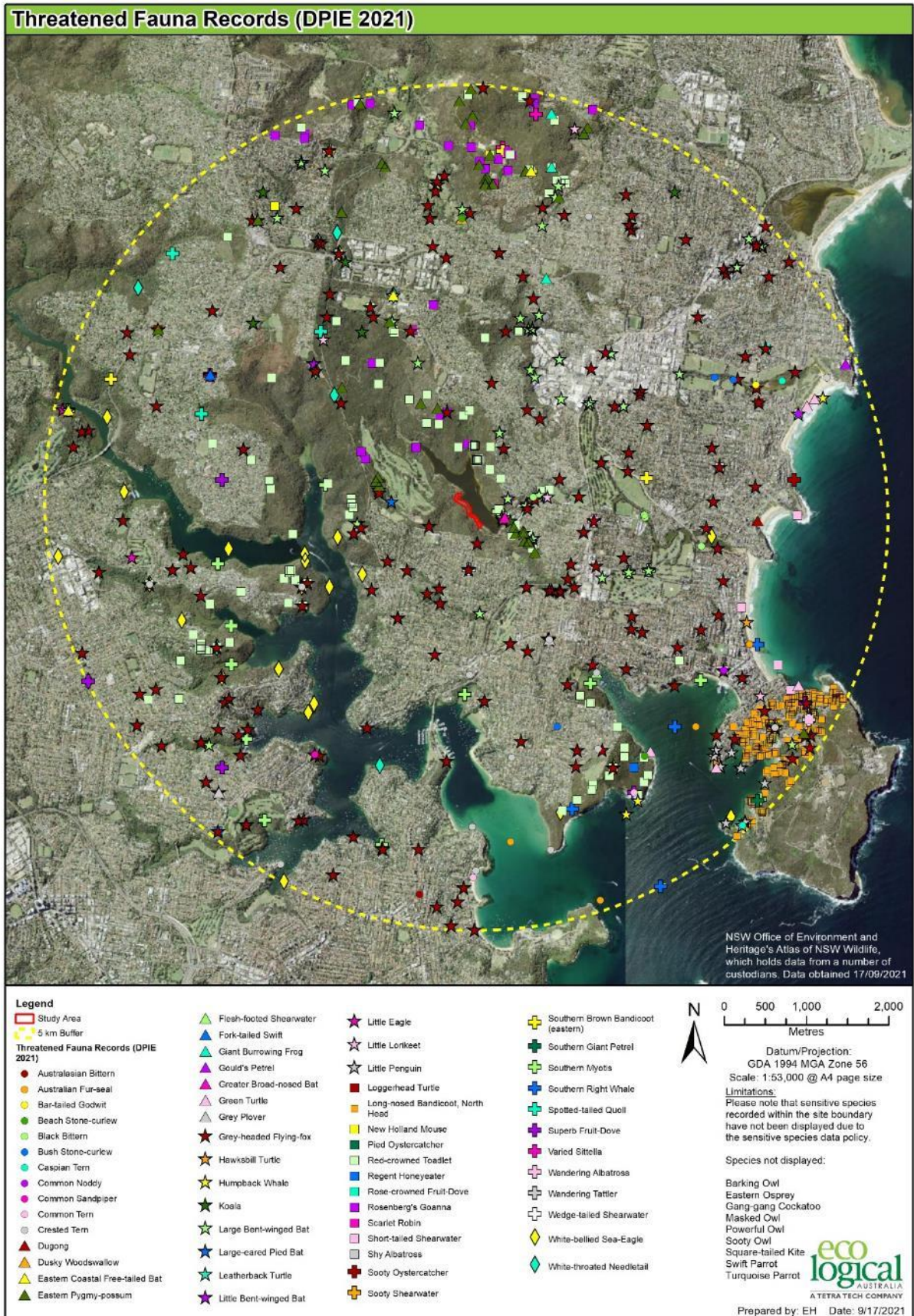


Figure 7: Threatened fauna species recorded within 5 km of study area (DPIE 2021)

Threatened flora species are known from within Manly Dam, however no threatened flora species have been previously recorded within the study area or development footprint (ELA 2017, DPIE 2021). No threatened flora species were recorded during field survey. Given the considerable levels of modification of vegetation within the development footprint and previous surveys, it is considered highly unlikely that threatened species occur within the development footprint.

No threatened fauna species have been previously recorded within the study area or development footprint (ELA 2017, DPIE 2021). No threatened fauna species were recorded during field survey. Four hollow bearing trees were identified within the study area in 2017 (Figure 5), however these are not proposed for removal. Native vegetation within the development footprint may provide habitat for the following threatened species:

- *Cercartetus nanus* (Eastern Pygmy-possum)
- *Isoodon obesulus obesulus* (Southern Brown Bandicoot)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

An impact assessment was not deemed necessary for the *Isoodon obesulus obesulus* (Southern Brown Bandicoot) as the preferred habitat for this species was not identified within development footprint.

3.4.2 Impact Assessment

A total of 0.12 ha of native vegetation would be impacted within the development footprint. The breakdown of this total by PCT is presented in Table 3-5.

Table 3-5: Vegetation impacts

Plant community type	Proposed impacts (ha)
PCT 1250 Sydney Peppermint - Smooth-barked Apple - Red Bloodwood shrubby open forest on slopes of moist sandstone gullies, eastern Sydney Basin Bioregion (Coastal Sandstone Gully Forest)	0.01
PCT 1783 Red Bloodwood - Scribbly Gum / Old-man Banksia open forest on sandstone ridges of northern Sydney and the Central Coast (Sydney North Exposed Sandstone Woodland)	0.11
Total	0.12

No threatened flora species or suitable habitat for threatened flora species would be impacted by the proposed works.

The proposed works would impact 0.12 ha of native vegetation which may provide habitat for the following threatened species:

- Eastern Pygmy-possum
- Grey-headed Flying-fox.

Assessments of Significance in accordance with the BC Act and Significant Impact Criteria in accordance with the EPBC Act were applied for the relevant species listed above and are presented in Appendix E and Appendix F. It was determined that the proposed works would not result in a significant impact to any of the above species.

Mitigation measures to minimise biodiversity impacts are provided in Section 5.

3.5 Aboriginal Heritage

3.5.1 Existing Environment

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database was undertaken on 12 August 2021. The search parameters were GDA2020, Zone: 56, Eastings: 336179 - 340179, Northings: 6258638 - 6262638 with a Buffer of 0 meters. The search identified 97 Aboriginal sites as being within 3km of the study area. The AHIMS result is included as Appendix G of this report.

No AHIMS sites have been recorded within the study area.

The distribution of recorded Aboriginal sites adjacent to the study area is shown in Table 3-6. A regional overview of AHIMS sites surrounding the study area is shown in Figure 18. The frequencies of site types and contexts recorded within the AHIMS database search area are listed below.

Table 3-6: AHIMS Search Results

Site Context	Site Features	Number	%
Closed site	Art Site, Water Hole	2	2.06%
	Rock Engraving	1	1.03%
	Shelter with Art	3	3.09%
	Shelter with Art and Artefact Site	1	1.03%
	Shelter with Art and Midden	1	1.03%
	Shelter with Deposit	2	2.06%
	Shelter with Midden	23	23.71%
Open site	Aboriginal Resource and Gathering	1	1.03%
	Art Site	7	7.22%
	Art Site, Grinding Groove	1	1.03%
	Artefact Site	2	2.06%
	Artefact Site, Midden	8	8.25%
	Grinding Groove	2	2.06%
	Midden	18	18.56%
	Midden, PAD	1	1.03%
	PAD	4	4.12%
	Rock Engraving	20	20.62%
Total		97	100.00%

3.5.1.1 *Ethnohistory*

For thousands of years prior to the arrival of Europeans the Aboriginal occupants of the area lived primarily along the foreshores of the harbour. Food, fresh water and shelter was abundant and Aboriginal people fished and collected shellfish along the shores, hunted in the hinterlands and harvested food from the surrounding bush. People moved throughout their country in accordance with the seasons and developed a rich and complex ritual life comprising language, customs, spirituality and the law – the heart of which was connection to the land (Aboriginal Heritage Office 2020). The steep topography and dense vegetation are likely to have limited movement through country and shoreline activity would have been more common.

When the British First Fleet arrived in 1788, the Sydney region was home to numerous Aboriginal communities that had been living there for thousands of years. Current estimates suggest there may have been 3000-5000 people living in the Sydney region at that time. Captain Cook and the later British colonists recorded some of their language and place names, observed and recorded their observations regarding the new arrivals, their physical appearance, tools, clothing, camps and shelters, the food they ate, their ceremonies and their items of material culture. In addition, many artists recorded individuals and the activities of groups of people. Within a year of the British arrival well over half the local population had succumbed to smallpox and, as the British colony expanded, loss of country and acts of aggression made their traditional way of life unachievable (Attenbrow 2010:8,158). Aboriginal people continued to live around Sydney's harbour and coastal areas for more than a century after Europeans arrived, adapting their traditional life to their new conditions of dispossession and displacement, and maintaining, in scattered campsites, some of their skills and culture (Dictionary of Sydney).

One of the primary surviving records of Aboriginal culture within the Northern Beaches region left by the Aboriginal people themselves is contained in art found on rocks and in caves. In the Sydney region, some 600 rock art sites (painting and engraving) have been recorded with over 4,000 separate figures mainly of plants, animals, fish and people, which recall the dreamtime and events from the past.

Archaeological research on sites such as Aboriginal rock engravings, open camp sites and shell middens, along with the excavated artefacts and food remains, provide a record of the distant past. The archaeological record is important, as it reveals that many aspects of Aboriginal life changed over time, and people did not always use the same tools and subsistence technologies that were observed when the British arrived. In addition, it provides additional details about some aspects of life that are not described in the historical records such as the range of land and marine animals eaten, and the raw materials used in making tools and weapons (Attenbrow 2010).

Manly Dam was first constructed in 1892 to a height of 20m. The dam flooded the catchment area creating a lake over the top of the 3rd order Strahler stream, permanently altering the landform. The earliest aerial images of the study area, taken in 1943 show the extent of the impacts caused by the construction of Manly Dam (Figure 20).

3.5.1.2 Visual inspection

A site inspection of the development area was carried out by ELA Archaeologist Declan Coman on the 31st of August and the 22nd of September, 2021. The site inspection did not identify any new Aboriginal objects in the study area but did identify areas of disturbance and sensitivity.

The study area consists of a narrow stretch of land along the edge of Manly Dam. Along the north-eastern edge, a low flat landform runs along the banks of the dam, as this landform moves southwest it rises over exposed sandstone outcrops

At the southern extent of the study area existing park facilities and landscaping has disturbed ground surfaces (Figure 8, Figure 9). Platforms of exposed sandstone also occur at the water's edge (Figure 10, Figure 11), these surfaces have been partially impacted by park facilities and no grinding grooves or arts sits were observed.

In the centre of the study area the disturbances from existing park areas cease and revert to undisturbed bushland (Figure 12). Ground surfaces were obscured by leaf litter and vegetation (Figure 13) but show a thin soil profile over sandstone bedrock with no observable disturbances.

Outcrops of the sandstone bedrock occur through the study area and form a steep incline along the south-western extent of the study area (Figure 14). Much of the sandstone surfaces in the study area were obscured by leaf litter and vegetation hinder the visual inspection (Figure 15).

