South Cell at Woy Woy Waste Management Facility

Scoping Report

Central Coast Council

28 June 2023

→ The Power of Commitment

Project name	Detailed Design and Documentation for South Landfill Cell at Woy Woy					
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GHD Pty Ltd | ABN 39 008 488 373

133 Castlereagh Street, Level 15

Sydney, New South Wales 2000, Australia

T +61 2 9239 7100 | **F** +61 2 9239 7199 | **E** sydmail@ghd.com | **ghd.com**

Acknowledgement of Country

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Executive Summary

Background

Central Coast Council (Council) is proposing to develop a new 'South Cell' at the existing Woy Woy Waste Management Facility (WMF) to optimise the remaining landfill air space at the site and ensure that the WMF remains open for as long as possible to accept putrescible waste from the Local Government Area (LGA).

The South Cell project would include:

- Cell construction including site establishment, earthworks to form the base of the cell and lining installation
- Associated access, stormwater and leachate management infrastructure
- Continuation of current landfill operation practices in the new cell location
- Capping, closure and rehabilitation

Based on preliminary concept layouts prepared to date (SMEC, 2020), the project is expected to provide about an additional 970,000 cubic metres of airspace or seven and half years of filling capacity (at currently filling rates). It is also expected to generate additional construction materials for cell construction and cover material for the ongoing landfilling operations. These preliminary figures would be reviewed and the estimated airspace would be confirmed through the design development process and documented in the Environmental Impact Statement (EIS).

The construction of the proposed new South Cell is required to be completed in order to receive waste when the current tipping area reaches capacity in mid to late 2024. Therefore, following receipt of planning approval, construction is expected to commence in the second quarter of 2024 and be completed in two stages. Each stage is expected to take about four to six months.

The development and operation of the South Cell is expected to meet the definition of Regionally Significant Development (RSD) as defined by:

- Clause 7(1)(c) in Schedule 6 of *State Environmental Planning Policy (Planning Systems) 2021* as it would be development for the purpose of waste management facility or works that meet the requirements for designated development under the Environmental Planning and Assessment Regulation 2021, Schedule 3, section 45, as well as
- Clause 3 in Schedule 6 of *State Environmental Planning Policy (Planning Systems) 2021* as it would be Council related development with a capital investment value over $5 million.

As the project meets the definition of RSD under the *Environmental Planning & Assessment Act 1979* (EP&A Act), the Hunter and Central Coast Regional Planning Panel will be the consent authority for the project, and the project is to be assessed in accordance with the provisions of Division 4.2 of the EP&A Act.

An EIS would be prepared to support the application for project approval under the EP&A Act.

The site

The Woy Woy WMF is located on Nagari Road, Woy Woy, approximately 10 kilometres south of Gosford across Brisbane Water, on the New South Wales (NSW) Central Coast. It is situated on three lots comprising a total area of 50 hectares. The landfill and transfer area is the primary waste disposal area for the Gosford region and has operated as a waste facility since 1974.

The site of the proposed South Cell at the Woy Woy WMF has an area of about five hectares. The area is on the southern portion of the WMF, has previously been mostly cleared and is currently being used for excavation and stockpiling of engineering and cover material for the existing landfilling operations.

Assessment of impacts

The identification of issues to be addressed in the EIS has been undertaken through a risk-based approach in accordance with the 'State significant development guidelines – preparing a scoping report' (DPIE, 2021a).

The following key environmental matters identified during the risk assessment would require assessment in the EIS:

- Soil and water
- Air quality and odour
- Noise and vibration

Other matters that would require consideration include waste management, traffic, bushfire, hazards and risk, landscape character and visual amenity and Aboriginal and historic heritage.

A biodiversity constraints assessment identified that the project is unlikely to have any significant impact on threatened species or biodiversity values, a biodiversity development assessment report (BDAR) is therefore not required.

For each environmental matter, the potential impacts associated with the construction, operation, closure and rehabilitation of the project would be identified and mitigation measures would be provided to eliminate or reduce potential impacts associated with the South Cell.

Purpose of this document

This document provides a description of the project and presents the strategic context of the project. It presents a preliminary environmental risk-based assessment undertaken during scoping of the project to identify matters to be addressed in the EIS.

This document has been prepared in support of an application for Secretary's Environmental Assessment Requirements (SEARs) for the South Cell.

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.6 and the assumptions and qualifications contained throughout the report.

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1. Introduction

1.1 Overview of the project

Central Coast Council (Council) is proposing to develop a new 'South Cell' at the existing Woy Woy Waste Management Facility (WMF) ('the project'). The project would optimise the remaining landfill air space at the site and ensure that the facility remains open for as long as possible to accept putrescible waste from the Local Government Area (LGA).

The project is deemed to be regionally significant development (RSD) in accordance with Clause 7(1)(c) and Clause 3 in Schedule 6 of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and it is a development for the purposes of a waste management facility or works that meets the requirements for designated development under the Environmental Planning and Assessment Regulation 2021, Schedule 3, section 45 as well as being Council related development with a capital investment value over $5 million. The project therefore requires assessment and approval in accordance with Part 4, Division 4.3 of *the Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) for determination by the Hunter and Central Coast Regional Planning Panel. An environmental impact statement (EIS) is required to be submitted as part of the application for development consent.

Key features of the project include:

- Cell construction including excavation and earthworks to form the base of the cell and lining installation
- Development of associated access, stormwater and leachate management infrastructure
- Continuation of current landfilling operations in the new cell location
- Capping, closure and rehabilitation.

Based on existing preliminary concept layouts (SMEC, 2020), the project is expected to provide about an additional 970,000 cubic metres of airspace or seven and a half years of filling capacity (based on current filling rates). It is also expected to generate additional cell construction and cover materials for the ongoing landfilling operations. These preliminary figures would be reviewed and the estimated airspace would be confirmed through the design development process and documented in the EIS.

The construction of the proposed new South Cell is required to be completed and able to receive waste when the current tipping area reaches capacity in mid to late 2024. Construction would commence following receipt of planning approval and be completed in two stages, with each stage expected to take about four to six months.

This application is specific to the development of the project at the Woy Woy WMF. Further information on the design, operation and construction of the project is provided in Section 2.4.

1.2 Project background and history

Council owns and operates the Woy Woy WMF located on Nagari Road, Woy Woy, approximately 10 kilometres south of Gosford across Brisbane Water, on the New South Wales (NSW) Central Coast (refer to Figure 1.1). It is situated on three lots comprising a total area of 50 hectares:

- Lot 110 deposited plan (DP) 755251
- Lot 1 DP 126813
- Lot 1 DP 654885

The landfill and transfer area is the primary waste disposal area for the southern Central Coast community and has operated as a waste facility since 1974. Prior to this, the Woy Woy WMF site was a quarry and the resulting gully was then landfilled.

In 2012, a decision was made to transport all dry waste off-site to alternate disposal facilities and to landfill only putrescible waste in order to extend the current life of the site.

Key components of the existing Woy Woy WMF include:

- Weighbridge and office/education centre
- Current active landfill cell and tipping area
- Transfer station
- Green waste facility
- Excavation and stockpiling area
- Stormwater, leachate and gas management infrastructure

In 2020 Council commissioned the 'Woy Woy Waste Management Facility – Development Strategy' (SMEC, 2020) (the 'Development Strategy') to guide the future use and development of the WMF. The Development Strategy identified the existing excavation and stockpile area at the southern end of the Woy Woy WMF site as the location for the next waste cell (known as the new 'South Cell').

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Legend

- Woy Woy WMF
- Project site
- Suburb Name
- Horsfield bay
- Patonga
- Umina Beach
- Woy Woy
- Waterways
- Roads

Paper Size ISO A3

0 70 140 210 280

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Central Coast Council
South Cell at Woy Woy WMF

Site location

Project No. **12595244**
Revision No. **0**
Date **06/04/2023**

FIGURE 1.1

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1.3 The applicant

The applicant is Central Coast Council:

- ABN: 73 149 644 003
- Address: 2 Hely Street, Wyong NSW 2259

1.4 Related development

In 1994 a legal review of the development consent for the Woy Woy WMF site (Dawson, 1994) found the following:

- 1928 – Site used as a quarry
- 1933 – Part of the site was used for the disposal of night soil
- 1968 – Gosford Planning Scheme Ordinance zone land 1(b) – extractive industry
- 1974 – Gosford City Council applied for and obtained the consent of the then Health Commission to use the site as a solid waste disposal depot. The records of a Council meeting on the 19th of February 1974 showed that Gosford City Council resolved to accept the conditions on the use of the site imposed by the Health Commission. Public notices were then issued to the community regarding the opening of the waste disposal depot.

Central Coast Council was established on 12 May 2016 following the amalgamation of Gosford and Wyong Shire Councils.

The other existing operations (weighbridge and office/education centre, transfer station, green waste facility etc) at the Woy Woy WMF would continue to be operated in conjunction with the project under the existing consent.

It is noted that Council has recently commenced the planning and design for a proposed upgrade to the northern sediment dam. The upgrade works would provide additional capacity to manage the expected run-off from the existing northern WMF catchment, plus any minor catchment increase that may result from development of the final landform for the South Cell. Preliminary estimates indicate that the upgraded dam would provide about 7.3 ML of storage volume, but the final volume would be confirmed through the design development process. The northern sediment dam upgrade works are expected to be completed before the end of 2023 and well in advance of any works associated with the proposed South Cell. The dam upgrade works are being undertaken as part of current WMF operations and do not form part of this application.

In addition, Council is proposing a new stockpile area on the eastern portion of the Woy Woy WMF site, for the temporary storage of the virgin excavated natural material (VENM) that is currently extracted from and stored at the existing excavation and stockpile area. It is expected that, if approved, this new stockpile area may also be suitable to temporarily store a portion of the material excavated as part of the construction of the project, if required. This new VENM stockpile area will be subject to separate assessment and approval and does not form part of this application.

It is noted that the South Cell would be staged to accommodate the storage of construction materials within the project site.

1.5 Purpose of this report

As RSD, the development application for the project must be accompanied by an EIS prepared in accordance with the Secretary's environmental assessment requirements (SEARs). This report has been prepared to support an application to NSW Department of Planning and Environment (DPE) to request the SEARs for the project.

This scoping report includes a description of the project, the strategic context, statutory framework, proposed engagement activities, preliminary identification of relevant environmental matters, potential impacts and the proposed scope of the assessment to be undertaken in the EIS.

The EIS would be prepared in accordance with the requirements of the SEARs, the *Environmental Planning and Assessment Act 1979*, the Environmental Planning and Assessment Regulation 2021 (the Regulation).

1.6 Scope and limitations

This report: has been prepared by GHD for Central Coast Council and may only be used and relied on by Central Coast Council for the purpose agreed between GHD and Central Coast Council as set out in Section 1.5 of this report.

GHD otherwise disclaims responsibility to any person other than Central Coast Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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Accessibility of documents

If this report is required to be accessible in any other format than its current format, this can be provided by GHD upon request and will incur additional costs.

2. Strategic context

2.1 Consistency with strategic documents

The project is consistent with relevant policy, strategies, guidelines and plans including:

- 'NSW Waste and Sustainable Materials Strategy: A guide to future infrastructure needs' (DPIE, 2021c)
- 'Woy Woy Waste Management Facility – Development Strategy Report' (SMEC, 2020)
- 'Central Coast Waste Resource Management Strategy 2020-2030' (Central Coast Council, no date)

The 'NSW Waste and Sustainable Materials Strategy: A guide to future infrastructure needs' (DPIE, 2021c) supplements the 'NSW Waste and Sustainable Materials Strategy 2041' (DPIE, 2021d), which sets out the long-term vision for managing waste and planning for waste and resource recovery infrastructure in NSW.

The guide to future infrastructure needs (DPIE, 2021c) notes that while organisations implement strategies to reduce the volume of waste they generate and increase the amount that they re-use, repair and recycle, they also need to make sure they have enough capacity to safely dispose of the material that they can't recycle.

The project would provide critical putrescible waste landfill capacity and help ensure that there is safe disposal for material generated in the lower part of the Central Coast LGA that cannot be reused, recovered or recycled.

Development of the South Cell was identified in the overarching development strategy for the Woy Woy WMF as the next stage for landfilling.

The project is also consistent with the 'Central Coast Waste Resource Management Strategy 2020-2030' (Central Coast Council, no date) which identifies the expansion of the current landfill at the WMF to extend the operating life as an opportunity for future development.

The EIS would provide further information on these strategic documents, as well as evaluate their relationship to the project.

2.2 Project objectives

The objectives of the project are to:

- Construct and operate a new landfill cell at the WMF
- Optimise the remaining landfill air space at the WMF
- Ensure that the WMF remains open for as long as possible to accept putrescible waste from the Local Government Area (LGA).
- Ensure that putrescible waste generated in the Central Coast LGA that cannot be recovered or recycled can continue to be safely disposed of
- Make efficient and effective use of the asset

2.3 Site setting

The project site is located within the southern portion of the existing Woy Woy WMF. The WMF is located in the township of Woy Woy, approximately 10 kilometres south of Gosford across Brisbane Water within the Central Coast LGA (refer Figure 1.1).

The WMF consists of:

- Lot 110 DP 755251
- Lot 1 DP 126813
- Lot 1 DP 654885

The project site is about five hectares in area and located on the southern portion of the WMF. It comprises part of Lot 110 DP 755251.

The WMF is operated in accordance with environment protection licence (EPL) 6053. The EPL permits resource recovery, waste disposal (application to land) and waste storage. EPL 6053 authorises the disposal of up to a total of 100,000 tonnes per year of waste. The current filling rate is about 80,000 to 85,000 tonnes or 105,000 to 110,000 cubic metres per year (SMEC, 2020).

EPL 6053 authorises the disposal of the following waste types:

- General solid waste (putrescible)
- General solid waste (non-putrescible)
- Special waste (asbestos waste and waste tyres)

Entry to the WMF is from the north via Nagari Road. All customers enter and exit the site via weighbridges and a gatehouse. An office/waste information room, a carpark and a landfill gas generation unit and flare are located to the south of the gatehouse.

The main areas for waste sorting and disposal are listed below and shown on Figure 2.1 and Figure 2.2:

- **Current active tipping area**: Council's domestic waste contractor and other large operators or those with specialised wastes drop waste directly at the active tipping area.
- **Transfer station**: A transfer bay is located on a completed section of the landfill. The general public and smaller commercial operators drop off waste and recycling to the transfer bay. Dry waste is then sorted to remove scrap metal and transferred to alternative disposal facilities. Recyclable materials are stored in this area until they are collected by the various contractors for further separation and/or recycling off-site. Recyclable materials include concrete, brick and tiles, scrap metal, untreated timber, comingled recyclables, batteries, e-waste, mattresses, motor oil, gas bottles and fluorescent globes.
- **Green waste facility**: The green waste area is located adjacent to the transfer bay. The green waste material is received at the site and then screened, chipped and transferred off-site again. This operation commenced at the site in 2000 and has continued ever since. The green waste facility is operated by Australian Native Landscapes (ANL).
- **Excavation and stockpile area**: South of the transfer station and green waste facility is the excavation and stockpile area. The excavated material is used for building landfill cell walls and covering the waste.

The excavation and stockpile area was previously proposed for an Alternative Waste Treatment (AWT) facility (URS, 2007) however, this area is now proposed to be used for the new South Cell. All other areas of the WMF would continue to operate as they currently do in conjunction with the project.

Figure 2.1 Existing Woy Woy WMF site layout (SMEC, 2020)

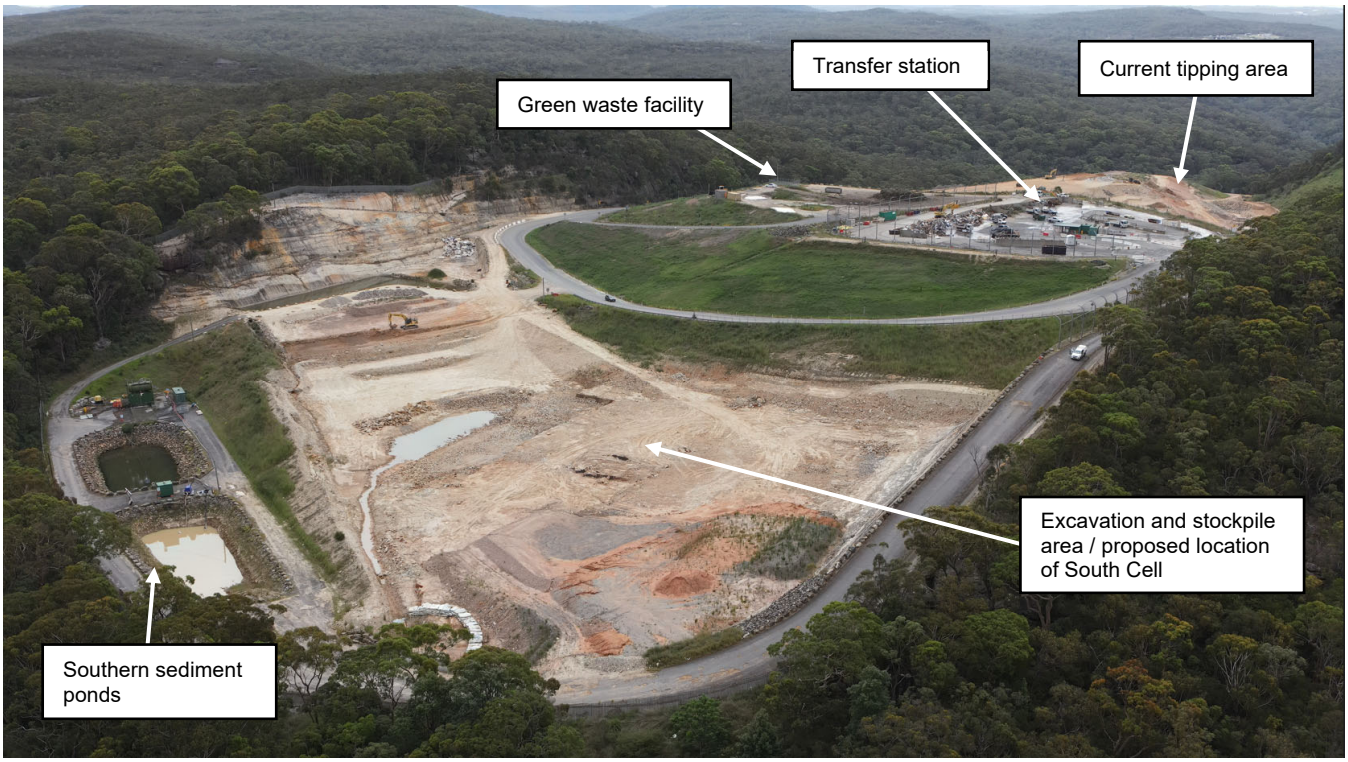


Figure 2.2 ***Ortho-view showing existing green waste facility, transfer station, current tipping area and current excavation and stockpile area/proposed location of the South Cell***

2.3.1 Natural environment

Key environmental considerations are shown on Figure 2.3. The project site is surrounded to the west, east and south by thick native bush land of the Brisbane Water National Park. The surrounding topography steeply slopes towards the project site.

The project site is about 1.8 kilometres southwest of Brisbane Water and three kilometres northwest of Umina Beach.

Patonga Creek runs to the south of the project site. A couple of recharge tributaries of Woy Woy Creek are located in the northeast area of the WMF. Woy Woy Creek is located about 1.6 kilometres to the north of the project site.

The WMF is mapped as containing Vegetation Category 1 as well as Vegetation Buffer bushfire prone land.

2.3.2 Surrounding land uses

Land use and infrastructure immediately surrounding the project site includes the wider WMF immediately to the north and the Woy Woy STP located more than a kilometre to the north.

Within the locality of the project site are the residential suburbs of Umina Beach, Horsfield Bay and Woy Woy. The nearest residential area is located about 800 metres to the east on The Citadel. A natural ridgeline and heavy vegetation provides a physical barrier between the project site and the residential areas to the east.

Recreational facilities within the locality include Correa Bay Reserve located about 1.8 kilometres to the northeast, Dulkara Road Reserve/Park and Everglades Golf Course each about 1.5 kilometres to the northeast of the project site.

The closest school, St John the Baptist Catholic Primary School, is located about 1.3 kilometres to the northeast of the project site.

2.3.3 Key risks and natural hazards

The project site was selected due to it possessing a number of inherent advantages, being that it is:

- Within the existing WMF
- In an area that is currently mostly cleared and heavily disturbed
- Remote from sensitive receivers (nearest residential receiver is about 800 metres away)
- Well screened by ridgelines and heavy vegetation

Key risks associated with the project site include:

- Location within bush fire prone land
- Proximity to Patonga Creek to the south
- Presence of native vegetation within parts of the wider WMF site and surrounds (Brisbane Water National Park)

2.3.4 Zoning

The project site is zoned SP1 Special Activities (see Figure 2.4) under *Central Coast Local Environmental Plan 2022*. The accompanying Land Zoning Map identifies the purpose as 'Waste or Resource Management Facility or Resource Management Facility'.

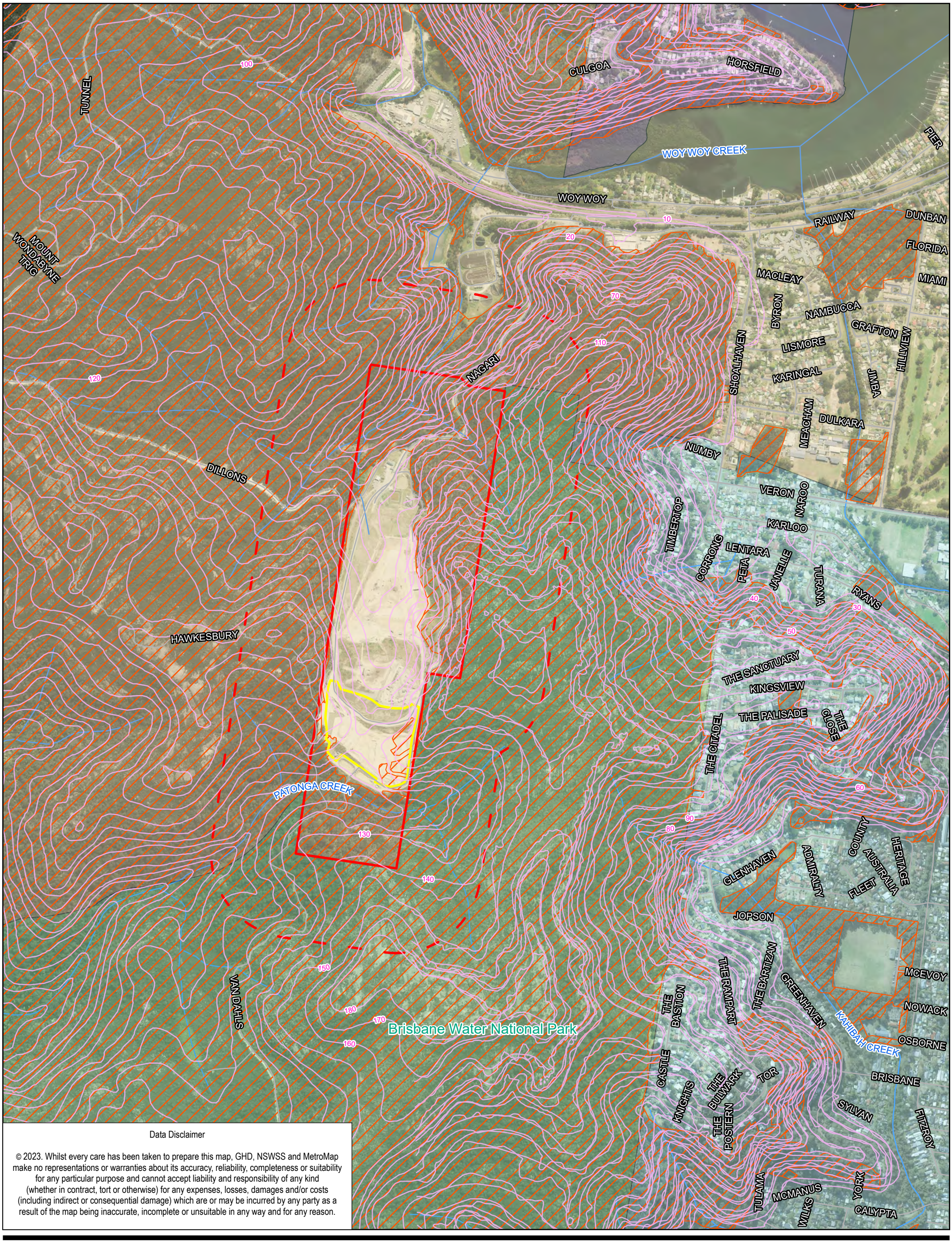
The objectives of the SP1 Special Activities zone are:

- To provide for special land uses that are not provided for in other zones
- To provide for sites with special natural characteristics that are not provided for in other zones
- To facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land

In accordance with the zone provisions, waste management facilities are permissible with consent in the SP1 Special Activities (Waste or Resource Management Facility or Resource Management Facility) zone.

2.4 Agreements

The applicant has not entered into any agreements with other parties to mitigate or offset the impacts of the project.



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Legend

- Woy Woy WMF
- Project site
- Suburb Name
- Horsfield bay
- Patonga
- Umina Beach
- Woy Woy
- Bushfire zone
- Woy Woy WMF 250m Buffer
- Contours
- Waterways
- Roads

Paper Size ISO A3

0 70 140 210 280

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Environmental considerations

Project No. **12595244**
Revision No. **0**
Date **06/04/2023**

FIGURE 2.3

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Landuse zone

- Deferred Matter
- Environmental Conservation
- General Industrial
- General Residential
- Infrastructure
- Low Density Residential
- National Parks and Nature Reserves
- Public Recreation
- Special Activities

Legend

- Woy Woy WMF
- Project site
- Roads
- Waterways

Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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Project No. **12595244**
Revision No. **0**
Date **06/04/2023**

Land use zoning

FIGURE 2.4

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3. The project

3.1 Key characteristics of the project

The key project characteristics are summarised in Table 3.1 and project footprint is shown on Figure 3.1.

Table 3.1 Key project characteristics

Feature	Description
Project summary	Construction and operation of the South Cell at the Woy Woy WMF, involving: – Cell construction including site establishment, earthworks and lining installation – Development of associated access and stormwater and leachate management infrastructure – Continuation of current landfill operation practices in the new cell location – Capping, closure and rehabilitation
Project site	Part of Lot 110 DP 755251 at the Woy Woy WMF About 5 hectares within the southern portion of the Woy Woy WMF
Zoning	SP1 Special Activities (Waste or Resource Management Facility or Resource Management Facility)
Proponent	Central Coast Council
Operator	Central Coast Council
Construction hours	– 7 am to 6 pm Monday to Friday – 8 am to 1 pm Saturdays – No work on Sundays or Public Holidays
Operating hours	As per the Woy Woy WMF: – 7 am to 5 pm Monday to Friday – 8 am to 4 pm Saturday and Sunday – No work on Christmas Day, Good Friday and New Year's Day
Waste disposal	No change to existing approved annual capacity (up to 100,000 tonnes per year) as per EPL 6053
Waste acceptance	No change to existing approved waste types as per EPL 6053: – General solid waste (putrescible) – General solid waste (non-putrescible) – Special waste (asbestos waste and waste tyres) Waste received only from the Central Coast LGA
Estimated employment	About 5 to 10 personnel during construction No change to existing operational staffing levels

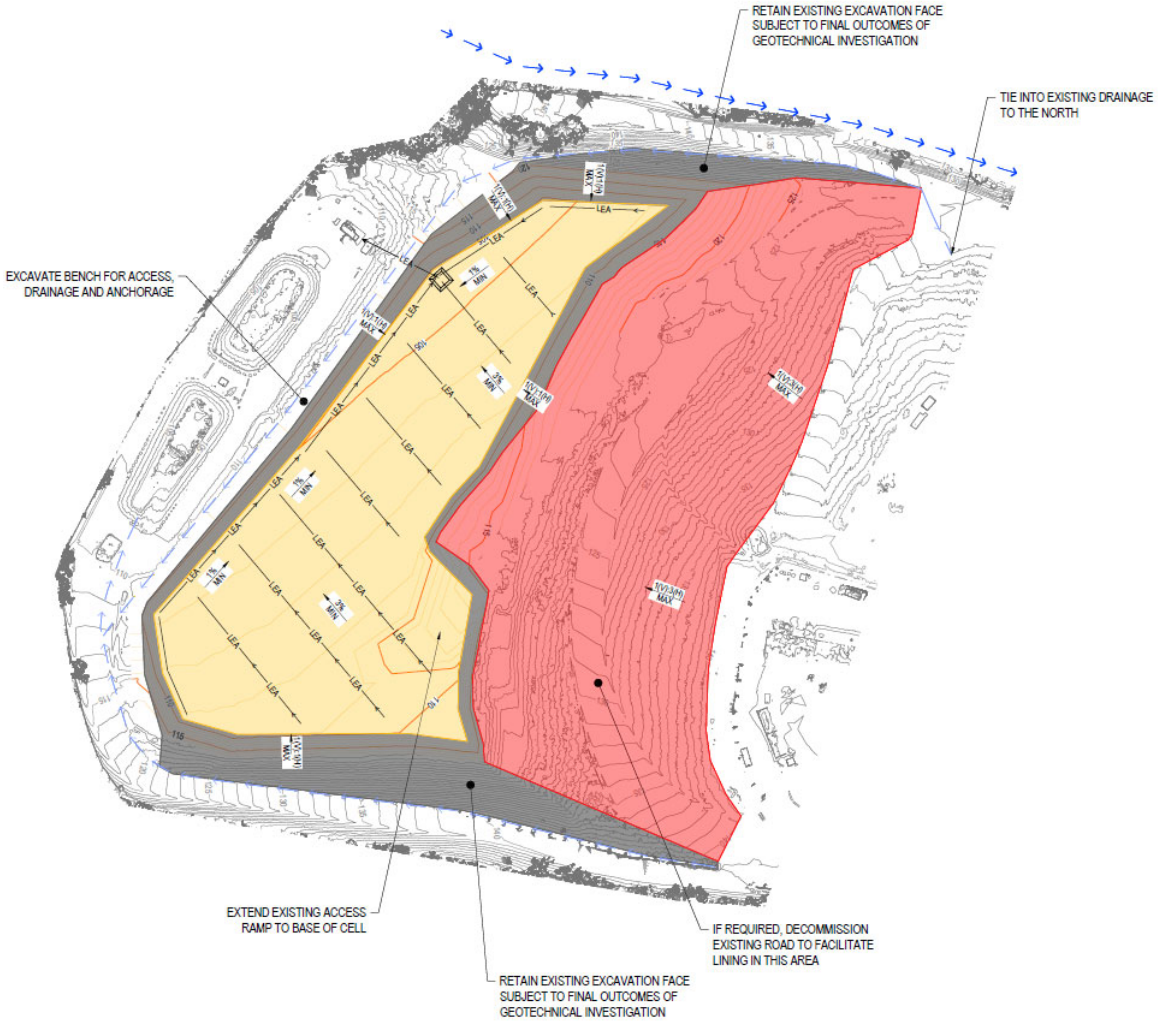

Figure 3.1 Project footprint

3.2 Construction

Construction of the project would be subject to the methods proposed by the construction contractor, but is expected to involve the following:

- Site establishment: establishment of site environmental controls including sediment and erosion controls
- Earthworks: excavation and grading along the base of the landfill cell in accordance with the requirements of the Environmental Guidelines: Solid waste landfills (NSW EPA, 2016)
- Lining and gravel placement: installation of basal, batter and sidewall liners systems
- Development of ancillary infrastructure including access roads, leachate and water management infrastructure

Construction would be undertaken in two stages, with each stage expected to take about four to six months to complete.