At the northern extent of the study area the landform opens up into a wider, gentle slope with evidence of land clearance and other modifications from the construction of the park (Figure 16, Figure 17)



Figure 8: Ground surfaces and existing park infrastructure at southern extent of study area



Figure 9: Ground surfaces and existing park infrastructure at southern extent of study area



Figure 10: Park facilities in the south of the study area



Figure 11: Exposed sandstone surfaces in the south of the study area



Figure 12: Ground surfaces and vegetation along the proposed alignment



Figure 13: Ground surfaces along the proposed alignment



Figure 14: Sandstone outcrops in the centre of the study area



Figure 15: Obscured sandstone surfaces in the centre of the study area



Figure 16: Ground surfaces at the northern extent of the study



Figure 17: Modified ground surfaces and park infrastructure at the northern extent of the study area

3.5.2 Impact assessment

Direct harm may occur as the result of any activity which disturbs the ground including, but not limited to, site preparation activities, installation of services and infrastructure, roadworks, excavating detention ponds and other drainage or flood mitigation measures, and changes in water flows affecting the value of a cultural site. The proposed works may cause direct harm through the clearing of vegetation, the excavation of ground surfaces for the construction of steel posts and concrete surfaces, the incising of sandstone surfaces for the construction of steel posts.

Indirect harm may affect sites or features located immediately beyond, or within, the area of the proposed activity. Examples of indirect impacts include, but are not limited to, increased impact on art in a shelter site from increased visitation, destruction from increased erosion and changes in access to wild food resources.

Following the database searches and site inspection, it has been identified that there are No Aboriginal objects were identified during site inspection. Disturbances from previous land use and vegetation clearance, coupled with the shallow soil profile, indicates that there is a low potential for intact archaeological deposits to be present and impacts to ground surfaces can proceed with caution.

Sandstone surfaces have the potential to contain Aboriginal sites such as art sites, grinding grooves and rock engravings, however no such sites were identified during the site inspection. As the impacts to sandstone surfaces will be minor and conducted with hand tools, impacts to potential art and rock engraving sites can be avoided through the implementation of an unexpected finds policy and a heritage induction prior to the commencement of works as detailed in Section 5 of this report.

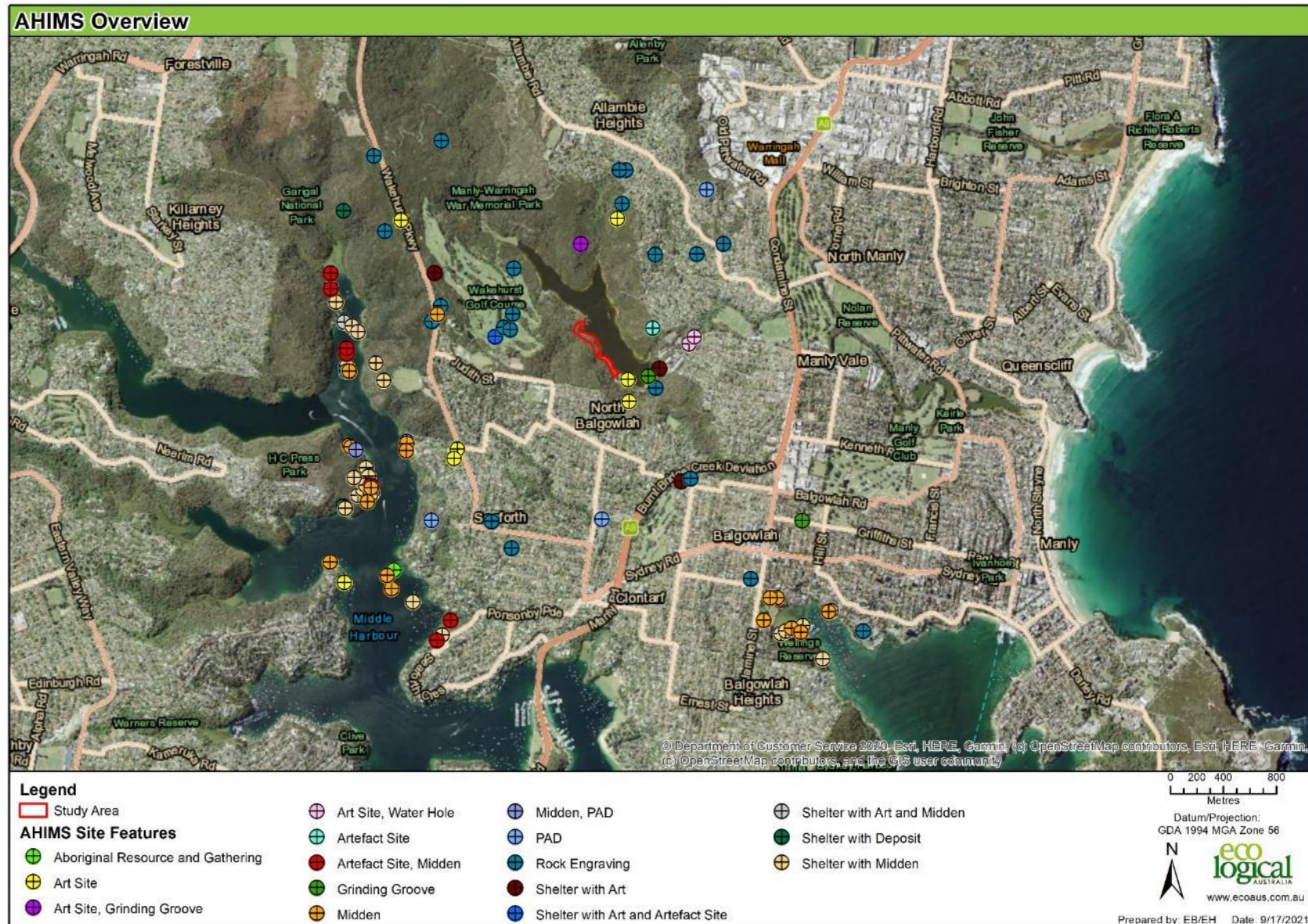


Figure 18: Regional overview of AHIMS sites surrounding study area



Figure 19: 1930 Aerial Imagery showing Manly dam prior to the construction of park facilities and walking trails



Figure 20: Aerial Imagery from 1978 showing Manly Dam after the construction of walking trails

3.6 Historic Heritage

3.6.1 Existing Environment

A preliminary desktop assessment of historical heritage was carried out to establish if there are any known places or items of historical heritage significance or potential areas containing archaeological relics in, or near, the area of proposed works. The preliminary desktop assessment included searches of heritage registers to identify any listed items and places within or near the project area.

Searches of the Australian Heritage Database, the State Heritage Register (SHR) and the Warringah LEP 2011 utilising the terms “Manly”, “Warringah” and “Manly Dam” were conducted on the 12 August 2021. in order to determine if any places of historical heritage are located within or in proximity to the proposed works.

One item; “C9; Manly Dam and Surrounds Conservation Area”, was found to cover the study area.

3.6.1.1 C9; Manly Dam and Surrounds Conservation Area

The land surrounding Manly Dam is protected as a conservation area for the reservoir and water run off which feeds into the dam. This conservation area is listed in the Warringah LEP 2011 as item C9. Its significance rests in its historical natural values. Its historical values are associated with the development of the Sydney metropolitan water supply and engineering. Its natural values are concerned with the adjoining bushland allotments as they have a role in maintaining the existing biological and ecological processes of the Sydney region. They also comprise a significant part of an ecosystem that forms the catchment for Manly Dam and its tributaries.

The Warringah LEP 2011 lists the land as zoned as RE1 for public recreation.

3.6.1.2 Impact Assessment

The link trail will enable the safe movement of visitors within the park. The link trail will be located within the conservation area of Manly Dam but will not impact on the significance of the item. The link trail will enable the land to be used for public open space or recreational purposes and provide a compatible use of the land. The trail will effectively enhance the natural environment making it accessible for visitors whilst also still protecting it and managing the public land for ecological, scientific, cultural and aesthetic purposes.

Mitigation measures are also provided in Section 5 to minimise impacts during construction.



Figure 21: Historic Heritage Curtilages in the study area

3.7 Noise and Vibration

3.7.1 Existing Environment

The site is located within a substantial residential area. The closest sensitive receivers will be members of the public visiting Manly Warringah Memorial State Park during the time of construction. Existing noise sources in the general vicinity include the current vehicle movement, general residential and recreational activities.

3.7.2 Impact Assessment

Whilst there is potential for minor noise impacts during the construction phase of the works, particularly to public visiting the recreation area, these are anticipated to be minimal and will be worst during vegetation clearance using a small excavator for the entry trail which is anticipated to be short term. Some additional operational noise is anticipated from increased use of both Arana and King Street however, given ambient levels in the residential area these are anticipated to be negligible. Work hours will be in accordance with the Interim Construction Noise Guideline (DECC, 2009) detailed below which will minimise impacts to residents in proximity to the works:

- Monday to Friday 7.00am to 6.00pm
- Saturday 8.00am to 1.00pm
- No work on Sunday or public holidays

Mitigation measures are provided in Section 5 to minimise noise impacts during construction. Overall, the noise impacts are considered to be minimal.

3.8 Air Quality

3.8.1 Existing Environment

The current air quality within the site is likely to be typical of a suburban residential area with air quality likely to be moderate to good. Although the study area has bushland characteristics it is more appropriate to consider the air quality of the area as residential. This is due to the suburban residential environment that surrounds the Manly Warringah Memorial State Park.

3.8.2 Impact Assessment

The potential environmental impacts associated with the works that relate to air quality include:

- Potential increased dust and gas emissions during the construction phase because of soil disturbance and earth works.

There is potential that dust generation leading to air quality impacts around Manly Dam Memorial Reserve could occur during site preparation activities and construction if proper management measures are not employed. Proper management should include the regular monitoring of work areas and stockpiles for dust generation and where necessary covering loads or watering to suppress dust. With proper management, air quality impacts to receivers are considered to be low.

Mitigation measures are proposed below in Section 5 to minimise impacts further.

3.9 Waste Management

3.9.1 Impact Assessment

Minor, soil excavation and movement is proposed and will require management during construction. Therefore, soil reuse or classification and removal should be in accordance with EPA (2014) waste classification guidelines.

If contaminated soils are suspected, further surveys should be undertaken to assess the risk. If any excess soils are to be taken offsite for disposal or reuse, material should be tested to ensure they are safe for their end use or disposed of in accordance with EPA (2014) Waste Classification Guidelines.

General waste management from the construction activity will be the responsibility of the contractors undertaking the works. The construction contract must not dispose of waste in Council bins.

The proposal is not expected to greatly increase visitors to the park and waste generated by visitors is expected to remain at the current level. Therefore, existing waste management facilities and activities provide sufficient capacity to manage operational waste.

3.10 Traffic

3.10.1 Existing Environment

A Traffic Safety Assessment was undertaken by Transport and Traffic Planning Associated in 2021. The assessment provided an overview of the existing environment and reviewed the proposed design options. Discussion of the proposed design options is provided in Section 3.10.2. The Traffic Safety Assessment is provided in Appendix H.

The road that travels through the park is an extension of Kings Street. The Road travels through the park for approximately 2 km along the side of the dam reservoir and provides access to a number of carparks and picnic areas. The road is a two-way road with widths between 3.8 m and 5 m. This is below the width presented in the Austroads Design Guide, minimum two way road width of 5.5 m to 6 m. The road is therefore considered substandard.

The portion of road that runs relatively parallel to the proposed trail alignment currently provides an informal access for pedestrians and cyclist, as well as vehicles. There is no foot path or pedestrian access along this portion of the road. The traffic safety assessment also found that the existing sightlines on the road were substandard due to the undulating topography and sharp bends. To summarise the existing roadway presents multiple manoeuvring difficulties for car which increase safety risks for all users.

The assessment also found that there has been a slight increase in vehicle traffic coming to the park attributed to the COVID19 lockdowns increasing the demand for outdoor recreation activities.

3.10.2 Impact Assessment

Construction activities will slightly increase traffic during the construction period. This is to accommodate vehicle movements to and from the site, associated with the transportation of personnel, materials, and the removal of waste. As the alignment of the trail is away from the road construction will not impact the movement of vehicles and pedestrians through the Park. As the work is in close

proximity to the road construction works will need to be vigilant of vehicles and pedestrians using the area. Overall construction impacts on traffic are considered to minimal and mitigation measures are discussed in Section 5 to further reduce impacts.

Operationally the proposal will have a significant positive affect on traffic in the area by improving road safety, through reducing opportunities for conflict between pedestrians and vehicles to occur.

The proposal's aim is to provide a safer pedestrian throughfare than is currently provided by pedestrian sharing the existing road with cars and cyclists. The Traffic Safety Assessment assessed the safety of three different design options:

- Option 1 – Off-road bush boardwalk (separated from the roadway)
- Option 2 – Edge of road boardwalk or footpath (along the roadway)
- Option 3 – Shared Zone (on the roadway)

Option 1 (the proposal) was determined to be the safest as it removes the most vulnerable user group from the currently substandard roadway. It is acknowledged that cyclists will not be able to use the proposed boardwalk due to geometrical constraints. The report noted that Council should investigate other possibilities to provide cycling infrastructure in the area. This work would be subject to a different approval.

Option 2 presents a less desirable outcome for pedestrians when compared to Option 1. This is largely due to the footpath having to follow the roadway's alignment and terrain. As such, it will 'inherit' the already substandard sightlines and grades. As the Trail is frequently used by wheel-chair dependent user-groups, they will not be able to negotiate these grades easily, thus rendering the proposed option inadequate.

Option 3 Shared Zone is found to be unsuitable in the context of the Trail's terrain and traffic circumstance. Fundamentally, Shared Zones are intended to prioritise dominant pedestrian activity on otherwise typically vehicle-centred roadways. This is in direct contradiction with the Trail's operating circumstance. The traffic data recorded a significant vehicular volume on the existing roadway. Therefore, if a Shared Zone was implemented on the Trail, it would potentially force majority of the drivers to wait for other road users. This 'imbalance' is a catalyst for misbehaviours that lead to more traffic safety issues.

3.11 Visual Amenity and Landscape

3.11.1 Impact Assessment

The works are proposing to connect existing infrastructure through the construct of new pathways around Manly Warringah War Memorial State Park. Given the small disturbance from the works, impacts to the visual amenity of the area including the visual landscape of the reserve are considered minimal. Some removal of vegetation will occur as part of the works however, disturbed areas within the construction impact buffer are likely to regenerate naturally.

Mitigation measures are proposed in Section 5.

3.12 Socio-Economic Considerations

Assuming that construction contractors and materials are sourced from local businesses where possible, there will be positive impacts to the local economy. Additionally, the proposed works will enable members of the public to utilise the area for recreation, as group seating and picnic areas will be constructed. As there has been an increase in cycling as a recreational activity for residents within the local area, the junior bike skills trail loop will assist in allowing young riders to develop their skills and confidence while riding and encourage an active and healthy lifestyle.

3.13 Cumulative Impacts

In accordance with clause 228 of the EP&A Regulation, any cumulative environmental effects of the project associated with other existing and likely future activities must be taken into account in determining the potential impacts of the project on the environment.

The works will be carried out in the Manly Warringah War Memorial State Park, Council is currently in the planning stage of upgrading other trails in the reserve. The cumulative impact of these project is considered positive as they are complimentary, creating a safe a diverse recreational offering in the reserve. The proposed works are likely to be constructed prior to the upgrade of the other trails therefore construction impacts will not be cumulative. No private development can occur in the park and private development outside of the park will not impact the Manly Warringah War Memorial State Park environment.

3.14 Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, the following Matters of National Environmental Significance (MNES) and impacts on Commonwealth land are required to be considered to assist in determining whether the project should be referred to the Australian Government Department of the Environment. Table 3-7 addresses the MNES for the project.

Table 3-7 Consideration of Matters of National Environmental Significance

MNES	Impact
Any environmental impact on a World Heritage property?	No
Any environmental impact on National heritage places?	No
Any environmental impact on RAMSAR wetlands?	No
Any environmental impact on Commonwealth listed threatened species or ecological communities?	Non-significant impact
Any environmental impact on Commonwealth listed migratory species?	No
Does any part of the project involve nuclear action?	No
Any environmental impact on a Commonwealth marine area?	No
Any impact on Commonwealth land?	No

3.15 Clause 228 of the Environmental Planning and Assessment Regulation

Clause 228 of the EP&A Regulation sets out 16 factors that need to be considered when assessing environmental impact under Part 5 of the EP&A Act. These factors are addressed in this report and relevant sections are listed in Table 3-8 below.

Table 3-8 Clause 228 Factors

Clause 228 Factors	Impact
(a) Any Environmental Impact on a Community?	<p>Noise and other impacts on the community are anticipated to be minimal and have been mitigated in Section 5. The works are expected to improve Council infrastructure and improve the public's experience when visiting Manly Dam Memorial Reserve.</p> <p>The works will provide an overall positive outcome for the local community, as the parks will be further enhanced as recreational areas and their overall amenity will be improved.</p>
(b) Any transformation of a locality?	No significant transformation of locality is proposed as part of the works. The works involve the construction of a link trail around the picnic area foreshore of Manly Dam.
(c) Any environmental impact on the ecosystems of the locality?	Minimal environmental impacts have been identified as a result of the works. Mitigation measures have been recommended to ensure the impacts are minimised (Section 5).
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	<p>The works will improve the recreational and aesthetic quality of the locality. Considering the bushland enhancement works and removal of only trees of low retention value within the study area, the works will reduce the aesthetic, scientific or environmental quality or value of the locality.</p> <p>furthermore, impacts on threatened ecological communities and species have been considered and mitigated.</p>
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	<p>No known Aboriginal heritage sites will be impacted by the works.</p> <p>Three items of local and state significance were identified adjacent to and surrounding the proposed study area including Manly Dam, The Manly Dam and Surrounds (conservation area) and the Manly Hydraulics Laboratory. All of these items are associated with each other. The dam itself is cross listed on three heritage registers including the Warringah LEP 2011, SHR, and under Section 170 of Sydney Water.</p> <p>No impacts will occur to any known items of heritage significance.</p>
(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i>)?	The impact assessment on threatened fauna has been addressed and mitigated. The impact, if any, will not be significant. In addition, the impact resulting from the loss of general fauna habitat as a result of vegetation disturbance is not likely to result in the loss or reduction in the viability of more common fauna species.
(g) Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air?	Potential impacts on flora and fauna have been considered as part of this REF. There will be no significant impact on any threatened species or other more common fauna species.
(h) Any long-term effects on the environment?	The project will not result in long-term impact if mitigation procedures are followed. Maintenance following the completion of the works will be infrequent.

Clause 228 Factors	Impact
	The works will have a long-term positive impact on the community through providing a useable public asset which will increase the overall safety, amenity, and potential for recreation within the area.
(i) Any degradation of the quality of the environment?	No significant impacts to the quality of the environment were found. No degradation to the quality of the environment should occur if mitigation measures are adhered to.
(j) Any risk to the safety of the environment?	A low risk to the environment is associated with the works. Potential for a small chemical spill (e.g. petrol or oil) and sedimentation is possible. The risk to the environment is considered minimal if the prescribed mitigation measures are adopted.
(k) Any reduction in the range of beneficial uses of the environment?	No reduction in the range of beneficial uses of the environment will result as part of the works. The works will provide a useable public asset and as such, will benefit the community.
(l) Any pollution of the environment?	No pollution of the environment is proposed or likely. The risk is minimal if the appropriate mitigation measures are followed.
(m) Any environmental problems associated with the disposal of waste?	All general waste is to be taken offsite and disposed of appropriately.
(n) Any increased demands on resources (natural or otherwise) that are or are likely to become in short supply?	No resources that are being utilised as part of this project are likely to become in short supply.
(o) Any cumulative environmental effect with other existing or likely future activities?	Negative cumulative environmental effects are unlikely to occur as a result of the works. This is due to the other works in the area being constructed at a different time and impacts being primarily associated to construction. Operationally the cumulative impact will be positive as the reserve tack network will be upgraded.
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	There are no impacts on coastal processes or hazards that will result as part of the works.

4. Consultation

Division 1 of the Infrastructure SEPP provides guidance on consultation with stakeholders.

Table 4-1 Infrastructure SEPP consultation requirements

ISEPP Clause	Clause Relevance	Consultation Undertaken
Clause 13	<p>Impacts on council-related infrastructure or services</p> <p>Consultation is required if the public authority is of the opinion that the development:</p> <ul style="list-style-type: none"> (a) will have a substantial impact on stormwater management services provided by a council, or (b) is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or (c) involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council, or (d) involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council, or (e) involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or (f) involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath). 	No, Northern Beaches Council is the proponent.
Clause 14	<p>Impacts on local heritage</p> <p>Consultation is required if the development:</p> <ul style="list-style-type: none"> (a) is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area, and (b) is development that this Policy provides may be carried out without consent. 	No consultation required. Impacts on local heritage are unlikely. Northern Beaches Council is the proponent.
Clause 15	<p>Impacts on flood liable land</p> <p>In this clause, flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled Floodplain Development Manual: the management of flood liable land published by the New South Wales Government and as in force from time to time.</p>	The site is mapped as flood liable land. However, Northern Beaches Council is the proponent.
Clause 16	<p>Consultation with public authorities other than councils</p> <p>Consultation is required if the development is:</p> <ul style="list-style-type: none"> (a) development adjacent to land reserved under the National Parks and Wildlife Act 1974—the Department of Environment and Climate Change, (b) development adjacent to a marine park declared under the Marine Parks Act 1997—the Marine Parks Authority, (c) development adjacent to an aquatic reserve declared under the Fisheries Management Act 1994—the Department of Environment and Climate Change, 	Consultation with public authorities other than Council was not deemed necessary in relation to Clause 16 of the Infrastructure SEPP.