The construction activities would be carried out during the following hours, consistent with the recommended standard hours of the Draft Construction Noise Guideline (NSW EPA, 2020a):

- 7 am to 6 pm Monday to Friday
- 8 am to 1 pm Saturdays
- No work on Sundays or Public Holidays

The construction workforce is expected to range from about five to ten workers per day.

3.3 Operation

3.3.1 Overview

The proposed South Cell is the next stage of the overarching development strategy for the Woy Woy WMF and is designed to optimise the remaining landfill air space at the site and ensure that the facility remains open for as long as possible to provide local disposal capacity for putrescible waste generated in the southern part of the Central Coast LGA.

Operations at the WMF are currently guided by the Landfill Management Plan (URS, 2012). The operation of the South Cell would be a continuation of the current landfill operation practices at the WMF but in the new cell location.

An updated Landfill Management Plan would be prepared following project approval. Updates would include:

- Details of the South Cell design and operation (including staging)
- The updated final landform
- Management and mitigation measures identified in the EIS and Submissions Report including any updates required with regard to water, leachate and landfill gas management and monitoring
- Any relevant conditions of consent.

The other existing operations (weighbridge and office/education centre, transfer station, green waste facility etc) at the WMF would continue to be operated in conjunction with the project as they currently are. The existing landfill gas management operations would also be extended into the South Cell project site.

3.3.2 Waste acceptance

The Woy Woy WMF is currently licensed to dispose (by application to land) up to 100,000 tonnes per year of the following waste types (as per EPL 6053):

- General solid waste (putrescible)
- General solid waste (non-putrescible)

- Special waste (asbestos waste and waste tyres)

The WMF currently accepts asbestos waste, but does not accept hazardous materials, contaminated soil or immobilised materials.

No change to the current approved waste types or annual disposal capacity is proposed.

3.3.3 Hours of operation

The proposed operational hours of the South Cell would be as per the existing Woy Woy WMF operational hours, which would remain unchanged:

- 7 am to 5 pm Monday to Friday
- 8 am to 4 pm Saturday and Sunday
- No work on Christmas Day, Good Friday and New Year's Day

3.3.4 Operational workforce

There are currently fifteen operational staff at the Woy Woy WMF including a landfill supervisor, gatehouse personnel, plant operators, labourers, and spotters. There are also contractor staff onsite from time to time as well.

Staff associated with the operation of the current landfill cell would transfer to the new South Cell.

There would be no change to the overall operational workforce at the WMF due to the project.

3.4 Closure and rehabilitation

No specific future land use has been selected by Council for the Woy Woy WMF following closure yet. However, it is likely that the future land use could be restricted open space, with the potential to retain infrastructure as part of a future waste transfer station operation.

Site closure would include:

- Site capping and revegetation
- Post-closure monitoring and maintenance

The key objectives of the site capping and revegetation are to:

- Minimise infiltration of rain and surface water into the waste
- Control landfill gas emissions
- Prevent hazards
- Protect public amenity

Final capping options would be developed consistent with the Environmental Guidelines: Solid Waste Landfills (NSW EPA, 2016) and would include five layers including a seal bearing surface, a gas drainage layer, a sealing layer, an infiltration drainage layer and the revegetation layer.

Prior to closure and rehabilitation, a landfill closure plan would be developed and submitted to the NSW EPA. The closure plan would document the chosen future land use and the capping and revegetation would reflect this.

Post-closure monitoring and maintenance would be undertaken to ensure that the landfill continues to be non-polluting and does not cause environmental harm after site closure. These details would also be included in the landfill closure plan to be submitted to the NSW EPA.

3.5 Alternatives considered

Alternatives to the project are considered at a site level and overall project level and would continue to be developed through the design stages to ensure the design meets best practice requirements and can avoid or minimise identified environmental, social and economic impacts.

The following alternatives have been assessed:

- the “do nothing” approach
- design alternatives

3.5.1 The “do nothing” approach

The “do nothing” approach would involve not constructing and operating the project at the Woy Woy WMF. Not developing the project at the Woy Woy WMF would leave the lower part of the LGA without any local putrescible waste landfill disposal capacity. Waste would need to be transported directly by the municipal kerbside collection vehicles (or other commercial waste vehicles) to another licensed landfill for disposal. There is currently no suitably sized or located transfer station that could be used to receive and bulk up (for transport) the waste that is currently disposed of at the WMF. Until such a time that there is, the “do nothing” option is not considered acceptable.

The ”do nothing” option would also not make effective use of the existing asset, given that the location of the South Cell is already cleared, heavily disturbed and considered suitable for the proposed land use.

3.5.2 Design alternatives

A preliminary concept for the location, layout and extent of the proposed South Cell and associated infrastructure was identified in the Development Strategy for the Woy Woy WMF (SMEC, 2020). Figure 3.2 shows a snapshot of the layout proposed as part of the Development Strategy.

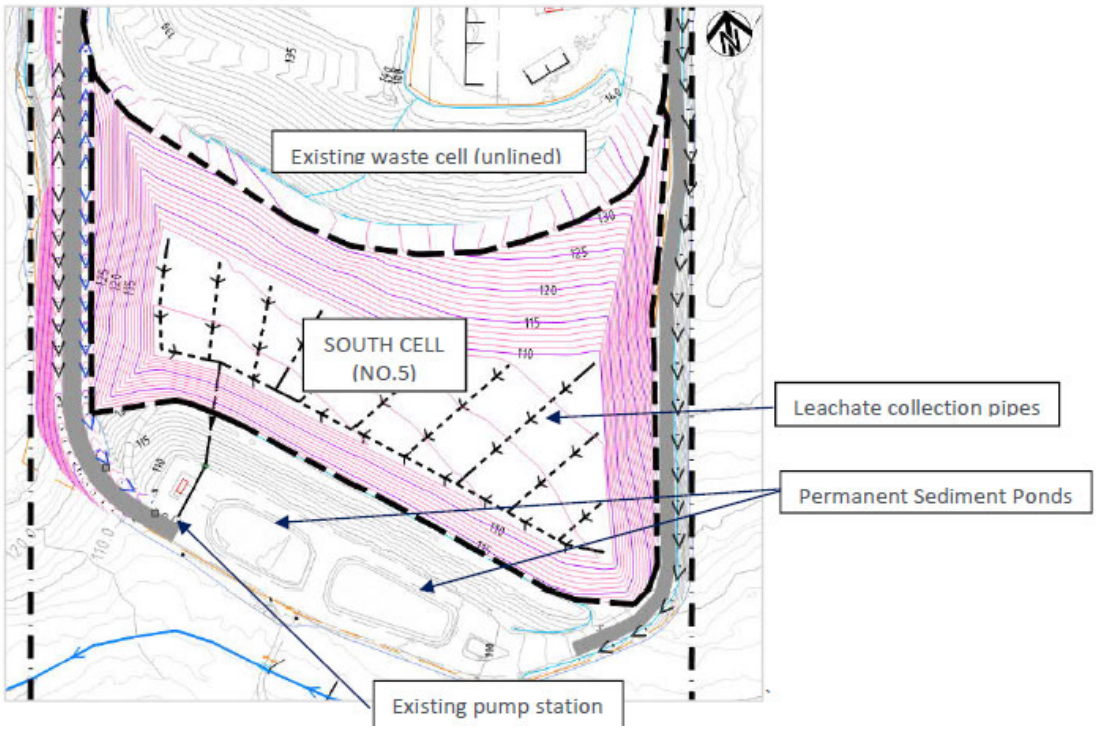

Figure 3.2 South Cell preliminary concept layout from Development Strategy (SMEC, 2020)

However, through the early biodiversity investigations (refer to Section 6.5) it was identified that the western access road for the South Cell proposed in the Development Strategy concept would require the removal of some native vegetation in the southwestern part of the WMF.

As a result, two additional alternative preliminary road access concepts were investigated with the aim to avoid the need to remove the identified native vegetation but still achieve the project objectives. The three options considered were as follows:

- Option 1: Formalisation and extension of the existing access road to the west of the South Cell (in line with South Cell preliminary concept layout from Development Strategy (SMEC, 2020) – refer to Figure 3.2).
- Option 2: Retain the existing surface to the west of the South Cell, removing the proposed western perimeter road adjacent to the cell and utilising the northern and eastern roads for commercial vehicle access into the cell and southern ponds. This would result in a realignment of the western cell boundary to tie into the existing surface.
- Option 3: Realign the western perimeter access road to retain the existing excavation face and avoid the native vegetation.

A comparative assessment of these options was undertaken giving consideration to potential biodiversity impacts, potential operational and airspace impacts as well as constructability. Based on this assessment, Option 2 was identified as the preferred option as it would avoid impacts to native vegetation and have limited impacts on landfill airspace. Consideration would need to be given to how surface water would be managed for this arrangement and construction of the sidewall lining system. However these issues are expected to be able to be managed through the design development process.

Option 2 has therefore been adopted for the project design and will be subject to further design development with details to be provided in the EIS. The project footprint, incorporating this preferred access option, is shown on Figure 3.1.

Liner profile, surface water management and capping profile options are currently being investigated through the design development process.

Further details on the design and alternatives considered will be provided in the EIS.

3.6 Project timing

Council has identified that the new South Cell needs to be constructed and ready for waste acceptance by mid to late 2024.

Construction would commence following attainment of planning approval and would be undertaken in two stages, with each stage expected to take about four to six months to complete.

Landfilling would then commence within the South Cell following the completion of filling in the current cell. The South cell is expected to operate for about seven and half years based on current filling rates and existing preliminary concept layouts. The estimated airspace and operational life would be confirmed through the design development process and documented in the EIS.

3.7 Strategies to avoid or minimise impacts

The key strategy to avoid or minimise potential impacts principally includes selecting an already heavily disturbed site within the existing Woy Woy WMF.

In addition, as detailed in Section 3.5.2, since preparation of the Development Strategy (SMEC, 2020), additional design options have been investigated in order to avoid impacts to native vegetation in the area originally earmarked for perimeter access for the South Cell. The project now avoids the need to remove native vegetation. Further information is also provided in Section 6.5.

Being within the existing WMF, and having relatively good separation distances from adjacent residences, screened by ridgelines and vegetation, and good transport links, the project site also offers advantages in terms of avoiding a number of amenity and social impacts such as visual intrusion, noise, odour etc.

Other key strategies that would be adopted to avoid, minimise or offset the impacts of the project would include:

- Leachate barrier system, leachate storage and disposal consistent with NSW EPA's Environmental Guidelines: Solid Waste Landfills (NSW EPA, 2016), designed to allow temporary in-cell leachate storage during emergency events
- Surface water management including:
  - Diversion of clean surface water around the landfill cell
  - Where possible, prevention of rainfall falling onto the landfill cell footprint from coming into contact with waste via application of soil (or other inert) cover materials
  - Collection and/or diversion of sediment laden water to sediment pond/s for treatment
- Waste screening, measurement and recording measures to ensure only authorised wastes are received and disposed
- Extension of the existing landfill gas management operations to the South Cell area
- Environmental monitoring in accordance with EPL conditions
- Future closure, final capping and revegetation consistent with NSW EPA's Environmental Guidelines: Solid Waste Landfills (NSW EPA, 2016)

4. Statutory context

The key requirements of the EP&A Act and the *Environmental Planning and Assessment Regulation 2021* (the EP&A Regulation) in relation to the approval and assessment of the project are summarised in Table 4.1.

Table 4.1 Summary of statutory requirements for the project

Matter	Comment
Power to grant consent	The project is deemed RSD in accordance with Clause 7(1)(c) and Clause 3 in Schedule 6 of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP): – The project would be development for the purpose of waste management facility or works that meet the requirements for designated development under the Environmental Planning and Assessment Regulation 2021, Schedule 3, section 45(1) – The project would also be Council related development with a capital investment value over $5 million. Pursuant to Division 4.2 of the EP&A Act, the Hunter and Central Coast Regional Planning Panel would be the consent authority.
Permissibility	The project is considered permissible with development consent. The basis for this is described below. The project site is located within the Central Coast LGA and the relevant local environmental plan is the *Central Coast Local Environment Plan 2022* (Central Coast LEP). As noted in Section 2.3.4, the project site is zoned SP1 – Special Activities. The Land Zoning Map identifies the purpose as 'Waste or Resource Management Facility or Resource Management Facility'. Waste or Resource Management Facilities are defined by the Central Coast LEP in accordance with the *Standard Instrument – Principal Local Environmental Plan* (NSW Legislation 2006) as follows: *"waste or resource management facility means any of the following—* *(a) a resource recovery facility,* *(b) a waste disposal facility,* *(c) a waste or resource transfer station,* *(d) a building or place that is a combination of any of the things referred to in paragraphs (a)–(c)."* The project involves construction and operation of a new landfill cell and therefore is considered to meet the definition of a waste or resource management facility (clause c). In accordance with the zone provisions, development for the purpose shown on the Land Zoning Map is permissible with consent in the SP1 – Special Activities Zone. In addition to the project being permissible with consent under the Central Coast LEP, the project is also considered permissible with consent under the provisions of Division 23 of Part 2.153 of *State Environmental Planning Policy (Transport and Infrastructure) 2021*.
Integrated development	The project would also be considered integrated development and would require the following approvals: – an environment protection licence under Chapter 3 of the Protection of the *Environment Operations Act 1997* – a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the Water Management Act 2000.
EPBC Act approval	The project is not anticipated to result in a significant impact on any Matters of National Environmental Significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A referral under the EPBC Act is not considered necessary for the project.
Mandatory matters for consideration	Section 7.7 of the *Biodiversity Conservation Act 2016* (BC Act) requires that for Part 4 development (other than State significant development or complying development) if a proposed development is likely to significantly affect threatened species, the application for development consent is to be accompanied by a biodiversity development assessment report. The project is unlikely to have any significant impact on threatened species or biodiversity

Matter	Comment
	values. Further information is provided in Section 6.5. A biodiversity constraints assessment is attached in Appendix C.

5. Engagement

5.1 Interest groups identified

Council has undertaken an initial stakeholder scoping exercise and has identified a number of key interest groups. These include the following:

- State Member of Parliament
- Central Coast Council
- NSW Government authorities including:
  - Department of Planning and Environment (DPE), comprising:
    - Environment Protection Authority (EPA)
    - Environment and Heritage
    - DPE Water and the Natural Resources Access Regulator
  - Heritage NSW
  - Transport for NSW
  - Rural Fire Service
- Local landowners
- Indigenous groups
- Patonga Progress Association

5.2 Early engagement carried out

In response to a query in June 2022 by the Patonga Progress Association asking if there were any plans to extend or widen the Woy Woy landfill, Council provided a response which included the following:

> *"Located within the existing site operational area and inside the existing exclusion fencing (which is in itself located some 230m inside the site's southern boundary), planning is also underway to transition the current filling area to the south into the existing excavated area. This would require some further earthworks and the construction of a fully engineered landfill liner and water management system which meets current best practice and would be subject to approval from the NSW Environmental Protection Authority (EPA)."*

5.3 Engagement to be carried out

5.3.1 Community and stakeholder engagement plan

A Community and Stakeholder Engagement Plan has been developed for the project which outlines the activities that Council will undertake to inform and consult the community and other identified key stakeholders. Council will notify neighbouring property owners and the surrounding community about the project and provide a project newsletter/FAQs and invitation to comment. Council will also provide project related information on its website.