ISEPP Clause	Clause Relevance	Consultation Undertaken
	<p>(d) development in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998—the Sydney Harbour Foreshore Authority,</p> <p>(e) development comprising a fixed or floating structure in or over navigable waters—the Maritime Authority of NSW,</p> <p>(f) development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service.</p> <p>Note. The Act defines bush fire prone land, in relation to an area, as land recorded for the time being as bush fire prone land on a map certified as referred to in section 146 (2) of the Act.</p> <p>Note. When carrying out development of a kind referred to in paragraph (f), consideration should be given to the publication of the NSW Rural Fire Service Planning for Bush Fire Protection 2006.</p> <p>(g) (Repealed)</p>	

5. Mitigation Measures

Table 5-1 Recommended mitigation measures for the proposed works

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
Soil Erosion and Sedimentation	<ul style="list-style-type: none"> Sedimentation caused by erosion and runoff from the site caused by removal of vegetation, vehicle movements and/or heavy rainfall. 	<ul style="list-style-type: none"> Prepare a Construction Environmental Management Plan (CEMP) prior to any construction works to address measures to be adopted to minimise impacts on the environment as a result of the construction works, including sediment erosion and sedimentation. Inspect erosion controls regularly (daily during workdays) and after rainfall. Fix damaged controls immediately. Remove accumulated sediment or waste material from the sediment controls regularly and dispose of at a licensed waste facility. Ensure only the minimum required vegetation is removed, maintaining the ground cover vegetation in all areas of work. Leave erosion and sediment controls in place until after the works are completed. Weather forecasts will be checked daily to ensure that work is not carried out before or during high rainfall. Schedule the works outside of predicted heavy rain periods. Stop work during and following heavy rainfall to reduce risk of mobilising sediment. 	<p>Project Manager All Staff/Contractors</p>
Soil Contamination	<ul style="list-style-type: none"> Incidental discovery or disturbance of soil contamination. Pollution of sediment from chemical spills (e.g. fuel or oil from machinery). 	<ul style="list-style-type: none"> If contaminated soils are uncovered during the works, all works within the vicinity of the find must cease immediately and Northern Beaches Council must be notified immediately. For any excess spoil material which requires offsite disposal, formal waste classification will be required before being taken to an appropriately licensed landfill in accordance with the EPA (2014) Waste Classification Guidelines. Store all chemicals (e.g. fuel, oil) in appropriate bunding/storage systems within the approved storage facility. Ensure appropriate spill kits are carried with the equipment. Ensure all equipment is in good working order. 	<p>Project Manager All Staff/Contractors</p>
Biodiversity	<ul style="list-style-type: none"> Damage to vegetation that is not proposed for removal 	<ul style="list-style-type: none"> Pre-works briefing to be undertaken by Northern Beaches Council staff advising of sensitive areas and relevant safeguards for these areas. Works must be stopped if any previously undiscovered threatened species or communities are discovered during works. An assessment of the impact and any 	<p>Project Manager All Staff/Contractors</p>

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
	<ul style="list-style-type: none"> Harm to non-identified threatened flora and fauna species Injured or orphaned wildlife 	<ul style="list-style-type: none"> required approvals must be obtained. Works must not recommence until Northern Beaches Council has provided written approval to do so. The site-specific CEMP must include instructions for dealing with orphaned or injured native animals and include the contact details for the NSW Wildlife Information, Rescue and Education Service Inc (WIRES). Revegetation works are to utilise characteristic species from the identified PCTs and will require ongoing maintenance activities such as weed removal to ensure successful recolonization. 	
Priority Weeds	<ul style="list-style-type: none"> Spread of priority weeds 	<ul style="list-style-type: none"> Wash down equipment and vehicles prior to and after use, to manage the introduction and spread of weed propagules. 	All Staff/Contractors
Aboriginal Heritage	<ul style="list-style-type: none"> Discovery of unsuspected Aboriginal objects Discovery of human remains Harm to AHIMS sites as well as other area of Aboriginal Significance 	<ul style="list-style-type: none"> A Heritage induction must be provided to all contractors undertaking works on site should be briefed on the protection of Aboriginal heritage objects under the NPW Act, and the penalties for damage to these items. This induction must be provided by a qualified archaeologist. Should an unexpected Aboriginal object be identified during construction, work in the immediate vicinity of the find is to stop and the area must be fenced off with suitable markers (star pickets, flagging or barrier mesh). The Northern Beaches Council Project Manager is to be notified. Engage an archaeologist to determine the significance of the find, and if required, determine the notification, consultation, and approval requirements. Works must not recommence until Northern Beaches Council has provided written approval to do so. If human remains are discovered, works should immediately cease, and the NSW Police should be contacted. If the remains are suspected to be Aboriginal, the DPIE may also be contacted at this time to assist in determining appropriate management 	<p>Project Manager</p> <p>All Staff/Contractors</p>
Historic Heritage	<ul style="list-style-type: none"> Impacts to Heritage items 	<ul style="list-style-type: none"> In accordance with Section 146 of the <i>Heritage Act 1977</i>, if an archaeological relic (such as a deposit or artefact) is uncovered during works, work must cease in the affected area and a qualified archaeologist contacted to assess the find. Further advice and clarification may be sought from the Heritage Council of NSW, or the Heritage Division under delegation regarding assessment and approvals. 	<p>Project Manager</p> <p>All Staff/Contractors</p>
Noise and Vibration	<ul style="list-style-type: none"> Noise impacts on sensitive receivers in proximity 	<ul style="list-style-type: none"> Avoid simultaneous operation of noisy plant within discernible range of a sensitive receiver. Works will only occur during the following times: <ul style="list-style-type: none"> Monday to Friday 7:00 am to 5:00 pm 	<p>Project Manager</p> <p>All Staff/Contractors</p>

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
	<ul style="list-style-type: none"> Impacts to fauna in proximity to the proposed works 	<ul style="list-style-type: none"> Saturday 8:00 am to 1:00 pm. Maximise the distance between noisy plant items and nearby residential receivers and potential fauna habitat. Orient equipment such as offensive noise carriers away from residential receivers and potential fauna habitat. Plant used intermittently is to be throttled or shut down when not required. 	
Air Quality	<ul style="list-style-type: none"> Dust generation from vibrating and ground disturbing works Fumes generation from machinery Cumulative impacts of greenhouse gas emissions 	<ul style="list-style-type: none"> Works must be minimised during high wind periods. Dust suppression should be applied as required to limit excessive dust generation. Plant and equipment must be regularly inspected to ascertain that fitted emission controls are operating efficiently. Plant and equipment must be maintained in accordance with manufacturer's specifications to ensure that it is in a proper and efficient condition. Do not have machinery running while not in use. Minimise use of machinery for required activity only. Vehicles to maintain recommended speed. Look for excessive dust generation and slow down if needed. 	<p>Project Manager</p> <p>All Staff/Contractors</p>
Waste Management	<ul style="list-style-type: none"> Excess spoil in the form of excavated material Litter left on-site by staff/contractors 	<ul style="list-style-type: none"> Resource management options for the project must be considered against a hierarchy of the following order embodied in the Waste Avoidance and Resource Recovery Act 2001: <ul style="list-style-type: none"> Avoid unnecessary resource consumption. Recover resources (including reuse, reprocessing, recycling and energy recovery). Dispose (as a last resort). All wastes and excess spoil must be classified in accordance to the Waste Classification Guidelines (DECC, 2009) prior to disposal and transported to a licensed waste disposal facility. All waste must be removed from the site on completion of the works. Upon completion of waste disposal, all original weighbridge / disposal receipts issued by the receiving waste facility must be retained in a waste register as evidence of proper disposal. An adequate number of bins must be placed at the site for workers and all litter will be placed in these bins. Work areas of the project site would be kept clean and free of litter, including cigarette butts, at all times. 	All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
Traffic	<ul style="list-style-type: none"> • Disruption to traffic flows • Temporary Road Closures 	<ul style="list-style-type: none"> • Vehicles, materials and equipment must be positioned to minimise impacts to public access and parking. • Heavy vehicles, if required, will be restricted to specified routes. • If road closures are required, A Traffic Management Plan should be implemented prior to the commencement of any construction works to ensure that traffic disruptions are mitigated, and commuters are notified of detours and closures through signage. • Nearby businesses and sensitive receivers should be notified and given an opportunity to comment on temporary road closures prior to commencement of construction. 	Project Manager All Staff/Contractors
Visual Amenity and Landscape	<ul style="list-style-type: none"> • Impact on the community 	<ul style="list-style-type: none"> • Ensure all access restrictions are removed following construction. • Landscape plantings must be in line with species found in PCT 1250 and PCT 1783 	Project Manager All Staff/Contractors

6. Conclusion

The Project has been subject to assessment under Division 5.1, Part 5 of the EP&A act. This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of other environmental planning instruments as well as other NSW and Commonwealth legislation.

The proposal will improve pedestrian safety in the park by removing pedestrians from the existing access road. This will create a safer environment for visitors to the park.

The Project as described in this REF best meets the Project objectives, however, would still result in some impacts. Potential environmental impacts associated with the Project would generally be limited to vegetation clearing. Appropriate mitigation measures to be undertaken both during the detailed design stage and during construction have been recommended to ensure such impacts are minimised.

A CEMP should be prepared that summarises all the relevant mitigation measures from this REF. The CEMP will guide the construction works and will be used as part of the site induction to familiarise all workers with the site environmental sensitivities.

This REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act. Based on the assessment contained in this REF, it is considered that the proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an Environmental impact Statement (EIS) is not recommended.

The Project has also taken into account the principles of ecologically sustainable development and the objects of the EP&A Act. The proposal would be delivered to the maximum benefit for the community, be cost effective and minimise any adverse impacts on the environment. On balance, the Project is considered justified and in the public interest.

7. REF Determination and Conditions

7.1 Assessor Declaration

This REF provides a true and fair review of the activity in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the project and provides sufficient information to determine whether there is likely to be a significant impact on the environment as a result of the Project.

I have considered all environmental impacts and safeguards to the best of my knowledge and have sought advice where required.

Project Name	4-6 Wyatt Avenue, Belrose Proposed Bike Skills Park - Review of Environmental Factors
Project Director Rebecca Ben-Haim Eco Logical Australia Level 3, 101 Sussex Street, Sydney 2000 Ph: 02 9259 3714	 Date: 24/09/2021
Project Manager Geraint Breese Eco Logical Australia Level 3, 101 Sussex Street, Sydney 2000 Ph: 02 9259 3745	 Date: 24/09/2021

7.2 Determiner Declaration and Approval

I have reviewed the document and consider that the project will not have a significant impact and can proceed subject to the controls outlined in this REF.

Project Name	Manly Dam Link Trail - Review of Environmental Factors
Role:	[Signature]
Name:	Date:
Company:	
Address:	
Phone Number:	
Role:	[Signature]
Name:	Date:
Company:	
Address:	
Phone Number:	

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Appendix A Manly Dam Link Trail Concept Plans

Appendix B Access, Protection and Demolition Plan

Appendix C Species list

Flora species recorded during 2017 and 2021 field surveys

Family	Scientific name	Common name	Exotic (*)	Priority Weed (PW) / Weed of National Significance (WoNS)
Apiaceae	<i>Actinotus helianthi</i>	Flannel Flower		
Apiaceae	<i>Actinotus minor</i>	Lesser Flannel Flower		
Asparagaceae	<i>Asparagus aethiopicus</i>	Ground Asparagus	*	PW, WONS
Asteraceae	<i>Ageratina adenophora</i>	Crofton Weed	*	
Asteraceae	<i>Senecio madagascariensis</i>	Fireweed	*	PW, WONS
Casuarinaceae	<i>Allocasuarina distylla</i>	Scrub She-oak		
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak		
Commelinaceae	<i>Commelina cyanea</i>	Scurvy Weed		
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed		
Cunoniaceae	<i>Callicoma serratifolia</i>	Black Wattle		
Cyperaceae	<i>Caustis flexuosa</i>	Curly Wig		
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flat-sedge		
Cyperaceae	<i>Gahnia</i> sp.			
Cyperaceae	<i>Lepidosperma laterale</i>			
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken		
Dilleniaceae	<i>Hibbertia linearis</i>			
Doryanthaceae	<i>Doryanthes excelsa</i>	Gynea Lily		
Elaeocarpaceae	<i>Elaeocarpus reticulatus</i>	Blueberry Ash		
Ericaceae (Epacridaceae)	<i>Epacris pulchella</i>	Wallum Heath		
Euphorbiaceae	<i>Homalanthus populifolius</i>	Bleeding Heart		
Fabaceae (Faboideae)	<i>Gompholobium grandiflorum</i>	Large Wedge Pea		
Fabaceae (Faboideae)	<i>Senna pendula</i>		*	PW
Fabaceae (Mimosoideae)	<i>Acacia linifolia</i>	White Wattle		
Fabaceae (Mimosoideae)	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	Sydney Golden Wattle		
Fabaceae (Mimosoideae)	<i>Acacia suaveolens</i>	Sweet Wattle		
Fabaceae (Mimosoideae)	<i>Acacia ulicifolia</i>	Prickly Moses		
Gleicheniaceae	<i>Gleichenia dicarpa</i>	Pouched Coral Fern		
Goodeniaceae	<i>Goodenia hederacea</i>			
Haloragaceae	<i>Gonocarpus teucrioides</i>			
Lauraceae	<i>Cassytha glabella</i>			