5.3.2 Agency consultation

Agency consultation will be undertaken with the interest groups identified in Section 5.1 and in accordance with the project's Community and Stakeholder Engagement Plan that has been prepared for the EIS and the SEARs. Details of the engagement carried out, and the outcomes of the consultation will be included in the EIS.

6. Proposed assessment of impacts

6.1 Introduction

The identification of issues to be addressed in the EIS has been undertaken through a risk-based approach. This process involved reviewing previous reports, undertaking limited investigations (such as site inspections), and desktop searches of proprietary environmental databases to identify key issues and sensitive areas throughout February and March 2023.

A summary of the key environmental matters identified during the risk assessment is provided in Section 6.2 through Section 6.5. Other matters for consideration are identified in Section 6.6. The intent of the discussion is to demonstrate an understanding of the matters and the need for further environmental assessment and mitigation measures for these matters.

6.2 Soil and water

6.2.1 Existing environment

The WMF is located within a gully, with site elevations ranging between about 60 to 170 metres AHD. It is oriented in a north-south orientation, with two parallel ridges forming the eastern and western boundaries. The general gully direction is from south to north, however local relief varies and is characterised by steep filled slopes and rock outcrops.

The WMF is located on a saddle with flows falling to the north towards Woy Woy Creek and the southern area of the site falling towards Patonga Creek. Cut off drains are located on the eastern and western ridges to convey external catchment flows and discharge to a tributary of Woy Woy Creek in the northwest of the site.

Much of the existing landfill site drains to a sedimentation pond on the northern end of the site, adjacent to the weighbridges and gatehouse. Water is reused for site operations or disposed of by evaporation. In large rainfall events stormwater discharges to a creek to the west.

The area proposed for the South Cell and the southern portion of the WMF drains to sedimentation ponds on the southern end of the site. The ponds have an outlet that discharges water towards Patonga Creek.

Patonga Creek, runs through the Brisbane Water National Park for about two kilometres before it becomes tidal, joining the Hawkesbury River close to the latter's mouth.

The NSW Government has classified the landscape as disturbed terrain (NSW Government, 2018).

A leachate collection system has been constructed within the historical landfill cells, located on the down slope side of the landfilled areas along the extremities of the WMF site (SMEC, 2020). The leachate collected in the south and northwest is directed to sumps where it is pumped to the leachate dam in the north. The leachate is then pumped off-site to the Woy Woy STP to the north of the WMF site.

The proposed South Cell would adjoin a completed part of the landfill which has reached the final height of reduced level (RL) 140 metres and has been capped. The historical cells in this completed area are unlined. A preliminary assessment of available groundwater quality monitoring data indicates that groundwater has not been impacted by leachate from these unlined historical cells. Ammonia concentrations in groundwater are low, with a maximum historical concentration of 7.26 mg/L recorded at groundwater monitoring well (WW6), which is located to the south of the proposed South Cell, in January 2003.

6.2.2 Potential impacts

Construction

The project's construction would involve earthworks including excavations to create the base of the cell. Recent (July 2022) groundwater level monitoring data from wells located south of the proposed South Cell show groundwater levels between about RL 106 to 108 metres. The base of the South Cell is expected to be below 108 metres AHD and therefore groundwater dewatering is likely to be required during construction (and operation). This would be confirmed through hydrogeological investigations and design development, which would verify whether groundwater would be intercepted and the likely volume and quality of groundwater to be dewatered during construction (and operation).

The EIS will document the findings of the hydrogeological investigations and identify methods for effective and practical management of groundwater during construction (and operation).

Excavations and earthworks also have the potential to impact on surface water quality if not appropriately managed. Appropriate erosion and sediment control measures will be identified and documented in the EIS.

Operation

Surface water management measures would be incorporated into the project design. Incoming clean surface water flowing from surrounding terrain would be diverted around the landfill cell area via diversion drains/banks. Where possible, rainfall falling onto the landfill cell footprint would be prevented from coming into contact with waste via the application of soil (or other inert) cover materials. Sediment laden water would be opportunistically collected and/or diverted to the existing pond/s for treatment.

Following landfilling, areas at final landform level would be capped, vegetated, and directed off-site to reduce the sediment-laden catchment.

To ensure that potential impacts to groundwater are avoided, the leachate management system for the site would need to be upgraded to incorporate the proposed South Cell, as well as cater for the existing cells. The design for the project would include:

- Sizing and design for in-cell storage and if required, a new leachate pond
- Sizing and design for leachate pump and pipe sizing
- Expansion of the current reticulation and sewer connection measures where appropriate/required

As the proposed South Cell would be located in an existing disturbed area, relatively high in the catchment, the project is unlikely to cause any flooding impacts at the project site or wider WMF.

6.2.3 Assessment approach

Leachate

The EIS will include a leachate assessment. This will include leachate generation modelling using US EPA's Hydraulic Evaluation of Landfill Performance (HELP), to estimate infiltration through the existing and future cover and capping layers at the site. The results will be input into an updated leachate water balance based on the proposed landfill staging. The water balance will be used to assess leachate storage and disposal requirements, considering an average/median and wet rainfall years.

Based on the results of the water balance, an assessment of leachate storage and disposal for the site considering the current and future staging will also be undertaken.

Soils and water

The EIS will include a groundwater investigation and soil and water impact assessment.

The groundwater investigation which will comprise review and documentation of the existing groundwater environment, including details on available monitoring data and a conceptual groundwater model identifying

groundwater levels, flow directions, receptors and aquifer properties. Where deemed necessary, additional groundwater monitoring wells will be installed and additional sampling and testing will be undertaken.

The soil and water impact assessment will assess the potential impacts (quantity and quality) of the project and proposed groundwater and surface water management methods on identified receptors. It will determine the potential impacts related to surface water and flooding.

Contamination

To understand the potential for contamination to be present, the EIS will include a Phase 1 Preliminary Site Investigation.

6.3 Air quality and odour

6.3.1 Existing environment

Climatological data (URS, 2007) indicates that the region experiences warm summers and mild winters. The records indicate that average daily temperatures for summer are approximately 27°C but can exceed 40°C in January, February and March. Mean wind speeds are lightest in the months between March and August. Afternoon winds show more seasonal variability than the morning winds, which may be attributed to coastal sea breezes. The morning winds remain consistently light until August to November where the monthly mean wind speed increases.

The only other potential odour source identified in the vicinity of the WMF is the Woy Woy STP, located more than a kilometre away in the base of the valley to the north of the project site.

No air quality or odour complaints have been received about the operation of the WMF.

6.3.2 Potential impacts

Construction

Excavation has the potential to generate dust resulting in short term, localised impacts to air quality during construction. The operation of construction machinery has the potential to generate emissions to air from vehicle, plant, and equipment exhausts. These emissions are considered to be negligible.

Operation

Operation of the South Cell has potential to generate odour emissions. These potential odour emissions are expected to be similar to existing levels.

Implementation of appropriate management measures may be required to minimise any potential air quality impacts from the project.

6.3.3 Assessment approach

The EIS will include an assessment of operational air quality and odour impacts in accordance with Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022a). This will include:

- A qualitative risk-based assessment to assess dust emissions to air during construction of the project in accordance with ‘Guidance on the assessment of dust from demolition and construction’ (Institute of Air Quality Management, 2016)
- Odour dispersion modelling of the Woy Woy WMF, including the project using the CALPUFF dispersion model to predict odour concentrations and comparison with criteria in the Approved Methods
- Qualitative assessment of the potential for cumulative odour impacts, most critically related to the nearby Woy Woy STP

6.4 Noise and vibration

6.4.1 Existing environment

The project site adjoins the Brisbane Water National Park to the south, west and east. To the north is the WMF and the Woy Woy STP beyond that further to the north.

The existing WMF noise sources include truck movements both delivering waste and leaving, non-stationary plant and machinery (such as compactors, loaders, excavators, dump trucks and water cart). In addition, the existing drainage system (incorporating tanks and pumps) and landfill gas extraction system would also be existing sources of noise.

The Woy Woy STP is a small operation with major noise generating plant and processes located below ground (URS, 2007).

There are no residences close to the project site. The project site is located about 800 metres from the nearest residential areas (to the east on The Citadel). The natural ridgeline and heavy vegetation within the Brisbane Water National Park also provides a physical barrier between the proposed South Cell and the surrounding residential areas.

6.4.2 Potential impacts

Construction

The project has potential to create some short-term (temporary) noise during construction activities. This would mainly be as a result of earthworks and gravel and liner installation which would require use of heavy plant and machinery such as excavators (with rock hammer and/or standard bucket attachment), dump trucks, bulldozer, telehandler etc. Some noise may also be generated from and the small amount of construction traffic.

Excavation works are currently being carried out within the location of the proposed South Cell as part of current site operations. Construction activities associated with the project are expected to be similar in nature and intensity to the existing excavation operations.

Given the location of the project site (being about 800 metres from the nearest residential areas and separated by the natural ridgelines and heavy vegetation) and the expected scale of activities being similar to existing operations, the project is not expected to result in construction noise impacts.

Operation

Heavy plant and machinery required for operation of the South Cell would generate noise. The plant and machinery used on-site at the current tipping face would be relocated to the South Cell. No additional noisy plant and machinery is expected to be required.

The nature and intensity of operational activities associated with the project would be similar to those that currently occur at the WMF at the existing tipping area. Therefore, operational noise levels are expected to be similar to current levels.

Council has never received any noise complaints associated previous cell construction activities or ongoing operations at the WMF.

Given the location of the project site (being about 800 metres from the nearest residential areas and separated by the natural ridgelines and heavy vegetation) and the expected scale of activities, operation of the project is not expected to result in any noise impacts.

6.4.3 Assessment approach

The EIS will include a quantitative assessment of the construction noise impacts in accordance with the Interim Construction Noise Guideline (DECC, 2009) and operational noise impacts in accordance with the NSW Noise Policy for Industry (NSW EPA, 2017).

6.5 Biodiversity

A biodiversity constraints assessment was undertaken to describe the conservation value of the study area, with particular emphasis on threatened ecological communities, populations and species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and *Fisheries Management Act 1994* (FM Act), and Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The study area for the biodiversity constraints assessment is shown on Figure 6.1, which was based on the preliminary concept design for the South Cell and associated infrastructure presented in the Development Strategy (SMEC, 2020). It is noted that the project footprint (project site) has since been revised, as discussed in Section 6.5.2 and Section 3.5.2.

The scope of the assessment was as follows:

- Describe and map vegetation types and condition classes across the study area and compile a flora species inventory
- Identify areas of native vegetation, species or habitat of conservation significance within the study area
- Identify areas of disturbed or cleared land with development potential within the study area
- Map ecological constraints to potential development within the study area

The assessment included the following tasks:

- Review of existing information to identify terrestrial biodiversity values that may be affected by the project, including:
  - Results of register searches and review of threatened species profiles (DPE 2023a, 2023b; DCCEEW 2023a, 2023b) to identify threatened species, populations and ecological communities that could potentially be affected by the project
  - Woy Woy Waste Management Facility Development Strategy – Initial Biodiversity Constraints Assessment (SMEC, 2020)
- An initial one-day site inspection on 16 February 2023 conducted by two GHD ecologists to ground-truth and verify vegetation mapping, habitat values and conservation significance. The site inspections included:
  - Mapping of the extent of native vegetation and identifying plant community types (PCTs) and condition classes according to the Biodiversity Assessment Method (BAM) (DPIE, 2020)
  - Assessment of Identification of threatened ecological communities (TECs) listed under the BC Act or EPBC Act
  - Terrestrial habitat assessment to assist in identifying threatened species potentially occurring at the site and the value of habitat resources
  - Mapping of hollow-bearing trees within potential direct impact areas
  - Vegetation integrity plots in accordance with the BAM (DPIE, 2020) and random meander survey. The random meander survey involved walking the length of the proposal site and immediate surrounds and recording all flora species present. Notes were also taken regarding the dominant canopy and understory vegetation as well as relative cover abundance of species present.
  - Diurnal surveys for birds and reptiles and opportunistic sightings or call identification of native fauna and/or signs of fauna activity in all areas likely to be affected.

6.5.1 Existing environment

Flora and vegetation zones

Vegetation zones (i.e. PCTs and broad condition classes) were mapped in accordance with the BAM. Additional non-native vegetation units were defined based on observed species composition and vegetation structure. The vegetation surveyed on site included exotic grassland, intact native vegetation and

vegetation around waterbodies. The vegetation at the study area is shown on Figure 6.1 along with the location of hollow-bearing trees. The following vegetation units were recorded within the study area:

- **Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition)**
  - Features a mature canopy of *Eucalyptus piperita* and *Angophora costata* with *Syncarpia glomulifera* occurring occasionally. *Corymbia gummifera* was also recorded in the canopy along the cliff top. Two coppicing stumps of *Corymbia eximea* were recorded along the edge of the road, in the northern portion of the study area.
  - The native mid storey in the southern occurrence of the PCT in the south west of the study area was dominated by *Banksia serrata* and *Leptospermum polygalafolium*, with *Acacia suaveolens*. The midstorey in this location also included a moderately dense cover of ferns, with *Pteridium esculentum* and *Calochlena dubia* recorded frequently.
  - Along the top of the cliff, near the western boundary of the study area, the midstorey was dominated by prickly native shrubs, including *Daviesia ulicifolia* and *Epacris longiflora*. The PCT was recorded along the northern portion of study area, near the western boundary of the study area, and appeared to have regrown following road construction. The vegetation contained a good diversity and cover of native species including the canopy species *Angophora costata* and *Syncarpia glomulifera* and was representative of the PCT.
  - The understorey had a deep layer of leaf litter and good diversity of native species, including *Entolasia stricta*, *Lepidosperma laterale*, *Dianella caerulea* and *Hardenbergia violacea*.
  - Exotic plant cover was generally low, at less than one percent in the southern portion of the native vegetation along the western boundary of the study area. The exotic species observed in the PCT in the northern portion of the study area were likely introduced when the road was constructed.
  - Was located on the steep slope on the western edge of the study area and on top of the cliff in the western edge of the study area.
- **Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_poor condition)**
  - Had no mature canopy species, with young eucalypt seedlings to approximately 30-40 centimetres tall.
  - The native mid storey is present but low in height, at approximately 30-40 centimetres tall. It is most likely grown from seed dropped by overhanging vegetation from the steep slope above. Species recorded included *Acacia ulicifolia*, *Leptospermum polygalafolium* and *Persoonia linearis*.
  - The understorey was dominated by exotic grasses and patches of bare soil. Species recorded included *Paspalum dilatatum*, *Taraxicum officinale*, *Conyza sumatrensis* and *Bidens pilosa*. Some native species were present including *Gonocarpus tetragynus*, *Entolasia stricta*, *Hardenbergia violacea*, *Lepidosperma laterale* and *Pteridium esculentum*.
  - Was located on the western edge of the cleared area, just south of the small rectangular dam (Figure 6.1), adjoining the intact native vegetation mapped as Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition).
- **Exotic grassland**
  - Had no canopy or midstorey species and the groundlayer was almost exclusively dominated by exotic grasses and herbs. The dominant species recorded was *Setaria sphacelata*, with other commonly occurring species being *Cyperus eragrostis*, *Verbena bonariensis*, *Bidens pilosa* and *Paspalum dilatatum*.
  - Was located in the northern edge of the study area, on the steep bank of the existing South Cell and around the edges of the western-most small rectangular dam (Figure 6.1).
  - The vegetation around the edges of the small rectangular dam in the study area was dominated by the exotic species *Paspalum dilatatum* and *Cyperus eragrostis*, with the native *Persicaria hydropiper* also common. The dam had steep sloping sides approximately one metre deep and the water was cloudy with sedimentation at the time of the site inspection.
  - One small patch of the exotic grassland, in the north west of the study area was dominated by exotic grass and herbs species but had occasional native species present. Native species included

Leptospermum polygalifolium, *Lomandra longifolia* and *Acacia ulicifolia*, however these were uncommon and had very low percentage cover.