Family	Scientific name	Common name	Exotic (*)	Priority Weed (PW) / Weed of National Significance (WoNS)
Lauraceae	<i>Cinnamomum camphora</i>	Camphor Laurel	*	PW
Lomandraceae	<i>Lomandra glauca</i>	Pale Mat-rush		
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		
Lomandraceae	<i>Lomandra obliqua</i>	Fish Bones		
Malvaceae	<i>Lasiopetalum ferrugineum</i>			
Myrtaceae	<i>Angophora costata</i>	Smooth-barked Apple		
Myrtaceae	<i>Angophora floribunda</i>	Rough-barked Apple		
Myrtaceae	<i>Callistemon linearis</i>	Narrow-leaved Bottlebrush		
Myrtaceae	<i>Corymbia eximia</i>	Yellow Bloodwood		
Myrtaceae	<i>Corymbia gummifera</i>	Red Bloodwood		
Myrtaceae	<i>Eucalyptus piperita</i>	Sydney Peppermint		
Myrtaceae	<i>Eucalyptus punctata</i>	Grey Gum		
Myrtaceae	<i>Eucalyptus sieberi</i>	Silvertop Ash		
Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush		
Myrtaceae	<i>Leptospermum trinervium</i>	Paperbark Teatree		
Ochnaceae	<i>Ochna serrulata</i>	Mickey Mouse Plant	*	PW
Passifloraceae	<i>Passiflora</i> sp.		*	
Phormiaceae	<i>Dianella caerulea</i> var. <i>producta</i>			
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee Bush		
Phyllanthaceae	<i>Glochidion ferdinandi</i>	Cheese Tree		
Phyllanthaceae	<i>Phyllanthus hirtellus</i>	Thyme Spurge		
Pittosporaceae	<i>Billardiera scandens</i>	Apple Dumpling		
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum		
Poaceae	<i>Aristida</i> sp.			
Poaceae	<i>Cynodon dactylon</i>	Couch	*	
Poaceae	<i>Ehrharta erecta</i>	Vasey Grass	*	
Poaceae	<i>Entolasia marginata</i>	Bordered Panic		
Poaceae	<i>Entolasia stricta</i>	Wiry Panic		
Poaceae	<i>Imperata cylindrica</i>	Blady Grass		
Poaceae	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass		
Poaceae	<i>Paspalum quadrifarum</i>	Tussock Paspalum	*	PW
Poaceae	<i>Stenotaphrum secundatum</i>	Buffalo Grass	*	
Primulaceae	<i>Lysimachia arvensis</i>	Scarlet Pimpernel	*	

Family	Scientific name	Common name	Exotic (*)	Priority Weed (PW) / Weed of National Significance (WoNS)
Proteaceae	<i>Banksia ericifolia</i>	Heath-leaved Banksia		
Proteaceae	<i>Banksia oblongifolia</i>	Fern-leaved Banksia		
Proteaceae	<i>Banksia serrata</i>	Old Man Banksia		
Proteaceae	<i>Banksia spinulosa</i>	Hairpin Banksia		
Proteaceae	<i>Grevillea buxifolia</i>	Grey Spider Flower		
Proteaceae	<i>Grevillea linearifolia</i>	Linear-leaf Grevillea		
Proteaceae	<i>Hakea dactyloides</i>	Finger Hakea		
Proteaceae	<i>Hakea gibbosa</i>	Hairy Hakea		
Proteaceae	<i>Lambertia formosa</i>	Mountain Devils		
Proteaceae	<i>Persoonia levis</i>	Broad-leaved Geebung		
Proteaceae	<i>Persoonia linearis</i>	Narrow-leaved Geebung		
Pteridaceae	<i>Cheilanthes sieberi</i>			
Rubiaceae	<i>Pomax umbellata</i>			
Sapindaceae	<i>Dodonaea triquetra</i>	Larg-leaf Hop Bush		
Smilacaceae	<i>Smilax glycyphylla</i>	Sweet Sarsaparilla		
Xanthorrhoeaceae	<i>Xanthorrhoea arborea</i>			

Appendix D Likelihood of Occurrence Assessment

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the site inspection and professional judgement. Some Migratory or Marine species identified from the Commonwealth database search have been excluded from the assessment, due to lack of habitat. The terms for likelihood of occurrence are defined below:

- “known” = the species was or has been observed on the site
- “likely” = a medium to high probability that a species uses the site
- “potential” = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- “unlikely” = a very low to low probability that a species uses the site
- “no” = habitat on site and in the vicinity is unsuitable for the species.

A test of significance was conducted for threatened species or ecological communities that were recorded within the development footprint or had a higher likelihood of occurring and were not recorded during the site visit. It is noted that some threatened fauna species that are highly mobile, wide ranging and vagrant may use portions of the study area intermittently for foraging. For these fauna species, the habitat present and likely to be impacted is not considered to be important to the threatened species, particularly in relation to the amount of similar habitat remaining in the surrounding landscape. As such, a test of significance in reference to State or Commonwealth legislation was not considered necessary.

The records column refers to the number of records occurring within 5 km of the study area, as provided by the Atlas of NSW Wildlife (BioNet) and Protected Matters Search Tool database search.

Information provided in the habitat associations’ column has primarily been extracted (and modified) from the Commonwealth Species Profile and Threats Database and the NSW Threatened Species Profiles.

Table 8-1: Likelihood of occurrence table, and requirement of impact assessment, for threatened fauna species recorded or predicted to occur within 5 km of study area

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
Amphibians							
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	Heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	0	No – preferred habitat not identified within development footprint, no local records.	No
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	Marshes, dams and stream-sides, particularly those containing <i>Typha</i> spp. (bullrushes) or <i>Eleocharis</i> spp. (spikerushes). Some populations occur in highly disturbed areas.	0	Unlikely – preferred habitat not identified within development footprint, no local records	No
<i>Pseudophryne australis</i>	Red-crowned Toadlet	V	-	Open forests, mostly on Hawkesbury and Narrabeen Sandstones.	116	Unlikely – preferred habitat not identified within development footprint.	No
Birds							
<i>Anthochaera phrygia</i>	Regent Honeyeater	E4A	CE	Eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of <i>Casuarina cunninghamiana</i> (River Oak).	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	V	-	Widespread in NSW from coast to inland including the western slopes of the Great Dividing Range and farther west. Species have also been recorded in southern and southwestern Australia. Woodlands and dry open sclerophyll forest, usually eucalypts and mallee associations. Also have recordings in shrub and heathlands and various modified habitats, including regenerating forests. In western NSW, this species is primarily associated with River Red Gum/Black Box/Coolabah open	0	Unlikely – preferred habitat not identified within development footprint.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
				forest/woodland and associated with larger river/creek systems.			
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1	E	Permanent freshwater wetlands with tall, dense vegetation, particularly <i>Typha</i> spp. (bullrushes) and <i>Eleocharis</i> spp. (spikerushes).	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Burhinus grallarius</i>	Bush Stone-curlew	E1	-	In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt. In NSW, it occurs in lowland grassy woodland and open forest.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	-	Open forest and woodlands of the coast and the Great Dividing Range where stands of she oak occur.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Inhabits eucalypt forests and woodlands, mallee and Acacia woodland.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Dasyornis brachypterus</i>	Eastern Bristlebird	E	E	Habitat is characterised by dense, low vegetation and includes sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest, as well as open woodland with a heathy understorey. In northern NSW occurs in open forest with tussocky grass understorey. All of these vegetation types are fire prone, aside from the rainforest habitat as utilised by the northern population as fire refuge. Age of habitat since fires (fire-age) is of paramount importance to this species;	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	Dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.	3	Unlikely – preferred habitat not identified	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence			Impact Assessment Required
						within footprint.	development		
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests.	0	Unlikely habitat within footprint.	– not identified development	preferred	No
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	The Little Eagle is widespread in mainland Australia, central and eastern New Guinea. The Little Eagle is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest. The population of Little Eagle in NSW is considered to be a single population. This species was recently listed as vulnerable due to a moderate reduction in population size based on geographic distribution and habitat quality.	2	Unlikely habitat within footprint.	– not identified development	preferred	No
<i>Ixobrychus flavicollis</i>	Black Bittern	V	-	Terrestrial and estuarine wetlands. Also flooded grassland, forest, woodland, rainforest and mangroves where permanent water is present.	0	Unlikely habitat within footprint.	– not identified development	preferred	No
<i>Lathamus discolor</i>	Swift Parrot	E1	CE	Box-ironbark forests and woodlands.	0	Unlikely habitat within footprint.	– not identified development	preferred	No
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	Timbered habitats including dry woodlands and open forests, particularly timbered watercourses.	0	Unlikely habitat within footprint.	– not identified development	preferred	No
<i>Ninox connivens</i>	Barking Owl	V	-	Woodland and open forest, including fragmented remnants and partly cleared farmland, wetland and riverine forest.	0	Unlikely mobile	– this species occasionally fly over the	highly may	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
						study area on feeding forays. However, preferable habitat is available within the broader locality.	
<i>Ninox strenua</i>	Powerful Owl	V	-	Woodland, open sclerophyll forest, tall open wet forest and rainforest.	0	Unlikely – this highly mobile species may occasionally fly over the study area on feeding forays. However, preferable habitat is available within the broader locality.	No
<i>Pandion cristatus</i>	Eastern Osprey	V	-	Rocky shorelines, islands, reefs, mouths of large rivers, lagoons and lakes.	0	Unlikely – this highly mobile species may occasionally fly over the study area on feeding forays. However, preferable habitat is available within the broader locality.	No
<i>Petroica boodang</i>	Scarlet Robin	V	-	Dry eucalypt forests and woodlands, and occasionally in mallee, wet forest, wetlands and tea-tree swamps.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Ptilinopus superbus</i>	Superb Dove	Fruit-V	-	Rainforest and closed forests. May also forage in eucalypt or acacia woodland where there are fruit-bearing trees.	1	Unlikely – preferred habitat not identified within development footprint.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	Dry eucalypt forests and woodlands from sea level to 1100 m.	0	Unlikely – this highly mobile species may occasionally fly over the study area on feeding forays. However, preferable habitat is available within the broader locality.	No
<i>Tyto tenebricosa</i>	Sooty Owl	V	-	Dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	0	Unlikely – this highly mobile species may occasionally fly over the study area on feeding forays. However, preferable habitat is available within the broader locality.	No
Mammals							
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	-	Rainforest, sclerophyll forest (including Box-Ironbark), woodland and heath.	32	Potential – habitat identified within development footprint in the form of PCTs 1250 and 1783.	Yes
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country.	2	Unlikely – suitable roosting habitat (caves, cliff crevices, old mine workings, and disused Fairy Martin nests) not present within the development footprint.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
<i>Dasyurus maculatus maculatus</i>	Spotted-tailed Quoll	V	E	Rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	4	Unlikely – suitable habitat not identified within development footprint.	No
<i>Isoodon obesulus obesulus</i>	Southern Brown Bandicoot (eastern)	E1	E	Heath or open forest with a heathy understorey on sandy or friable soils.	3	Unlikely – preferred habitat not identified within development footprint.	No
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	V	-	Dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range.	2	Potential – hollow bearing trees were identified within the study area.	No – no hollow bearing trees present within the development footprint.
<i>Miniopterus australis</i>	Little Bent-winged Bat	V	-	Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub.	6	Potential – hollow bearing trees were identified within the study area.	No – no hollow bearing trees present within the development footprint.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	V	-	Rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland.	341	Potential – hollow bearing trees were identified within the study area.	No – no hollow bearing trees present within the development footprint.