Photo 1 ***Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition) in the south west of the study areal***

Photo 2 ***Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_poor condition) in the south west of the study area***

Photo 3 *Exotic grassland in the north east of the study area*

Photo 4 *Rectangular dam in the west of the study area*

Fauna and habitat resources

A low diversity of native fauna species were recorded at the study area. This could be due to the time of day the survey was conducted (throughout middle of day), where warm to high temperatures were experienced, and because of the constant noise from vehicles on site, which may deter fauna species. High biodiversity value is present in intact native vegetation surrounding the WMF. The study area comprises largely cleared areas with patches of exotic grassland on formerly cleared areas and patches of forest on its western perimeter. The study area contains the following broad habitat types for fauna:

- Dry sclerophyll forest
- Exotic grassland
- One dam

Dry sclerophyll forest in the study area directly adjoins extensive areas of intact native forests associated with Brisbane Waters National Park.

Dry sclerophyll forest in the study area contains a moderate number of habitat resources for common and threatened fauna in the locality. Habitat resources within the study area include a myrtaceous canopy and midstory with nectar, seed and fruit resources. The mature canopy includes *Syncarpia glomulifera,* a highly productive species in the blossom diet of the Grey-headed Flying-fox (*Pteropus poliocephalus*). Two hollow-bearing trees are present on the edge of the study area which may provide refuge and denning habitat for possums, microbats and birds. Hollow-bearing trees within the study area have the potential to be occupied by threatened microbat species such as the Eastern Free-tail Bat (*Mormopterus norfolkensis*) and Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) or parrots such as the Gang-gang Cockatoo (*Callocephalon fimbriatum*). The high density of hollows in the broader study area within the adjacent Brisbane Waters National Park is likely to comprise a locally significant area of roosting and nesting habitat in the locality.

The understorey of the dry sclerophyll forest within the study area has a high density of leaf litter, woody debris and fungi which would provide refuge and foraging habitat respectively for a number of guilds such as reptiles and small ground-dwelling mammals. Rocky outcropping throughout the dry sclerophyll forest would also provide suitable shelter habitat for small mammals and reptiles. A small cave is present about 30 metres north west of the study area contains potential roost habitat (honey-combing and crevices) for the Large-eared Pied Bat (*Chalinolobus dwyeri*) and other cave-dwelling mammals.

The exotic grassland in the study area is restricted to isolated pockets between existing roads and previously cleared land. Exotic grassland in the study area occurs on a highly modified soil profile, which has previously been scraped, resulting in the loss of any native seedbank. This has facilitated the establishment of a thick cover of exotic species, capable of self-recruitment in heavily disturbed areas. The high density and height of exotic grasses within this vegetation zone would allow for small reptiles and mammals to take refuge and forage, when moving through the study area.

There is no emergent aquatic vegetation associated with the rectangular dam, which is surrounded by a thin strip of exotic vegetation. The dam is not associated with any drainage lines, is highly modified and has been created as part of WMF activities. Local frog populations may use this dam on occasion. A number of opportunistic urban birds known to occur within the landfill including the Australian White Ibis (*Threskiornis molucca*), would use this dam regularly.

PATONGA CREEK

Data Disclaimer

Habitat resources

- Caves
- Hollow-bearing trees

Legend

- Woy Woy WMF
- Study area boundary (South cell)
- Dam boundary
- Exotic grassland
- Sydney hinterland turpentine - Apple gully forest (PCT 3621_medium condition)
- Sydney hinterland turpentine - Apple gully forest (PCT 3621_poor condition)
- Waterways

Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Central Coast Council (NSW)
South Cell at Woy Woy WMF

Vegetation mapping

Project No. **12595244**
Revision No. **0**
Date **21-Apr-23**

FIGURE 6.1

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Print date: 21 Apr 2023 - 16:51

Data source: GHD: Site Boundary (2023), Survey Data (2023). MetroMap: Imagery (Date Extracted: 28 Feb 2023; Imagery Date: 12 Sept 2022).Metromap Tile Service: . Created by: mfredle

Conservation significance

No threatened species, populations or ecological communities were recorded during the initial field survey. Patches of moderate quality PCT 3621 Sydney Hinterland Turpentine – Apple Gully Forest provide potential habitat for a suite of fauna species associated with sandstone landscapes. Given Brisbane Waters National Park is adjacent to the eastern, western and southern boundaries of the study area, threatened fauna may regularly utilise native vegetation and habitats in the study area, as part of a wider home range.

Lists of threatened biota predicted or known to occur in the locality are provided in Appendix C. The study area would provide potential habitat for the following threatened species (Table 6.1).

Table 6.1 Threatened flora and fauna with potential habitat in the study area

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat in study area
FLORA				
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Potentially suitable habitat present
Acacia bynoeana	Bynoe's Wattle	E	V	Potentially suitable habitat present
Ancistrachne maidenii		V		Potentially suitable habitat present as Sydney Hinterland Turpentine – Apple Gully Forest was recorded on site
Astrotricha crassifolia	Thick-leaf Star-hair	V	V	Potentially suitable habitat present however as this species is a shrub, it would be readily detectable year round if present
Callistemon linearifolius	Netted Bottle Brush	V		Recorded previously in western portion of site (SMEC, 2020). Potentially suitable habitat present in sandstone woodland (PCT 3621)
Darwinia glaucophylla		V		Potentially suitable habitat present
Darwinia peduncularis		V		Potentially suitable habitat present
Epacris purpurascens var. purpurascens		V		Potentially suitable habitat present
Hibbertia puberula		E		Potentially suitable habitat present
Melaleuca deanei	Deane's Paperbark	V	V	Potentially suitable habitat present
Micromyrtus blakelyi		V	V	Potentially suitable habitat present
Prostanthera junonis	Somersby Mintbush	E	E	Potentially suitable habitat present
Tetratheca glandulosa		V		Potentially suitable habitat present
FAUNA				
Burhinus grallarius	Bush Stone-curlew	E		Previously recorded in study area (DPE, 2023a). Potentially suitable habitat present in sandstone woodland
Callocephalon fimbriatum	Gang-Gang Cockatoo	V	V	Potentially suitable habitat present in sandstone woodland
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	Potentially suitable habitat present in sandstone woodland
Cercartetus nanus	Eastern Pygmy-possum	V		Previously recorded in study area (DPE, 2023a). Potentially suitable habitat present in sandstone woodland
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Potentially suitable habitat present in sandstone woodland. Nearby caves potential roosting habitat for the species.

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat in study area
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Broadly suitable foraging habitat in both sandstone woodland and exotic grassland
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		Broadly suitable foraging habitat in both sandstone woodland and exotic grassland
Glossopsitta pusilla	Little Lorikeet	V		Potentially suitable habitat present in sandstone woodland
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Previously recorded in study area (DPE, 2023a). No large stick nests recorded. No foraging habitat
Heleioporus australiacus	Giant Burrowing Frog	V	V	Non-breeding habitat present in sandstone woodland
Lathamus discolor	Swift Parrot	E	CE	Potentially suitable habitat present in sandstone woodland
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		Previously recorded in study area (Hoye, 2006). Foraging and roosting habitat present in sandstone woodland
Miniopterus australis	Little Bent-winged Bat	V		Previously recorded in study area (Hoye, 2006). Foraging habitat present in sandstone woodland with natural caves providing potential roosting habitat.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Previously recorded in study area (Hoye, 2006). Foraging habitat present in sandstone woodland. No breeding habitat present.
Myotis macropus	Southern Myotis	V		Previously recorded in study area (Hoye, 2006). Foraging and roosting habitat present in sandstone woodland
Ninox connivens	Barking Owl	V		Potentially suitable foraging habitat present in sandstone woodland. No breeding habitat present
Ninox strenua	Powerful Owl	V		Potentially suitable foraging habitat present in sandstone woodland. No breeding habitat present
Petaurus norfolcensis	Squirrel Glider	V		Potentially suitable habitat present in sandstone woodland
Phascolarctos cinereus	Koala	V	V	Potentially suitable habitat present in sandstone woodland
Pseudophryne australis	Red-crowned Toadlet	V		Previously recorded to the east of the study area (Stewart, 2006). Marginal habitat in study area given the absence of drainage lines.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Previously recorded in study area (DPE, 2023a). Foraging habitat present in sandstone woodland
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		Potentially suitable habitat present in sandstone woodland
Scoteanax rueppellii	Greater Broad-nosed Bat	V		Potentially suitable habitat present in sandstone woodland
Tyto novaehollandiae	Masked Owl	V		Potentially suitable foraging habitat present in sandstone woodland. No breeding habitat present
Varanus rosenbergi	Rosenberg's Goanna	V		Broadly suitable foraging habitat in sandstone woodland. Rocky outcropping

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat in study area
				refugia habitat present No breeding habitat (termite mounds) are present in study area)
Vespadelus troughtoni	Eastern Cave Bat	V		Previously recorded in WMF (DPE, 2023a). Foraging habitat present in sandstone woodland with natural caves providing potential roosting habitat.

Notes:
CE = Critically endangered
E = Endangered
V = Vulnerable

Biodiversity constraints assessment

Biodiversity constraints were classified into classes based on conservation significance and sensitivity to impacts arising from development. Table 6.2 presents the biodiversity constraint classes along with a description of the biodiversity features that have been used to define the classes.

The biodiversity constraints classes within the study area are mapped on Figure 6.2.

Table 6.2 Biodiversity constraint classes

Biodiversity constraints class	Description
Low	Areas of low biodiversity value comprising developed or cleared land and non-native vegetation that do not contain any habitat resources of particular value for threatened or migratory species or other native flora and fauna. Low constraint areas at the study area comprise: – Areas of previously cleared bare earth without vegetation cover – Exotic grassland – Dam The areas of bare earth and exotic grassland do not contain any habitat resources of particular value for threatened or migratory species or other native flora and fauna.
Moderate	Areas of moderate biodiversity value and conservation significance under relevant legislation, which comprises native vegetation and habitat for threatened biota. Moderate constraint areas at the study area comprise: – Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_poor condition). This vegetation is substantially modified and has no mature canopy species. The shrubs are generally immature. Due to the lack of mature trees or shrubs there would only be limited foraging resources available from this vegetation. However, if left undisturbed the foraging opportunities of this patch would increase as vegetation present matures. Due to the large patches of bare soil, the area is relatively open and would only be used by fauna species more tolerant of disturbance.
High	High biodiversity value and conservation significance under relevant legislation, which comprises native vegetation and habitat for threatened biota. High constraint areas at the study area comprise: – Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition). This vegetation contains mature trees and an intact midstorey and understory which are important habitat resources for a variety of threatened fauna species which have been recorded near the site, including Bush-stone Curlew, Grey-headed Flying-fox, Little Bent-wing Bat and Eastern Bent-wing Bat. Two hollow bearing trees are present within this vegetation zone which may provide habitat for Eastern Pygmy Possum and Squirrel Glider. The area of the PCT on the site is relatively small however it has good connectivity to extensive areas of similar native vegetation with the adjoining Brisbane Water National Park and would provide a buffer from the disturbance on site for the vegetation within the national park.

PATONGA CREEK

Data Disclaimer

Legend

- Woy Woy WMF
- Project site
- Study area boundary (South cell)
- Dam boundary

Constraints

- Low
- Moderate
- High
- Waterways

Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Central Coast Council
South Cell at Woy Woy WMF

Biodiversity constraints

Project No. **12595244**
Revision No. **0**
Date **06/04/2023**

FIGURE 6.2

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Print date: 06 Apr 2023 - 15:41

Data source: GHD: Site Boundary (2023), Survey Data (2023). MetroMap: Imagery (Date Extracted: 28 Feb 2023; Imagery Date: 12 Sept 2022).Metromap Tile Service: . Created by: pfield

The areas of native vegetation within the study area were found to have a moderate to high biodiversity constraint. All areas of moderate and high biodiversity constraint were associated with PCT 3621 Sydney Hinterland Turpentine – Apple Gully Forest. The areas of intact native vegetation and partially disturbed native vegetation with a canopy, midstorey and understorey were considered to have a high biodiversity constraint due to their potential to provide habitat for threatened fauna species. The small area of regrowing native shrubs adjoining the intact native vegetation was considered to have a moderate biodiversity constraint as it contained a range of native species that were present in the adjoining native vegetation however its disturbed condition without hollow bearing trees or mature shrubs made it less suitable as habitat for native fauna.

The areas dominated by exotic grassland areas that were cleared or hardstand and a highly modified dam were considered to have a low biodiversity constraint due to the very limited resources these areas would offer native fauna.

6.5.2 Potential impacts

As discussed in Section 3.5.2, as a result of the biodiversity constraints assessment work, early design development has investigated alternative designs with the specific aim to avoid impacts to native vegetation. The design has therefore been amended so that the project would avoid all areas of intact native vegetation mapped as Sydney Hinterland Turpentine – Apple Gully Forest (both poor and medium condition).

Figure 6.3 shows the vegetation mapping and the revised project footprint (project site).

It is noted that the revised project footprint (project site) includes an area of exotic grasses along the northern boundary of the study area that was not assessed during the site visit as it was not part of the project footprint at the time. However the species in this area are consistent with those recorded in other patches of exotic grassland in the proposal site (e.g. *Setaria sphacelata, Cyperus eragrostis, Verbena bonariensis, Bidens pilosa* and *Paspalum dilatatum*).The project site is already cleared of all native vegetation with only portions of exotic grasses and weeds present in the footprint.

While threatened bird species such as *Burhinus grallarius* (Bush Stone-curlew) has previously been recorded in the greater WMF, the project site does not comprise the preferred habitat for the Bush Stone-curlew (i.e. open woodland) and, given that there are more suitable areas of good quality habitat/areas of continuous vegetation surrounding the project site (i.e. Brisbane Water National Park), native fauna species would be unlikely to rely on the project site for foraging, roosting or denning.

The sediment basin in the project site is not considered suitable habitat for aquatic species given that it is a ‘dry’ basin, meaning that it is usually empty and, when in use, is utilised to collect sediment, potential contaminants and surface water from the greater WMF to prevent pollution of Patonga Creek, which is then discharged when full.

No other threatened entities were considered to have the potential to occur within the project site, or be impacted by the project. There is no suitable habitat for any predicted threatened fauna species associated with any of the existing structures (i.e. the above ground storage tank [AST] and shipping containers) on the project site (refer to Figure 6.3), nor is there any suitable habitat for any threatened flora species predicted to occur.

Design development and the proposed EIS assessments for soils and water (including leachate), air quality and odour and noise and vibration would identify measures, where appprioppriate, to also ensure that the project would not result in any significant potential indirect impacts on the adjacent National Park.

6.5.3 Assessment approach

As the project is unlikely to have any significant impact on threatened species or biodiversity values, therefore a biodiversity development assessment report (BDAR) is not required. No further assessment is proposed.

PATONGA CREEK

Data Disclaimer

Vegetation type
- Exotic Grassland
- Sydney hinterland turpentine - Apple gully forest (PCT 3621_medium condition)
- Sydney hinterland turpentine - Apple gully forest (PCT 3621_poor condition)

Legend

Habitat resources
- Caves
- Hollow-bearing trees

- Woy Woy WMF
- Poposed cell footprint (South cell)
- Sediment basin
- Waterways

Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Central Coast Council
South Cell at Woy Woy WMF

Project No. **12595244**
Revision No. **0**
Date **06/04/2023**

Vegetation mapping and project site

FIGURE 6.3

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Print date: 21 Apr 2023 - 14:37

Data source: GHD: Site Boundary (2023), Survey Data (2023). MetroMap: Imagery (Date Extracted: 28 Feb 2023; Imagery Date: 12 Sept 2022).Metromap Tile Service: . Created by: mfredle

6.6 Other matters

This section provides an overview of other environmental matters for those environmental aspects that, based on existing information and description of the project, would require limited or no further assessment in the EIS.