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
<i>Myotis macropus</i>	Southern Myotis	V	-	Foraging habitat is waterbodies (including streams, or lakes or reservoirs) and fringing areas of vegetation up to 20m.	8	Potential – hollow bearing trees were identified within the study area.	No – no hollow bearing trees present within the development footprint.
<i>Petauroides volans</i>	Greater Glider	-	V	Eucalypt forests and woodlands.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	-	In NSW, occurs in a range of coastal habitats from low scrubby eucalypt woodlands and banksia thickets to tall, wet eucalypt forests bordering on rainforest.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E1	V	Rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	0	Unlikely – preferred habitat not identified within development footprint.	No
<i>Phascolarctos cinereus</i>	Koala	V	V	Eucalypt woodlands and forests.	0	Unlikely – marginal foraging habitat occurs within the development footprint, but the species is not known from the study area.	No
<i>Phascolarctos cinereus</i>	Koala in the Pittwater Local Government Area	E2,V	V	Eucalypt forests and woodlands. Key likely habitats within Pittwater Council are: Swamp Mahogany Forest, ecotone between Spotted Gum Forest & Hawkesbury Sandstone Open-Forest, Northern form of Coastal Sandstone Woodland at Whale Beach, Red Bloodwood - Scribbly Gum	-	Unlikely – marginal foraging habitat occurs within the development footprint, but the species is	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution/ Habitat	BioNet Records within 5 km	Likelihood of Occurrence	Impact Assessment Required
				Woodland, Bilgola Plateau Forest and the Grey Ironbark - Grey Gum form of the Newport Bangalay Woodland.		not known from the study area.	
<i>Pseudomys novaehollandiae</i>	New Holland Mouse		V	Open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes.	1	Unlikely – preferred habitat not identified within development footprint.	No
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	567	Potential – foraging habitat identified within development footprint in the form of PCTs 1250 and 1783. No breeding habitat (in the form of camps) present within the study area.	Yes

BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable; EPBC Act: Bonn = Listed migratory species under Bonn Convention, CD = Conservation Dependent, CE = Critically Endangered, E = Endangered, V = Vulnerable, X = Extinct.

Table 8-2: Likelihood of occurrence, and requirement of impact assessment, for threatened flora species recorded or predicted to occur within 5 km of subject site

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Number of records within 5 km radius of subject site	Likelihood of Occurrence	Impact Assessment Required
<i>Acacia bynoeana</i>	Bynoe's Wattle	E1	V	Heath or dry sclerophyll forest on sandy soils.	0	Unlikely – not known from within the study area.	No
<i>Acacia terminalis</i> subsp. <i>Eastern Sydney</i>	Sunshine Wattle	E1	E	Coastal scrub and dry sclerophyll woodland on sandy soils.	137	Unlikely – not known from within the study area.	No
<i>Asterolasia elegans</i>	-	E1	E	Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys."	0	Unlikely – not known from within the study area.	No
<i>Caladenia tessellata</i>	Thick-lipped Spider-orchid	E1	V	Grassy sclerophyll woodland on clay loam or sandy soils, or low woodland with stony soil.	0	Unlikely – not known from within the study area.	No
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V	-	Dry sclerophyll forest.	0	Unlikely – not known from within the study area.	No
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	Coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest."	0	Unlikely – not known from within the study area.	No
<i>Darwinia biflora</i>	-	V	V	Woodland, open forest or scrub-heath on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	0	Unlikely – not known from within the study area.	No
<i>Epacris purpurascens</i> var. <i>purpurascens</i>	-	V	-	Sclerophyll forest, scrubs and swamps. Most habitats have a strong shale soil influence.	1	Unlikely – not known from within the study area.	No
<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	V	V	Coastal heath on shallow sandy soils overlying Hawkesbury sandstone, mostly on exposed sandy ridges.	1	Unlikely – not known from within the study area.	No
<i>Genoplesium baueri</i>	Bauer's Midge Orchid	E1	E	Dry sclerophyll forest and moss gardens over sandstone.	0	Unlikely – not known from within the study area.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Number of records within 5 km radius of subject site	Likelihood of Occurrence	Impact Assessment Required
<i>Grevillea caleyi</i>	Caley's Grevillea	E4	E	Open forest, generally dominated by <i>Eucalyptus sieberi</i> and <i>E. gummifera</i> on a ridgetop, in association with laterite soils.	0	Unlikely – not known from within the study area.	No
<i>Haloragodendron lucasii</i>	-	E1	E	Dry sclerophyll forest and low open woodland on sheltered slopes near creeks, in moist sandy loam soils.	0	Unlikely – not known from within the study area.	No
<i>Hibbertia puberula</i>	-	E	-	Occurs on low heath on sandy soils or rarely in clay and favours upland swamps.	0	Unlikely – not known from within the study area.	No
<i>Hibbertia superans</i>		E1	-	From Baulkham Hills to South Maroota in the northern outskirts of Sydney, and at one locality at Mount Boss, inland from Kempsey. Open woodland and heathland, and appears to prefer open disturbed areas.	1	Unlikely – not known from within the study area.	No
<i>Lasiopetalum joyceae</i>	-	V	V	Heath on lateritic to shaley ridgetops over sandstone.	0	Unlikely – not known from within the study area.	No
<i>Leptospermum deanei</i>	Deane's Tea-tree	V	V	Woodland, riparian scrub and open forest on lower hill slopes or near creeks, on sand or sandy alluvial soil.	0	Unlikely – not known from within the study area.	No
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	Damp places, often near streams or low-lying areas on alluvial soils.	1	Unlikely – not known from within the study area.	No
<i>Melaleuca deanei</i>	Deane's Melaleuca	V	V	Heath on sandstone.	0	Unlikely – not known from within the study area.	No
<i>Microtis angusii</i>	Angus's Onion Orchid	E1	E	Ingleside location is highly disturbed and dominated by the introduced weeds Coolatai grass (<i>Hyparrhenia hirta</i>) and <i>Acacia saligna</i> . The area is likely to have originally supported the Duffys Forest Vegetation Community, which ranges from open forest to low open forest and woodland.	0	Unlikely – not known from within the study area.	No
<i>Persoonia hirsuta</i>	Hairy Geebung	E1	E	Sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	0	Unlikely – not known from within the study area.	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Habitat	Number of records within 5 km radius of subject site	Likelihood of Occurrence	Impact Assessment Required
<i>Pimelea curviflora</i> <i>var. curviflora</i>		V	V	Woodland, mostly on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes.	5	Unlikely – not known from within the study area.	No
<i>Prostanthera junonis</i>	Somersby Mintbush	E1	E	Open forest, low woodland and open scrub on gently undulating country over weathered Hawkesbury sandstone.	0	Unlikely – not known from within the study area.	No
<i>Prostanthera marifolia</i>	Seaforth Mintbush	E4A	CE	In or in close proximity to the endangered Duffys Forest ecological community, on deeply weathered clay-loam soils associated with ironstone and scattered shale lenses.	0	Unlikely – present within Manly Dam but not known from within the study area.	No
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E1	V	Subtropical and littoral rainforest on gravels, sands, silts and clays.	18	Unlikely – not known from within the study area.	No
<i>Tetradlea glandulosa</i>	-	V	-	Heath, scrub, woodlands and open forest on upper-slopes and mid-slope sandstone benches. Soils generally shallow, consisting of a yellow, clayey/sandy loam.	769	Unlikely – not known from within the study area.	No
<i>Thesium australe</i>	Austral Toadflax	V	V	Grassland on coastal headlands or grassland and grassy woodland away from the coast.	0	Unlikely – not known from within the study area.	No

BC Act: E1 = Endangered, E2 = Endangered Population, E4 = Extinct, E4A = Critically Endangered, V = Vulnerable; EPBC Act: Bonn = Listed migratory species under Bonn Convention, CD = Conservation Dependent, CE = Critically Endangered, E = Endangered, V = Vulnerable, X = Extinct.

Appendix E *Biodiversity Conservation Act 2016* Tests of Significance

The 'Test of significance' (5-part test) is applied to species, populations and ecological communities listed on Schedules 1 and 2 of the BC Act and Schedules 4, 4A and 5 of the FM Act. The assessment sets out 5 factors, which when considered, allow proponents to undertake a qualitative analysis of the likely impacts of an action and to determine whether a significant impact is likely. All factors must be considered, and an overall conclusion made based on all factors in combination.

E1 *Cercartetus nanus* (Eastern Pygmy-possum)

The Eastern Pygmy Possum is listed as vulnerable under the BC Act. The habitat associations of this species are presented in Appendix D. This species was not observed during field survey. However, the works would impact 0.12 ha of habitat for this species in the form of PCTs 1250 and 1783.

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	Factors likely to have an adverse effect on the life cycle of Eastern Pygmy-possum would include a substantial loss and/or fragmentation of foraging habitat and loss of suitable breeding habitat. The proposed works would result in the clearing of native vegetation which represents potential foraging habitat for the Eastern Pygmy-possum. The works would not involve the removal of any hollow-bearing trees which represents potential breeding habitat. The impact is expected to be minimal when considering the large area of potential habitat available throughout Manly Dam. Consequently, the proposed works would not be likely to place a viable local population of the species at risk of extinction.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	The proposed works would result in the clearing of approximately 0.12 ha of potential foraging habitat for the Eastern Pygmy-possum. The proposed loss of potential habitat is minimal when compared to the large area of potential habitat available throughout Manly Dam.

BC Act	Question	Response
7.3.1 c) ii	<p>In relation to the habitat of a threatened species or ecological community:</p> <p>Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity</p>	<p>The proposed works would involve the clearing of vegetation that is on the edge of a larger, less disturbed tract of bushland that occurs within Manly Dam. Given the location of the development footprint, the proposed vegetation clearance is unlikely to result in the fragmentation or isolation of habitat of the Eastern Pygmy-possum.</p>
7.3.1 c) iii	<p>In relation to the habitat of a threatened species or ecological community:</p> <p>The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.</p>	<p>The proposed works would result in the removal of small area of native vegetation that represents potential foraging habitat for the Eastern Pygmy Possum. The area of habitat that would be impacted is not likely to be crucial habitat for the species given that prime foraging and breeding habitat for the Eastern Pygmy-possum exists within the large area of potential habitat available throughout Manly Dam.</p> <p>Therefore, the removal of the small amount of habitat is not likely to affect the long-term survival of the species in the locality.</p>
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	The proposed works would not impact any declared area of outstanding biodiversity value.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	One key threatening process, the removal of native vegetation, is relevant to this proposal. The proposed works are unlikely to contribute significantly to this process given that only 0.12 ha of native vegetation is proposed to be impacted.
Conclusion	Is there likely to be a significant impact?	<p>No. The proposed activity is unlikely to have a significant impact on Eastern Pygmy-possum for the following reasons:</p> <ul style="list-style-type: none"> • The extent of vegetation to be impacted is relatively small (0.12 ha) and similar habitat for these highly mobile species is available directly adjacent to the development footprint. • The proposed works would not result in the removal of any hollow-bearing trees • The proposed works would not isolate an area of known habitat from currently interconnecting areas of potential habitat for this species.