Table 6.3 Summary of relevant information for issues other than key issues for the project

Environmental matter	Existing environment	Potential impacts	Level of assessment/ assessment approach
Waste management	The project site is located within the southern part of the existing WMF. The WMF is currently operated in accordance with EPL 6053 and the site's Landfill Management Plan (URS, 2012).	The WMF would continue to receive waste for landfilling and resource recovery. This is expected to include predominantly general household type waste and other municipal waste. Appropriate handling (including transport), identification, receipt, storage and quality control of wastes will be important to minimise potential impacts to the environment. The proposed South Cell would be operated consistent with existing landfill operations. No change to the authorised waste quantities or types (as per EPL 6053) is proposed.	The EIS will identify the types, quantities and classifications of waste expected to be received at the WMF for landfilling at the proposed South Cell. It would also describe the proposed waste management, handling (including transport, identification, receipt, stockpiling and quality control) measures.
Traffic	The roads which surround the WMF include Brisbane Water Drive, Woy Woy Road, Empire Bay Drive, Railway Street and Nagari Road. Access to the project site would be via the existing WMF access on Nagari Road, which is a local road controlled by Council that connects with Railway Street. Nagari Road is a sealed road which accommodates one travel lane in each direction and also caters for the movement of heavy vehicles.	Construction of the project would require the transport of some cell construction materials to the site by road (e.g. gravel and liner materials). There would also be some small vehicle traffic associated with the movement of construction personnel (5-10 vehicles per day). The small temporary increase in traffic associated with cell construction would be negligible compared to the existing traffic flows to and from the WMF. Existing data indicates that the key roads in proximity to the subject site operate with a good level of service, with minor delays, and have significant capacity to accommodate the construction vehicle activity associated with the Woy Woy WMF. No significant change to the current WMF operational traffic is expected as a result of the project.	The EIS will provide additional details on the proposed size of the construction workforce, forecast construction traffic volumes and a qualitative assessment of the impacts of these additional movements during construction and operation.

Environmental matter	Existing environment	Potential impacts	Level of assessment/ assessment approach
Hazards and risk	No dangerous goods or hazardous materials are stored on the project site. Only very minor quantities of dangerous goods are stored on-site at the WMF. This includes waste motor oil, discarded LPG gas bottles, batteries etc at the resource recovery area which are temporarily stored before being transported off-site for further separation and recovery/recycling. No dangerous goods or hazardous materials are currently stored in the proposed location for the South Cell. A landfill gas extraction and power generation system has been in operation at the WMF since 2007. The system was installed and is operated and maintained by LMS Energy Pty Ltd.	The project would not require the transport or storage of any additional dangerous goods or hazardous substances. Landfill gas emissions would be minimised through a combination of the leachate barrier system and the covering of wastes. In the longer-term landfill gas containment would be achieved by site capping and revegetation. The landfill gas extraction system would be extended to include the proposed South Cell in accordance with the Landfill Guidelines (NSW EPA, 2016). This would minimise the risk of explosion or fire due to landfill gas.	The EIS will include the results of a preliminary risk screening in line with State Environmental Planning Policy (Resilience and Hazards) 2021 to identify if a Preliminary Hazard Assessment is required. The EIS would also identify other general health and safety hazards and where appropriate, mitigation measures.
Bushfire	The project site is mapped as bushfire prone land containing Vegetation Category 1 as well as Vegetation Buffer. Category 1 refers to forests which are considered to create a high hazard for bush fires.	Bushfire risks associated with and from the project need to be managed and adequate fire prevention measures need to be in place to ensure that site personnel are able to access fire-fighting equipment and manage fire outbreaks.	The EIS will include a bushfire protection assessment and bushfire management plan prepared in accordance with the specifications detailed in A2.1 and A2.6 respectively of Planning for Bush Fire Protection (PBP) 2019 (NSW Rural Fire Service, 2019). The bushfire protection assessment will provide details for the ongoing management and maintenance of bushfire protection measures during the construction and operation phases of the project.
Landscape character and visual amenity	The WMF is located within a gully and oriented in a north-south direction with two parallel ridge lines forming the eastern and western boundaries. Existing development at the WMF in relation to local visual amenity includes a gatehouse and weighbridge, landfill, resource recovery area, and greenwaste sorting area. Brisbane Water National Park surrounds the project site on three sides (south, east and west). The Woy Woy STP is located to the north.	The natural ridgeline within the Brisbane Water National Park provides a visual barrier for the proposed South Cell, from the surrounding residential areas. That is, views to the project site from surrounding residences would be entirely blocked by the existing landform (ridgelines) and vegetation beyond the WMF boundary. South of the proposed project site is a section of the Great North Walk. The proposed South Cell may be visible from sections of this walk, however the majority of the project would be screened by natural vegetation from	The EIS will include a basic landscape character and visual impact assessment prepared with reference to EIA-N04 Environmental Impact Assessment Practice Note – Landscape character and visual impact assessment (Transport for NSW, 2020).

Environmental matter	Existing environment	Potential impacts	Level of assessment/ assessment approach
	The National Park consists of generally tall vegetation dominated by *Eucalyptus sp*. The closest residences to the project site, are located about 800 metres to the east on The Citadel. These residences are located at an elevation of approximately 120 m AHD, well below the ridgeline of 170 m AHD, located within Brisbane Water National Park between the project site and the residential area.	bushwalkers. In addition, the nature of the project will be visually similar to existing facilities and operations at the WMF. Therefore, the potential for visual or landscape character impacts is considered very low.	
Aboriginal heritage	The Darkinjung Local Aboriginal Land Council (LALC) are the traditional custodians of the land on which the project site is located (Darkingjung Local Aboriginal Land Council (LALC), 2020). An extensive search of the Aboriginal Heritage Information Management System in February 2023 identified 45 Aboriginal sites within one kilometre of the project site, one Aboriginal site within 200 metres and no recorded sites within 50 metres of the project site.	The project site has previously been mostly cleared and is currently being used for excavation and stockpiling of cell construction and cover material for the landfilling operations. Given the highly disturbed nature of the project site, the risk of direct impacts to items or sites of Aboriginal cultural heritage is considered low.	The EIS will include an Aboriginal Cultural Heritage Assessment prepared in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales (OEH, 2011). This will include Aboriginal community consultation in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECC, 2010).
Historic heritage	A search on the NSW State Heritage Inventory found one item listed under the NSW Heritage Act, the Woy Woy Railway Tunnel (#01835) which is located about five kilometres from the project site. The nearest item of local heritage significance is a house under Schedule 5 of the Central Coast Local Environmental Plan (LEP) 2022 which is located about 2.5 kilometres to the northeast of the project site. No other state heritage items of significance were identified within 500 metres of the project site.	The site of the proposed South Cell at the WMF has previously been mostly cleared and is currently being used for excavation and stockpiling of cell construction and cover material for the landfilling operations. Given the highly disturbed nature of the project site, the risk of direct impacts to items or sites of non-Aboriginal heritage is considered low.	The EIS will include an assessment of non-Aboriginal heritage including preparation of a Heritage Impact Statement.
Social	The project site is located within the existing WMF. The closest residential areas are about 800 metres to the east of the proposed location for the South Cell. South of the proposed project site is a section of the Great North Walk. Nearby waterways include Woy Woy Creek and Patonga Creek. Patonga Creek runs through the	The initial evaluation of social impacts (refer Appendix B for details) found there would be minor benefits and no social impacts that have the potential to occur during the construction and operation of the project. This is because the project site is located about 800 metres from the nearest residential areas and the natural ridgeline and heavy vegetation within the Brisbane Water National Park provides a physical and visual	Considering that there would be a minor social benefits and no negative social impacts, the EIS will include a basic description of the social locality and the potential socio-economic impacts and benefits of the project.

Environmental matter	Existing environment	Potential impacts	Level of assessment/ assessment approach
	Brisbane Water National Park for a little over two kilometres before it joins the Hawkesbury River.	barrier between the proposed South Cell, from the surrounding residential areas. The proposed construction and operation activities for the South Cell involve activities which have both historically and currently do occur at the WMF. For example, excavation activities are already currently occurring in the location of the proposed project site and landfilling activities occur in the active tipping area. Council has never received any amenity complaints (noise, vibration, odour, dust, traffic) from residents associated with previous cell construction or landfilling operations at the WMF. The nature and intensity of activities associated with the project would not be different or greater than those that currently occur at the WMF. Construction and operation activities associated with the project are therefore not expected to result in any noticeable change to amenity. The project would provide a social benefit as it would enable essential putrescible waste disposal capacity to continue be provided to the Central Coast community and local businesses, particularly in the lower part of the LGA. Waste drop-off facilities would continue to be made available. A small number of local and regional businesses may benefit from procurement opportunities associated with cell construction works. Some local businesses may also benefit from construction personnel spending wages at local food outlets such as nearby local cafés and bakeries as well.	

6.7 Cumulative impacts

The main issue that has potential to generate cumulative impacts is odour due to the proximity of the project site to the Woy Woy STP (more than one kilometre to the north). The EIS will therefore include a qualitative assessment of the potential for cumulative odour impacts related to the Woy Woy STP.

The leachate and soils and water assessment will also consider the wider WMF including the current and future landfill staging.

A search of the DPE Major Projects database was undertaken on 1 March 2023 but no SSD and SSI projects were identified within the vicinity of the project site that may be relevant for the EIS cumulative impact assessment.

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Appendices

Appendix A

Scoping summary table

Table A.1 Scoping summary table

Level of assessment	Matter	Cumulative impact assessment?	Engagement	Relevant government plans, policies, and guidelines	Scoping report reference
Standard	Soil and water	No	Specific	– NSW State Rivers and Estuary Policy (Riding, 1992) – NSW Aquifer Interference Policy (DPI Office of Water, 2012) – Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANSG, 2018) – NSW Water Quality and River Flow Objectives (NSW Government, 2006) – Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006a) – Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC & ARMCANZ, 2000) – Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales (NSW EPA, 2022b) – Managing Urban Stormwater: Soils and Construction (DECCW, 2008) – Environmental Guidelines Solid Waste Landfills (NSW EPA, 2016) – Groundwater assessment toolbox for major projects in NSW (DPE, 2022)	Section 6.2
Standard	Contamination	No	General	– Contaminated Land Guidelines: Consultants Reporting on Contaminated Land (NSW EPA, 2020b) – *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (amended 2013)	Section 6.2
Standard	Air quality and odour	Yes	General	– Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022a) – Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management (Institute of Air Quality Management, 2016)	Section 6.3
Standard	Noise and vibration	Yes	General	– Interim Construction Noise Guideline (ICNG) (DECC, 2009) – NSW Road Noise Policy (RNP) (DECCW, 2011) – Noise Policy for Industry (NPI) (NSW EPA, 2017) – Assessing Vibration: A Technical Guideline (DEC, 2006b) – DIN 4150-3 Structural Vibration – effects of vibration on structures (DIN, 2016) – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (Australian and New Zealand Environment Council, 1990)	Section 6.4

Level of assessment	Matter	Cumulative impact assessment?	Engagement	Relevant government plans, policies, and guidelines	Scoping report reference
Standard	Waste management	No	General	– Waste Classification Guidelines Part 1: Classifying Waste (NSW EPA, 2014) – NSW Waste and Materials Recovery Strategy 2041 (DPIE, 2021d)	Table 6.3
Standard	Traffic	No	General	– Guide to Traffic Generating Developments (RTA, 2002)	Table 6.3
Standard	Hazards and risk	No	General	– Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 – Hazardous Industry Planning Advisory Paper No. 6 'Guidelines for Hazard Analysis' (HIPAP 6) – HIPAP No. 4 'Risk Criteria for land Use Safety Planning' – ISO 31000:2018 Risk Management	Table 6.3
Standard	Bushfire	No	General	– Planning For Bushfire Protection (NSW Rural Fire Service, 2019) – Developments adjacent to National parks and Wildlife Service land. Guidelines for consent and planning authorities (NPWS, 2020)	Table 6.3
Standard	Landscape character and visual amenity	No	General	– EIA-N04 Environmental Impact Assessment Practice Note – Landscape character and visual impact assessment (Transport for NSW, 2020)	Table 6.3
Standard	Aboriginal heritage	No	Specific (with RAPs)	– Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010) – Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH, 2011) – OEH (2011) Aboriginal cultural heritage consultation requirements for proponents 2010 (OEH, 2010)	Table 6.3
Standard	Historic heritage	No	General	– Assessing Significance for Historical Archaeological Sites and 'Relics' (Heritage Branch of the Department of Planning 2009)	Table 6.3
No further assessment	Social	No	General	– Social Impact Assessment Guideline (DPIE, 2022)	Table 6.3
No further assessment	Biodiversity	No	General	– How to apply for a biodiversity development assessment report waiver for a Major Project Application (DPIE, 2019) – Biodiversity Assessment Method (DPIE, 2020)	Section 6.5

Appendix B

SIA scoping worksheet

Social Impact Assessment (SIA) Worksheet

Project name: South Cell at Woy Woy Waste Management Facility

CATEGORIES OF SOCIAL IMPACTS	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS INVESTIGATION OF IMPACT		CUMULATIVE IMPACTS		ELEMENTS OF IMPACTS - Based on preliminary investigation				
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics				
							extent i.e. number of people potentially affected?	**duration** of expected impacts? (i.e. construction vs operational phase)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?
Categories in SIA guideline	Free text	Positive Negative	Yes - this project, Yes - other project, No	Free text	Combined Cumulative Combined and Cumulative No Unknown N/A		Yes No Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown	Yes No Unknown
access	There would be a small amount of construction traffic generated from the project which can have the potential to lead to very minor delays for people travelling on Nagari Road or other nearby local roads (Railway Street, Woy Woy Road). However the expected construction traffic numbers are negligible compared to the existing traffic flows to and from the Woy Woy WMF. Existing data indicates that the key roads in proximity to the subject site operate with a good level of service, with minor delays, and have significant capacity to accommodate the construction vehicle activity associated with the Woy Woy WMF. The temporary minor increase is not expected to be discernible.	Negative	No	N/A	No	Not required	No	No	No	No	No
access	There would be no discernable change to traffic during operation on Nagari Road or other local roads in the vicinity of the project site	Negative	No	N/A	No	Not required	No	No	No	No	No
way of life	Changes to local amenity (noise, vibration, air quality and visual changes) for people located close to construction activities. Understanding of the social locality indicated that there are no residences close to the project site. It is located about 800 metres from the nearest residential areas and the natural ridgeline and heavy vegetation within the Brisbane Water National Park provides a physical and visual barrier between the proposed South Cell and the surrounding residential areas. South of the project site is a section of the Great North Walk. Nearby waterways include Woy Woy Creek and Patonga Creek. Patonga Creek, runs through the Brisbane Water National Park for a little over two kilometres before it joins the Hawkesbury River. The proposed construction activities for the South Cell involve activities which have both historically and currently do occur at the Woy Woy WMF. For example, excavation activities are already currently occurring at the project site. Council has never received any amenity complaints (noise, vibration, odour, dust, traffic) from residents associated with previous cell construction or landfilling operations at the Woy Woy WMF. The nature and intensity of activities associated with the project would not be different or greater than those that currently occur at the WMF. Construction activities associated with the project are therefore not expected to result in any noticeable change to amenity.	Negative	Yes - other project	An alternative waste technology (AWT) facility and composting facility was previously proposed at the Woy Woy WMF in the approximate location of the proposed South Cell. The EIS (prepared in 2007) assessed potential noise, vibration, air quality and visual amenity impacts associated with construction of the AWT and composting facility. The project was approved in May 2008. The construction activities associated with the South Cell project would be shorter in duration and less intense.	No	Not required	No	No	No	No	No
livelihoods	There is potential for local and regional buinesses to participate in procurement opportunities during construction, as well as for increased activity in this locality to provide stimulus to local businesses such as nearby cafes and bakeries. There are no walk-in businesses nearby the project site, however there is an assortment of local businesses 1 to 5 km away from the project site that may experience a small amount of increased patronage during construction due to the construction workforce. There would be a small increase in demand for skilled and unskilled workforce during construction of the project, which may lead to increased temporary employment opportuninties for the local and regional workforce.	Positive	No	N/A	No	Not required	No	No	No	No	No
health and wellbeing	The proposed operation of the South Cell involves activities which have both historically and currently do occur at the Woy Woy WMF. For example, waste deliveries already occur and landfilling acitivites are already currently occurring in the existing active landfill cell. Council has never received any amenity complaints (noise, vibration, odour, dust, traffic) from residents associated with previous or current landfilling operations at the Woy Woy WMF. The nature and intensity of operational activities associated with the project would not be different or greater than those that currently occur at the WMF. Best practice landfill operations that are currently used at the Woy Woy WMF would continue to be adopted for operation of the South Cell. Therefore operational activities associated with the project are not expected to result in any noticeable change to noise, vibration or air quality amenity. South of the proposed project site is a section of the Great North Walk. The proposed South Cell may be visible from sections of this walk, however the majority of the project would be screened by natural vegetation from bushwalkers. In addition, the nature of the project will be visually similar to existing facilities and operations at the Woy Woy WMF. The South Cell would not be visible from any other visual receivers. Therefore, the potential for visual or landscape character impacts is considered low.	Negative	No	N/A	No	Not required	No	No	No	No	No

CATEGORIES OF SOCIAL IMPACTS	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS INVESTIGATION OF IMPACT		CUMULATIVE IMPACTS		ELEMENTS OF IMPACTS - Based on preliminary investigation				
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row .	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics				
							extent i.e. number of people potentially affected?	**duration** of expected impacts? (i.e. construction vs operational phase)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or vulnerability of people potentially affected?	**level of concern/interest** of people potentially affected?
culture	A number of Aboriginal archaeological sites have been previously recorded wtihin the immediate region and wider Woy Woy WMF site. However the project site for the South Cell has previously been mostly cleared, highly disturbed and is currently being used for excavation and stockpiling of cell construction and cover material for the landfilling operations. Given the highly disturbed nature of the project site, the risk of direct impacts to items or sites of Aboriginal cultural heritage is considered low. Similarly, given the highly disturbed nature of the project site, the risk of direct impacts to items or sites of non-Aboriginal heritage is considered low.	Negative	Yes - other project	An alternative waste technology (AWT) facility and composting facility was previously proposed at the Woy Woy WMF in the approximate location of the proposed South Cell. The EIS (prepared in 2007) assessed heritage impacts. It concluded that it is considered highly unlikely that any archaeological artefacts remain. The project was approved in May 2008.	No	Not required	No	No	No	No	No

Social Impact A Date: 14/03/2023

CATEGORIES OF SOCIAL IMPACTS	ASSESSMENT LEVEL FOR EACH IMPACT				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact?			Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
		Secondary data	Primary Data - Consultation	Primary Data - Research		
Categories in SIA guideline	Detailed, Standard, Minor, Nothing further on this impact	Free Text			Yes No	Free Text
access	Nothing further on this impact	Not required	Not required	Not required	No	Construction traffic would be assessed in the traffic assessment for the project. The study would recommed appropriate mitigation measures which are epected to manage potential impacts.
access	Nothing further on this impact	Not required	Not required	Not required	No	Operational traffic would be assessed in the traffic assessment for the project. The study would recommed appropriate mitigation measures which are expected to manage potential impacts.
way of life	Nothing further on this impact	Not required	Not required	Not required	No	Changes to local amenity during construction are expected to be minimal, and if any, localised. They would be assessed in the EIS by studies such as noise and vibration, air quality and landscape and visual assessments. These studies are all expected to recommend appropriate mitigation measures (if required) which would assist to manage impacts to the local community's way of life. The Construction Environment Management Plan (CEMP) would include a communication management plan to manage impacts to the local community.
livelihoods	Nothing further on this impact	Not required	Not required	Not required	No	This impact will not be assessed further
health and wellbeing	Nothing further on this impact	Not required	Not required	Not required	No	Changes to local amenity during operation are expected to be minimal, and if any, would be localised. They would be assessed in the EIS by studies such as noise and vibration, air quality and odour and landscape and visual assessments. These studies are all expected to recommend appropriate mitigation measures (if required) which would assist to manage impacts to the local community's way of life. The Landfill Management Plan would be updated where appropriate.

CATEGORIES OF SOCIAL IMPACTS	ASSESSMENT LEVEL FOR EACH IMPACT				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact?			Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
		Secondary data	Primary Data - Consultation	Primary Data - Research		
culture	Nothing further on this impact	Not required	Not required	Not required	No	Aboriginal and non-Aboriginal heritage would be assessed in the EIS including consultation with Registered Aboriginal Parties. These studies are expected to recommend appropriate mitigation measures (if required).

Appendix C

Biodiversity constraints assessment

Report

22 March 2023

To	Charlotte Drury	**Contact No.**	0439 821 840
Copy to	Tristan Hinchcliffe, Stefan Botha, Andrew Pearce	**Email**	Charlotte.Drury@centralcoast.nsw.gov.au
From	Rebecca Goodenough and Malith Weerakoon	**Project No.**	12595244
Project Name	South Cell at Woy Woy Waste Management Facility		
Subject	Biodiversity Constraints Assessment		

Dear Charlotte

1. Introduction

1.1 Background

Central Coast Council (Council) is proposing to develop a new 'South Cell' at the existing Woy Woy Waste Management Facility (WMF) to optimise the remaining landfill air space at the site and ensure that the facility remains open for as long as possible to accept putrescible waste from the Local Government Area (LGA). Council has identified that the new South Cell needs to be constructed and ready for waste acceptance by mid-2024, to ensure the ongoing disposal capacity of the WMF.

The project is deemed to be State Significant Development (SSD) as it is a development for the purposes of an extension to a regional putrescible landfill that has capacity to receive more than 650,000 tonnes of putrescible waste over the life of the site and capacity to receive more than 75,000 tonnes per year of putrescible waste. The project therefore requires assessment and approval in accordance with Part 4, Division 4.7 of *the Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) for determination by the NSW Minister for Planning. An environmental impact statement (EIS) is required to be submitted as part of the application for development consent. The GHD Biodiversity team is providing specialist biodiversity survey and assessment inputs to the concept design and environmental assessment.

1.2 Key features

The project would provide critical putrescible waste landfill capacity and help ensure there is safe disposal of material generated in the lower part of the Central Coast LGA that cannot be reused, recovered or recycled. The project would include:

– Cell construction including excavation and earthworks to form the base of the cell and lining installation
– Development of associated access and stormwater and leachate management infrastructure
– Continuation of current landfilling operations in the new cell location
– Capping, closure and rehabilitation at the end of the life of the cell

1.3 Purpose of the report

The development of a new 'South Cell' at the existing WMF has the potential for direct and indirect impacts on biodiversity values within the subject site and the adjoining areas during construction and operation. The purpose of this Biodiversity Constraints Assessment is to describe the conservation value of the study area, with particular emphasis on threatened ecological communities, populations and species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and *Fisheries Management Act 1994* (FM Act), and Matters of National Environmental Significance (MNES) listed under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The specific objectives of this report are to:

– Describe and map vegetation types and condition classes across the study area and compile a flora species inventory
– Identify areas of native vegetation, species or habitat of conservation significance within the study area
– Identify areas of disturbed or cleared land with development potential within the study area
– Map ecological constraints to potential development within the study area

2. Scope and limitations

2.1 Scope of work

The study area for the project is the South Cell of the Woy Woy Waste Management Facility and associated road works required to the west and east of the cell (see Figure 1).

The biodiversity assessment conducted to date has included the following tasks:

– Review of existing information relating to the study area to identify terrestrial biodiversity values that may be affected by the project, including:
    - Results of register searches and review of threatened species profiles (DPE 2023a, 2023b; DCCEEW 2023a, 2023b) to identify threatened species, populations and ecological communities that could potentially be affected by the proposed works
– Woy Woy Waste Management Facility Development Strategy – Initial Biodiversity Constraints Assessment (SMEC 2019)
– An initial one-day site inspection on 16 February 2023 conducted by two GHD ecologists, Rebecca Goodenough and Malith Weerakoon, to ground-truth and verify vegetation mapping, habitat values and conservation significance. The site inspections included:
    - Mapping of the extent of native vegetation and identifying plant community types (PCTs), using the revised East Coast PCT classification and condition classes according to the Biodiversity Assessment Method (BAM)
    - Identification of threatened ecological communities (TECs) listed under the BC Act and/or EPBC Act
    - Terrestrial habitat assessment to assist in identifying threatened species potentially occurring at the site and the value of habitat resources present for predicted species
    - Mapping of hollow-bearing trees within the potential direct impact areas
    - Vegetation integrity plots in accordance with the BAM and random meander survey as per Cropper (1993). The random meander survey involved two ecologists walking the length of the proposal site and immediate surrounds and recording all flora species present. All areas that could be safely traversed or viewed from adjoining roads were inspected. Notes were also taken regarding the dominant canopy and understory vegetation for vegetation integrity plots and during random meander. Relative cover and abundance of species present were recorded for the vegetation integrity plots.

- Diurnal surveys for birds and reptiles and opportunistic sightings or call identification of native fauna and/or signs of fauna activity in all areas likely to be affected

– Preparation of this 'Biodiversity constraints assessment' letter report, including:
  - Background and legislative context for the biodiversity assessment
  - A high level description of the existing environment and terrestrial biodiversity values of the study area
  - Mapping of biodiversity values and constraints, including vegetation, threatened ecological communities, threatened species observations and habitat resources such as hollow-bearing trees
  - Identification of threatened biota as listed under the BC Act and the EPBC Act that could potentially be impacted by the proposed works
  - Identification and mapping of biodiversity constraints across the study area
  - Concluding statements and recommendations based on consideration of the requirements of the EP&A Act and the EPBC Act, with regard to whether a BDAR or BDAR waiver is required under the BC Act, and whether referral of the proposal for determination under the EPBC Act would be required.

2.2 Limitations

This report: has been prepared by GHD for Central Coast Council and may only be used and relied on by Central Coast Council for the purpose agreed between GHD and Central Coast Council as set out in Section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Central Coast Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

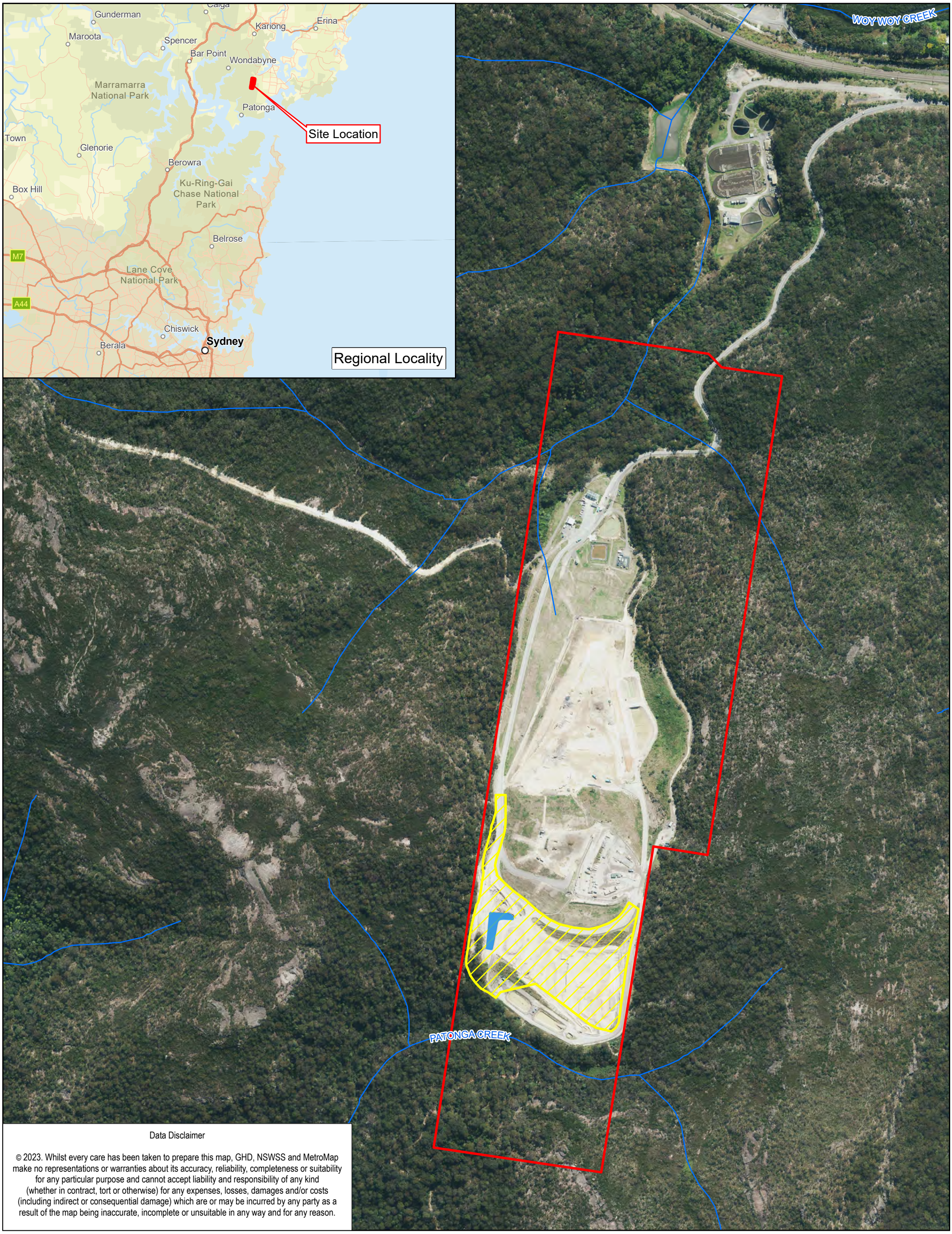
The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.