E2 *Pteropus poliocephalus* (Grey-headed Flying-fox)

The Grey-headed Flying-fox is listed as vulnerable under the BC Act and EPBC Act. The description and habitat associations of this species are presented in Appendix D. This species was not observed during field survey. The proposed works would impact 0.12 ha of foraging habitat for this species in the form of PCTs 1250 and 1783. No camps will be affected by the proposed development. The closest Nationally Important Camp is located approximately 10 km southwest of the study area, in Gordon. Other Flying-fox Camps nearby are located at Balgowlah (approximately 6 km southeast), Warriewood (approximately 6 km northeast) and Avalon (approximately 14 km northeast).

BC Act	Question	Response
7.3.1 a)	In the case of a threatened species: whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	The proposed works would impact 0.12 ha of foraging habitat for Grey-headed Flying-fox. No breeding habitat will be impacted as part of the proposed works. It is considered unlikely that the proposed works will place a viable population of the species at risk of extinction given that similar habitat is available adjacent to the study area and the species is highly mobile.
7.3.1 b) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable
7.3.1 b) ii	In the case of an endangered ecological community or critically endangered ecological community: Whether the proposed development or activity is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable
7.3.1 c) i	In relation to the habitat of a threatened species or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity	Impacts to native vegetation would be minimal. There is similar habitat available immediately adjacent to the development footprint and the species is highly mobile.
7.3.1 c) ii	In relation to the habitat of a threatened species or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity	This highly mobile species will still be able to access similar vegetation located directly adjacent to the development footprint.
7.3.1 c) iii	In relation to the habitat of a threatened species or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	The proposed works would impact up to 0.12 ha of potential foraging habitat for Grey-headed Flying-fox. The area of habitat to be impacted is not considered vital to the long-term survival of these species within the locality.

BC Act	Question	Response
7.3.1 d)	Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).	The proposed works will not impact any declared area of outstanding biodiversity value.
7.3.1 e)	Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	One key threatening process, the removal of native vegetation, is relevant to this proposal. The proposed works are unlikely to contribute significantly to this process given that only 0.12 ha of disturbed native vegetation is proposed to be removed.
Conclusion	Is there likely to be a significant impact?	<p>No. The proposed activity is unlikely to have a significant impact on Grey-headed Flying-fox for the following reasons:</p> <ul style="list-style-type: none"> • The extent of vegetation to be impacted is relatively small (0.12 ha) and similar habitat for these highly mobile species is available directly adjacent to the development footprint. • No breeding habitat (camps) will be impacted by the proposed upgrades. • The proposed works would not isolate or fragment any foraging habitat given that the species is highly mobile.

Appendix F *Environment Protection and Biodiversity Conservation Act 1999* Assessment of Significance

This assessment has been prepared in accordance with the EPBC Act Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (DAWE 2013). These guidelines have been established to assist proponents to determine whether a proposed action is likely to result in a significant impact on a matter of national environmental significance.

F1 *Pteropus poliocephalus* (Grey-headed Flying-fox)

Criterion	Question	Response
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1)	lead to a long-term decrease in the size of an important population of a species	No roosting habitat (camps) will be affected by the proposed action. The proposed action would affect 0.12 ha of native vegetation, which may provide foraging habitat for the Grey-headed Flying-fox. The Grey-headed Flying-fox is recorded as travelling long distances (up to 20 km) on feeding forays. Given the proximity of similar habitat adjacent to the development footprint, the removal of this potential foraging habitat would not lead to the long-term decrease in the size of an important population of Grey-headed Flying-fox. The closest Nationally Important Grey-headed Flying-fox camp is located approximately 10 km away.
2)	reduce the area of occupancy of an important population	The proposed action would affect 0.12 ha of potential foraging habitat for this species. The Grey-headed Flying-fox is not known to occupy the development footprint in the form of a camp but may occasionally forage within the development footprint, the nearest Nationally Important camp is located 10 km away. The Grey-headed Flying-fox is recorded as travelling long distances on feeding forays and could utilise similar foraging habitat outside of the development footprint.
3)	fragment an existing important population into two or more populations	According to the National Recovery Plan for the Grey-headed Flying-fox 2021, "the Grey-headed Flying-fox is considered to be a single, mobile population with individuals distributed across Queensland, New South Wales, Victoria, South Australia, Tasmania and the ACT." The proposed action would not fragment an existing important population into two or more populations. The nearest Nationally Important camp is 10 km away. There is an abundance of foraging habitat available within 20 km, therefore reduction by 0.12 ha would not fragment habitat for the nearest camp.
4)	adversely affect habitat critical to the survival of a species	The National Recovery Plan for the Grey-headed Flying-fox 2021 identifies 'a continuous temporal sequence of productive foraging habitats, linked by migration corridors or stopover habitats, and suitable roosting

Criterion	Question	Response
		habitat within nightly commuting distance of foraging areas' as habitat critical to the survival of the species. The proposed action would affect 0.12 ha of native vegetation, which may represent habitat critical survival to this species. However, this impact is considered unlikely to have an adverse effect given that the species is recorded as travelling long distances (20 km) on feeding forays and similar habitat is available adjacent to the development footprint.
5)	disrupt the breeding cycle of an important population	The proposed action would not disrupt the breeding cycle of the Grey-headed Flying-fox given that no camps would be affected by the proposed action and suitable foraging habitat is available adjacent to the development footprint. Therefore, the nearest Nationally Important camp would not be isolated from foraging habitat.
6)	modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action would remove 0.12 ha of vegetation, including marginal foraging habitat for the Grey-headed Flying-fox. It is unlikely that the extent of this vegetation removal would cause the species to decline because suitable habitat is available adjacent to the development footprint.
7)	result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the establishment of an invasive species that is harmful to the Grey-headed Flying-fox, such as <i>Syagrus romanzoffiana</i> (Cocos Palm). The fruit of this exotic species is toxic to bats and can lead to death.
8)	introduce disease that may cause the species to decline, or	Grey-headed Flying-fox are reservoirs for the Australian bat lyssavirus, Hendra Virus and Menangle virus which can cause clinical disease and mortality in Grey-headed Flying-fox. The risk of disease transmission is extremely low and rare, therefore the proposed action would not increase the incidence of this disease.
9)	interfere substantially with the recovery of the species.	The proposed action would remove suitable foraging habitat for this species; however this would not interfere substantially with recovery objectives listed in the National Recovery Plan for the Grey-headed Flying-fox 2021. The proposed action would not affect any camps and suitable foraging habitat is available adjacent to the development site.
Conclusion	Is there likely to be a significant impact?	<p>No. The proposed action is unlikely to have a significant impact on the Grey-headed Flying-fox for the following reasons:</p> <ul style="list-style-type: none"> • No camps would be removed by the proposed action. • An abundance of foraging habitat would still be available within 20 km of the nearest Nationally Important camp.

Appendix G AHIMS Search Results



AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-6-2285	Pickering Pt. 2 Seaforth.	GDA	56	336550	6259010	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	Recorders	Michael Guider					Permits		
45-6-2286	Bligh Cres;Seaforth;	AGD	56	336710	6258910	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	Michael Guider					Permits		
45-6-2044	Bantry bay 3;	AGD	56	336210	6260650	Open site	Valid	Artefact : -	Open Camp Site	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-2045	Bantry bay 4;	AGD	56	336210	6260690	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-2046	Bantry bay 5;	AGD	56	336210	6260780	Open site	Valid	Artefact : -, Shell : -	Midden.Open Camp Site	1809,102473
	Contact	Recorders	Michael Guider					Permits		
45-6-0689	Frenchs Forest;Allambie Road;	AGD	56	338536	6261528	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	ASRSYS					Permits		
45-6-0693	Balgowlah; '	AGD	56	339258	6259084	Open site	Destroyed	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Unknown Author					Permits		
45-6-0699	Frenchs Forest;Flat Rocks;	AGD	56	338850	6261534	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Ms.Lisa Campbell					Permits		
45-6-0706	Manly;Fairlight;	GDA	56	340104	6258690	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Unknown Author					Permits		
45-6-2047	Bantry bay 6;	AGD	56	336210	6260820	Open site	Valid	Artefact : -, Shell : -	Midden.Open Camp Site	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-2048	Bantry bay 7;	AGD	56	336250	6260990	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809,102473
	Contact	Recorders	Michael Guider					Permits		
45-6-2049	Bantry bay 1;	AGD	56	336490	6260580	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809,102473
	Contact	Recorders	Michael Guider					Permits		
45-6-2050	Bantry bay 8;	AGD	56	336190	6261020	Closed site	Valid	Art (Pigment or Engraved) : -, Shell : -, Artefact : -	Shelter with Art.Shelter with Midden	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-2051	Bantry bay 9;	AGD	56	336130	6261170	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809,102473
	Contact	Recorders	Michael Guider					Permits		

Report generated by AHIMS Web Service on 12/08/2021 for Declan Coman for the following area at Datum :GDA, Zone : 56, Eastings : 336179.0 - 340179.0, Northings : 6258638.0 - 6262638.0 with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 97

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-6-2052	Bantry bay 10;	AGD	56	336090	6261270	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	1809,102473
	Contact	Recorders	Michael Guider					Permits		
45-6-2053	Bantry bay 11;	AGD	56	336090	6261290	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-1255	Allambie Heights;	AGD	56	338287	6261912	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	ASRSYS					Permits		
45-6-0281	C.C.Y.S.7. Castle Cove Magazine Reserve	GDA	56	336356	6259920	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	858
	Contact	Recorders	Bobbie Oakley					Permits		
45-6-0464	C.C.Y.S.6 Castle Cove Magazine Reserve	GDA	56	336280	6260055	Open site	Valid	Shell : -, Artefact : -	Midden	858
	Contact	Recorders	Unknown Author					Permits		
45-6-0655	Frenchs Forest:Bantry Bay Road;	GDA	56	336415	6262272	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	2183,2184,102473
	Contact	Recorders	Alexandra Kelly					Permits	347	
45-6-1233	Manly Dam; Manly Vale	GDA	56	338540	6260523	Closed site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	ASRSYS.Sydney Water-Parramatta,Ms.Yvonne Kaiser					Permits		
45-6-0404	C.C.Y.S. 5 Castle Cove Magazine Reserve	GDA	56	336228	6260089	Open site	Valid	Shell : -, Artefact : -	Midden	858
	Contact	Recorders	Robert Walford					Permits		
45-6-2081	Cathedral Rock/Honeycomb cave	AGD	56	339800	6258480	Closed site	Partially Destroyed	Shell : -, Artefact : -	Shelter with Midden	1809
	Contact	Recorders	Michael Guider,Mr.Phil Hunt,Aboriginal Heritage Office					Permits	3140,3372	
45-6-2082	Fairlight cave;	AGD	56	339650	6258730	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-2085	Hydro Cave	GDA	56	338568	6260671	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	1809
	Contact	Recorders	Michael Guider,Sydney Water-Parramatta,Ms.Yvonne Kaiser					Permits		
45-6-2094	C.C.Y.S. 10;	GDA	56	336402	6259776	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	1809
	Contact	Recorders	Bobbie Oakley					Permits		
45-6-2095	C.C.Y.S. 14;	GDA	56	336200	6259615	Closed site	Valid	Shell : -, Artefact : -	Midden,Shelter with Midden	1809
	Contact	Recorders	Bobbie Oakley					Permits		
45-6-2394	Explosives Reserve 3	GDA	56	336295	6259713	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	2588
	Contact	Recorders	Val Attenbrow					Permits		
45-6-2395	Explosives Reserve 2;	GDA	56	336330	6259760	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	2588

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Val Attenbrow					Permits		
45-6-0413	C.C.Y.S.15 Castle Cove Magazine Reserve	GDA	56	336185	6259630	Closed site	Valid	Artefact : -	Shelter with Deposit	858
	Contact	Recorders	Bobbie Oakley					Permits		
45-6-2177	Malinya Rd;	AGD	56	339052	6261610	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Michael Guider					Permits		
45-6-2025	Sangrado Reserve 1;	GDA	56	336994	6258770	Open site	Valid	Artefact : -, Shell : -	Midden.Open Camp Site	
	Contact	Recorders	Michael Guider					Permits		
45-6-2026	Sangrado Reserve 2;	AGD	56	336890	6258620	Open site	Valid	Artefact : -, Shell : -	Midden.Open Camp Site	
	Contact	Recorders	Michael Guider					Permits		
45-6-2027	Sangrado Reserve 3;	AGD	56	336930	6258660	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	Michael Guider					Permits		
45-6-2043	Bantry bay 2;	AGD	56	336430	6260710	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	1809
	Contact	Recorders	Michael Guider					Permits		
45-6-0963	Frenchs Forest;	AGD	56	336920	6261140	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	254.102473
	Contact	Recorders	Mary Dallas Consulting Archaeologists (MDCA),Mr.R Taplin					Permits		
45-6-0660	Pickering Point Seaforth - same as 45-6-2887	AGD	56	336515	6259109	Open site	Valid	Shell : -, Artefact : -	Midden	101111
	Contact	Recorders	T Bartlett,Ms.Mary Dallas					Permits		
45-6-0662	Frenchs Forest;Bantry Bay;Wakehurst Parkway;	AGD	56	336498	6261705	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	102473
	Contact	Recorders	Unknown Author					Permits		
45-6-0666	Frenchs Forest;Frenchs Forest Road;	GDA	56	337304	6259515	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Unknown Author					Permits		
45-6-0667	Frenchs Forest;Curl Curl Creek;	AGD	56	336923	6262388	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	2988
	Contact	Recorders	Unknown Author					Permits		
45-6-0669	Seaforth;Wakehurst Golf Club	GDA	56	337470	6261425	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	254
	Contact	Recorders	Mr.Phil Hunt					Permits		
45-6-0670	Seaforth;Wakehurst Golf Club;	AGD	56	337394	6260981	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	254
	Contact	Recorders	D Beasley					Permits		
45-6-0671	Seaforth;Wakehurst Golf Club;	AGD	56	337444	6260962	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	254
	Contact	Recorders	D Beasley					Permits		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-6-0672	Seaforth;Wakehurst Golf Club;	AGD	56	337462	6261082	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	254
	Contact	Recorders	Permits							
45-6-0291	C.C.Y.S.8 Castle Cove Magazine Reserve	GDA	56	336375	6259857	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	858
	Contact	Recorders	Permits							
45-6-0881	Allambie Heights;	AGD	56	338315	6262166	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Permits							
45-6-0884	Middle Harbour Creek;East Lindfield;Switching Station Shelter;dredged shell;	AGD	56	336895	6261078	Open site	Valid	Shell : -, Artefact : -	Midden	2047
	Contact	Recorders	Permits							
45-6-0899	Balgowlah;Bantry;	AGD	56	336853	6261025	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	102473
	Contact	Recorders	Permits							
45-6-0087	C.C.Y.S.9 Castle Cove Magazine Reserve	GDA	56	336392	6259788	Open site	Valid	Shell : -, Artefact : -	Midden.Open Camp Site	858
	Contact	Recorders	Permits							
45-6-0964	Balgowlah	GDA	56	338804	6259840	Open site	Destroyed	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Permits							
45-6-0965	Balgowlah;200 FT Cave;	GDA	56	338734	6259820	Closed site	Destroyed	Art (Pigment or Engraved) : -	Shelter with Art	
	Contact	Recorders	Permits							
45-6-0260	Balgowlah;North Harbour Reserve;	GDA	56	339354	6258770	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	Recorders	Permits							
45-6-0904	Allambie Heights;	AGD	56	338268	6262167	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Permits							
45-6-0017	French's Forest;Seaforth;	AGD	56	336295	6260947	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	667
	Contact	Recorders	Permits							
45-6-1002	Balgowlah;	AGD	56	336873	6261392	Closed site	Valid	Art (Pigment or Engraved) : -	Shelter with Art	
	Contact	Recorders	Permits							
45-6-1003	Frenchs Forest;	AGD	56	336186	6261860	Closed site	Valid	Artefact : -	Shelter with Deposit	102473
	Contact	Recorders	Permits							
45-6-1006	Manly;Balgowlah;	GDA	56	339519	6258690	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	Permits							

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-6-1008	Balgowlah,	GDA	56	339864	6258841	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	ASRSYS Permits							
45-6-1018	Balgowlah,.	GDA	56	336242	6260078	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	Recorders	ASRSYS Permits							
45-6-1019	Balgowlah;Fallen Wattle Cave;	GDA	56	336351	6259791	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	ASRSYS Permits							
45-6-1020	Balgowlah,.,	GDA	56	336394	6259770	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	Recorders	ASRSYS Permits							
45-6-1021	Balgowlah;Sit and Think Cave;	GDA	56	336266	6259846	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	
	Contact	Recorders	ASRSYS Permits							
45-6-1587	Seaforth	GDA	56	337454	6259315	Open site	Valid	Art (Pigment or Engraved) : -	Rock Engraving	
	Contact	Recorders	Aboriginal Heritage Office Permits							
45-6-2633	wgc-2	AGD	56	337330	6260910	Closed site	Valid	Art (Pigment or Engraved) : -, Artefact : -		
	Contact	Recorders	Mr.Phil Hunt Permits							
45-6-2727	Will-155 - Explosives Reserve 4	GDA	56	336390	6259720	Closed site	Valid	Shell : 1		
	Contact	Recorders	David Watts Permits							
45-6-2732	Will-161 -Sugarloaf Point	AGD	56	336085	6259210	Open site	Valid	Shell : 1		
	Contact	Recorders	David Watts.Mr.Phil Hunt Permits							
45-6-1697	Bantry Bluff Midden;	AGD	56	336230	6260650	Open site	Valid	Shell : -, Artefact : -	Midden	1293
	Contact	Recorders	A.K Morris Permits							
45-6-2054	Bantry bay 12;	AGD	56	336090	6261390	Open site	Valid	Artefact : -, Shell : -	Midden.Open Camp Site	1809
	Contact	Recorders	Michael Guider Permits							
45-6-2887	GURNEY CRESCENT MIDDEN - same as 45-6-0660	AGD	56	336565	6259150	Open site	Valid	Aboriginal Resource and Gathering : -		
	Contact T Russell	Recorders	Aboriginal Heritage Networker Consultant Permits							
45-6-2888	Wellings Reserve 4	GDA	56	339564	6258710	Open site	Valid	Shell : 1		
	Contact	Recorders	Aboriginal Heritage Office Permits							
45-6-2889	Wellings Reserve 2	GDA	56	339634	6258680	Open site	Valid	Shell : 1		
	Contact	Recorders	Aboriginal Heritage Office Permits							
45-6-2913	Will 164-304 Edinburgh Rd	GDA	56	336194	6259055	Open site	Valid	Art (Pigment or Engraved) : -		
	Contact	Recorders	Mr.Phil Hunt Permits							
45-6-0467	C.C.Y.S.12 Castle Cove Magazine Reserve	GDA	56	336367	6259665	Open site	Valid	Shell : -, Artefact : -	Midden	858

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Bobbie Oakley					Permits		
45-6-0469	C.C.Y.S.11 Castle Cove Magazine	GDA	56	336405	6259733	Closed site	Valid	Shell : -, Artefact : -	Shelter with Midden	858
	Contact	Recorders	Bobbie Oakley					Permits		
45-6-2940	Rock engraving (Garigal National Park)	GDA	56	336620	6261787	Open site	Valid	Art (Pigment or Engraved) : -		102473
	Contact	Recorders	Michael Guider					Permits		
45-6-2905	Boronia Lane Pad	GDA	56	336850	6259525	Open site	Valid	Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Mr.Paul Irish,Ms.Mary Dallas					Permits		
45-6-3062	CASTLE CIRCUIT RES 1 MAN078	GDA	56	336664	6260105	Open site	Valid	Shell : 1		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3063	CASTLE CIRCUIT RES 2 MAN117	GDA	56	336664	6260120	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3080	WGC 1 WARR214	GDA	56	337975	6261610	Open site	Valid	Art (Pigment or Engraved) : 1, Grinding Groove : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3088	Castle CCT Reserve 3 Man	GDA	56	336660	6260050	Open site	Valid	Shell : 1		
	Contact	Recorders	Mr.Phil Hunt,Aboriginal Heritage Office					Permits		
45-6-3032	Wakehurst Engraving MAN 104	GDA	56	337044	6260060	Open site	Valid	Art (Pigment or Engraved) : 1		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3033	JAF Fenwick Engraving MAN 105	GDA	56	337019	6259990	Open site	Valid	Art (Pigment or Engraved) : 1		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3035	Wellings Reserve #5 MAN 085	GDA	56	339484	6258670	Closed site	Valid	Shell : -		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3036	Burtons Bush #1 MAN 083	GDA	56	339454	6258940	Open site	Valid	Shell : -		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3037	Burtons Bush #2 MAN 084	GDA	56	339404	6258940	Open site	Valid	Shell : -		
	Contact	Recorders	Aboriginal Heritage Office					Permits		
45-6-3038	Esplanade Park West MAN 108	GDA	56	339844	6258835	Open site	Valid	Shell : -		
	Contact	Recorders	Aboriginal Heritage Office					Permits		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-6-3127	Manly Dam Art Shelter Art 1	GDA	56	338340	6260420	Open site	Valid	Art (Pigment or Engraved) :-		
	Contact							Permits		
45-6-3147	Mermaid Pool (South)	GDA	56	338790	6260855	Closed site	Valid	Art (Pigment or Engraved) :-, Water Hole :-		
	Contact							Permits		
45-6-3139	Monserra Engraving WARR350	GDA	56	338250	6261800	Open site	Valid	Art (Pigment or Engraved) :-		
	Contact							Permits		
45-6-3148	Manly Dam 1	GDA	56	338518	6260973	Open site	Valid	Artefact :-		
	Contact							Permits		
45-6-3149	Mermaid Pool (North)	GDA	56	338831	6260908	Closed site	Valid	Water Hole :-, Art (Pigment or Engraved) :-, Potential Archaeological Deposit (PAD) :-		
	Contact							Permits		
45-6-3167	MANLY WEST PUBLIC 1. MAN120	GDA	56	339645	6259523	Open site	Valid	Grinding Groove :-		
	Contact							Permits		
45-6-3192	30 Lyly Rd Rockshelter	GDA	56	338924	6262018	Open site	Valid	Potential Archaeological Deposit (PAD) :-		
	Contact							Permits		
45-6-3497	Manly Dam Contact Art	GDA	56	338332	6260585	Open site	Valid	Art (Pigment or Engraved) : 5		
	Contact							Permits		
45-6-3498	Manly Dam 9 Grinding Grooves	GDA	56	338484	6260611	Open site	Valid	Grinding Groove : 9		
	Contact							Permits		
45-6-3363	BURNT BRIDGE CREEK PAD	GDA	56	338134	6259532	Open site	Valid	Potential Archaeological Deposit (PAD) : 1		
	Contact							Permits		
45-6-3789	Explosives Midden WILL230	GDA	56	336280	6260055	Open site	Valid	Shell : 1, Potential Archaeological Deposit (PAD) : 1		
	Contact							Permits		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 19803

Client Service ID : 613306

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
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** Site Status

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

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Appendix H Geotechnical Assessment

Appendix I Traffic Safety Assessment