Data Disclaimer

Legend

- Woy Woy WMF
- Study area boundary (South cell)
- Dam boundary
- Waterways

Paper Size ISO A3

0 40 80 120 160

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

Central Coast Council (NSW)
Detailed Design and Documentation for South Landfill Cell at Woy Woy

Site locality

Project No. **12595244**
Revision No. **0**
Date **23/03/2023**

FIGURE 1

N:\AU\Newcastle\Projects\22\12595244\GIS\Maps\Deliverables\12595244_Biodiversity.aprx
Print date: 23 Mar 2023 - 04:53

Data source: GHD: Site Boundary (2023), Survey Data (2023). MetroMap: Imagery (Date Extracted: 28 Feb 2023; Imagery Date: 12 Sept 2022).Metromap Tile Service:
World Street Map: Esri, HERE, Garmin, Foursquare, FAO, METI/NASA, USGS. Created by: dbbanatin

3. Existing environment

3.1 Flora and vegetation zones

Vegetation zones (i.e. PCTs and broad condition classes) were mapped in accordance with the BAM. Additional non-native vegetation units were defined based on observed species composition and vegetation structure. The vegetation surveyed on site included exotic grassland, intact native vegetation and vegetation around waterbodies. The vegetation at the study area is shown on Figure 2 along with the location of hollow-bearing trees. The following vegetation units were recorded within the study area:

– **Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition)**
  - Features a mature canopy of *Eucalyptus piperita* and *Angophora costata* with *Syncarpia glomulifera* occurring occasionally. *Corymbia gummifera* was also recorded in the canopy along the cliff top. Two coppicing stumps of *Corymbia eximea* were recorded along the edge of the road, in the northern portion of the study area.
  - The native mid storey in the southern occurrence of the PCT in the south west of the study area was dominated by *Banksia serrata* and *Leptospermum polygalafolium*, with *Acacia suaveolens*. The midstorey in this location also included a moderately dense cover of ferns, with *Pteridium esculentum* and *Calochlena dubia* recorded frequently.
  - Along the top of the cliff, near the western boundary of the study area, the midstorey was dominated by prickly native shrubs, including *Daviesia ulicifolia* and *Epacris longiflora*. The PCT was recorded along the northern portion of study area, near the western boundary of the study area, and appeared to have regrown following road construction. The vegetation contained a good diversity and cover of native species including the canopy species *Angophora costata* and *Syncarpia glomulifera* and was representative of the PCT.
  - The understorey had a deep layer of leaf litter and good diversity of native species, including *Entolasia stricta*, *Lepidosperma laterale*, *Dianella caerulea* and *Hardenbergia violacea*.
  - Exotic plant cover was generally low, at less than 1 per cent in the southern portion of the native vegetation along the western boundary of the study area. The exotic species observed in the PCT in the northern portion of the study area were likely introduced when the road was constructed.
  - Was located on the steep slope on the western edge of the study area and on top of the cliff in the western edge of the study area.

– **Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_poor condition)**
  - Had no mature canopy species, with young eucalypt seedlings to approximately 30 - 40 cm tall.
  - The native mid storey is present but low in height, at approximately 30-40 cm tall. It is most likely grown from seed dropped by overhanging vegetation from the steep slope above. Species recorded included *Acacia ulicifolia*, *Leptospermum polygalafolium* and *Persoonia linearis*.
  - The understorey was dominated by exotic grasses and patches of bare soil. Species recorded included *Paspalum dilatatum*, *Taraxicum officinale*, *Conyza sumatrensis* and *Bidens pilosa*. Some native species were present including *Gonocarpus tetragynus*, *Entolasia stricta*, *Hardenbergia violacea*, *Lepidosperma laterale* and *Pteridium esculentum*.
  - Was located on the western edge of the cleared area, just south of the small rectangular dam (Figure 1), adjoining the intact native vegetation mapped as Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition)

– **Exotic grassland**
  - Had no canopy or midstorey species and the groundlayer was almost exclusively dominated by exotic grasses and herbs. The dominant species recorded was *Setaria sphacelata*, with other commonly occurring species being *Cyperus eragrostis*, *Verbena bonariensis*, *Bidens pilosa* and *Paspalum dilatatum*.
  - Was located in the northern edge of the study area, on the steep bank of the existing South Cell and around the edges of the western-most small rectangular dam (Figure 1).

- The vegetation around the edges of the small rectangular dam in the study area was dominated by the exotic species *Paspalum dilatatum* and *Cyperus eragrostis*, with the native *Persicaria hydropiper* also common. The dam had steep sloping sides approximately 1 m deep and the water was cloudy with sedimentation at the time of the site inspection.
- One small patch of the exotic grassland, in the north west of the study area was dominated by exotic grass and herbs species but had occasional native species present. Native species included *Leptospermum polygalifolium*, *Lomandra longifolia* and *Acacia ulicifolia*, however these were uncommon and had very low percentage cover.

Photo 1 *Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition) in the south west of the study areal*

Photo 2 *Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_poor condition) in the south west of the study area*

Photo 3 *Exotic grassland in the north east of the study area*

Photo 4 *Rectangular dam in the west of the study area*

3.2 Fauna and habitat resources

A low diversity of native fauna species were recorded at the study area. This could be due to the time of day the survey was conducted (throughout middle of day), where warm to high temperatures were experienced, and because of the constant noise from vehicles on site, which may deter fauna species. High biodiversity value is present in intact native vegetation surrounding the WMF. The study area comprises largely cleared areas with patches of exotic grassland on formerly cleared areas and patches of forest on its western perimeter. The study area contains the following broad habitat types for fauna:

– Dry sclerophyll forest

– Exotic grassland
– One dam

Dry sclerophyll forest in the study area directly adjoins extensive areas of intact native forests associated with Brisbane Waters National Park.

Dry sclerophyll forest in the study area contains a moderate number of habitat resources for common and threatened fauna in the locality. Habitat resources within the study area include a myrtaceous canopy and midstory with nectar, seed and fruit resources. The mature canopy includes *Syncarpia glomulifera,* a highly productive species in the blossom diet of the Grey-headed Flying-fox (*Pteropus poliocephalus*). Two hollow-bearing trees are present on the edge of the study area which may provide refuge and denning habitat for possums, microbats and birds. Hollow-bearing trees within the study area have the potential to be occupied by threatened microbat species such as the Eastern Free-tail Bat (*Mormopterus norfolkensis*) and Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) or parrots such as the Gang-gang Cockatoo (*Callocephalon fimbriatum*). The high density of hollows in the broader study area within the adjacent Brisbane Waters National Park is likely to comprise a locally significant area of roosting and nesting habitat in the locality.

The understorey of the dry sclerophyll forest within the study area has a high density of leaf litter, woody debris and fungi which would provide refuge and foraging habitat respectively for a number of guilds such as reptiles and small ground-dwelling mammals. Rocky outcropping throughout the dry sclerophyll forest would also provide suitable shelter habitat for small mammals and reptiles. A small cave is present about 30m north west of the study area contains potential roost habitat (honey-combing and crevices) for the Large-eared Pied Bat (*Chalinolobus dwyeri*) and other cave-dwelling mammals.

The exotic grassland in the study area is restricted to isolated pockets between existing roads and previously cleared land. Exotic grassland in the study area occurs on a highly modified soil profile, which has previously been scraped, resulting in the loss of any native seedbank. This has facilitated the establishment of a thick cover of exotic species, capable of self-recruitment in heavily disturbed areas. The high density and height of exotic grasses within this vegetation zone would allow for small reptiles and mammals to take refuge and forage, when moving through the study area.

There is no emergent aquatic vegetation associated with the rectangular dam, which is surrounded by a thin strip of exotic vegetation. The dam is not associated with any drainage lines, is highly modified and has been created as part of WMF activities. Local frog populations may use this dam on occasion. A number of opportunistic urban birds known to occur within the landfill including the Australian White Ibis (*Threskiornis molucca*), would use this dam regularly.

PATONGA CREEK

Data Disclaimer

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Habitat resources

- Caves
- Hollow-bearing trees

Legend

- Woy Woy WMF
- Study area boundary (South cell)
- Dam boundary
- Exotic grassland
- Sydney hinterland turpentine - Apple gully forest (PCT 3621_medium condition)
- Sydney hinterland turpentine - Apple gully forest (PCT 3621_poor condition)
- Waterways

Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

Central Coast Council (NSW)
Detailed Design and Documentation for South Landfill Cell at Woy Woy

Project No. **12595244**
Revision No. **0**
Date **23/03/2023**

Vegetation mapping

FIGURE 2

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Print date: 23 Mar 2023 - 04:52

Data source: GHD: Site Boundary (2023), Survey Data (2023). MetroMap: Imagery (Date Extracted: 28 Feb 2023; Imagery Date: 12 Sept 2022).Metromap Tile Service: . Created by: dbbanatin

4. Conservation significance

No threatened species, populations or ecological communities were recorded during the initial field survey. Patches of moderate quality PCT 3621 Sydney Hinterland Turpentine – Apple Gully Forest provide potential habitat for a suite of fauna species associated with sandstone landscapes. Given Brisbane Waters National Park is adjacent to the eastern, western and southern boundaries of the study area, threatened fauna may regularly utilise native vegetation and habitats in the study area, as part of a wider home range.

Lists of threatened biota predicted or known to occur in the locality are provided in Appendix A. The study area would provide potential habitat for the following threatened species (Table 1). Further targeted surveys would be required if any clearing of native vegetation is proposed.

Table 1 Threatened flora and fauna with potential habitat in the study area

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat in study area
FLORA				
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	Potentially suitable habitat present
Acacia bynoeana	Bynoe's Wattle	E	V	Potentially suitable habitat present
Ancistrachne maidenii		V		Potentially suitable habitat present as Sydney Hinterland Turpentine – Apple Gully Forest was recorded on site.
Astrotricha crassifolia	Thick-leaf Star-hair	V	V	Potentially suitable habitat present however as this species is a shrub, it would be readily detectable year round if present.
Callistemon linearifolius	Netted Bottle Brush	V		Recorded previously in western portion of site(SMEC 2019). Potentially suitable habitat present in sandstone woodland (PCT 3621) .
Darwinia glaucophylla		V		Potentially suitable habitat present.
Darwinia peduncularis		V		Potentially suitable habitat present.
Epacris purpurascens var. purpurascens		V		Potentially suitable habitat present.
Hibbertia puberula		E		Potentially suitable habitat present.
Melaleuca deanei	Deane's Paperbark	V	V	Potentially suitable habitat present.
Micromyrtus blakelyi		V	V	Potentially suitable habitat present.
Prostanthera junonis	Somersby Mintbush	E	E	Potentially suitable habitat present.
Tetratheca glandulosa		V		Potentially suitable habitat present.
FAUNA				

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat in study area
Burhinus grallarius	Bush Stone-curlew	E		Previously recorded in study area (DPE 2023a). Potentially suitable habitat present in sandstone woodland
Callocephalon fimbriatum	Gang-Gang Cockatoo	V	V	Potentially suitable habitat present in sandstone woodland
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	Potentially suitable habitat present in sandstone woodland
Cercartetus nanus	Eastern Pygmy-possum	V		Previously recorded in study area (DPE 2023a). Potentially suitable habitat present in sandstone woodland
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Potentially suitable habitat present in sandstone woodland. Nearby caves potential roosting habitat for the species.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Broadly suitable foraging habitat in both sandstone woodland and exotic grassland
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		Broadly suitable foraging habitat in both sandstone woodland and exotic grassland
Glossopsitta pusilla	Little Lorikeet	V		Potentially suitable habitat present in sandstone woodland
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Previously recorded in study area (DPE 2023a). No large stick nests recorded. No foraging habitat
Heleioporus australiacus	Giant Burrowing Frog	V	V	Non-breeding habitat present in sandstone woodland
Lathamus discolor	Swift Parrot	E	CE	Potentially suitable habitat present in sandstone woodland
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		Previously recorded in study area (Hoye 2006). Foraging and roosting habitat present in sandstone woodland
Miniopterus australis	Little Bent-winged Bat	V		Previously recorded in study area (Hoye 2006). Foraging habitat present in sandstone woodland with natural caves providing potential roosting habitat.
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		Previously recorded in study area (Hoye 2006). Foraging habitat present in sandstone woodland. No breeding habitat present.

Scientific name	Common name	BC Act Status	EPBC Act Status	Habitat in study area
Myotis macropus	Southern Myotis	V		Previously recorded in study area (Hoye 2006). Foraging and roosting habitat present in sandstone woodland
Ninox connivens	Barking Owl	V		Potentially suitable foraging habitat present in sandstone woodland. No breeding habitat present
Ninox strenua	Powerful Owl	V		Potentially suitable foraging habitat present in sandstone woodland. No breeding habitat present
Petaurus norfolcensis	Squirrel Glider	V		Potentially suitable habitat present in sandstone woodland.
Phascolarctos cinereus	Koala	V	V	Potentially suitable habitat present in sandstone woodland.
Pseudophryne australis	Red-crowned Toadlet	V		Previously recorded to the east of the study area (Molino Stewart 2006). Marginal habitat in study area given the absence of drainage lines.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Previously recorded in study area (DPE 2023a). Foraging habitat present in sandstone woodland
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		Potentially suitable habitat present in sandstone woodland
Scoteanax rueppellii	Greater Broad-nosed Bat	V		Potentially suitable habitat present in sandstone woodland
Tyto novaehollandiae	Masked Owl	V		Potentially suitable foraging habitat present in sandstone woodland. No breeding habitat present
Varanus rosenbergi	Rosenberg's Goanna	V		Broadly suitable foraging habitat in sandstone woodland. Rocky outcropping refugia habitat present No breeding habitat (termite mounds) are present in study area)
Vespadelus troughtoni	Eastern Cave Bat	V		Previously recorded in WMF (DPE 2023a). Foraging habitat present in sandstone woodland with natural caves providing potential roosting habitat.

5. Biodiversity constraints assessment

Biodiversity constraints were classified into classes based on conservation significance and sensitivity to impacts arising from development. Table 2 presents biodiversity constraint classes along with a description of the biodiversity features that have been used to define the classes and a summary of the implications for the assessment and approval of a future development at the site. Biodiversity constraints are mapped on Figure 3.

Table 2 ***Biodiversity constraint classes***

Biodiversity constraints class	Description	Implications for assessment and approval of a development
Low	Areas of low biodiversity value comprising developed or cleared land and non-native vegetation that do not contain any habitat resources of particular value for threatened or migratory species or other native flora and fauna. Low constraint areas at the study area comprise: – Areas of previously cleared bare earth without vegetation cover – Exotic grassland – Dam The areas of bare earth and exotic grassland at the site do not contain any habitat resources of particular value for threatened or migratory species or other native flora and fauna.	Development activities should be concentrated in these areas where possible. Development activities could occur in these areas subject to appropriate environmental impact assessment under relevant approval processes. These areas may contain some limited habitat resources for threatened biota however removal of these resources would not comprise a significant impact on any threatened biota. Potential impacts in these areas would not require provision of biodiversity offsets. If all works are completed in areas of low biodiversity constraint, it may be appropriate to apply for a BDAR waiver.
Moderate	Areas of moderate biodiversity value and conservation significance under relevant legislation, which comprises native vegetation and habitat for threatened biota. Moderate constraint areas at the study area comprise: – Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_poor condition). This vegetation is substantially modified and has no mature canopy species. The shrubs are generally immature. Due to the lack of mature trees or shrubs there would only be limited foraging resources available from this vegetation. However, if left undisturbed the foraging opportunities of this patch would increase as vegetation present matures. Due to the large patches of bare soil, the area is relatively open and would only be used by fauna species more tolerant of disturbance.	Development activities should aim to avoid or minimise impacts to these areas where possible. Development activities may occur in these areas subject to appropriate environmental impact assessment under relevant approval processes. Detailed biodiversity assessment would be required, including: – Appropriate measures to avoid and mitigate impacts – Assessment of significance of impacts on MNES and the requirement for offsets in accordance with the EPBC Act and associated guidelines as required. – Assessment of significance of biodiversity impacts and the requirement for offsets pursuant to the NSW EPA Act, BC Act and Biodiversity Offset Scheme. If works are completed in areas of moderate biodiversity constraint, it is unlikely an application for a BDAR waiver would be successful.
High	High biodiversity value and conservation significance under relevant legislation, which comprises native vegetation and habitat for threatened biota. High constraint areas at the study area comprise: – Sydney Hinterland Turpentine – Apple Gully Forest (PCT 3621_medium condition). This vegetation contains mature trees and an intact midstorey and understory which are important habitat resources for a variety of threatened fauna species which have been recorded near the site, including Bush-stone Curlew, Grey-headed Flying-fox, Little Bent-wing Bat and Eastern Bent-wing Bat. Two hollow bearing trees are present within this vegetation zone which may provide habitat for Eastern Pygmy Possum and Squirrel Glider. The area of the PCT on the site is relatively small however it has good connectivity to	Development activities should aim to avoid impacts to these areas. Development activities could occur in these areas subject to appropriate environmental impact assessment under relevant approval processes. Detailed biodiversity assessment would be required, including: – Appropriate measures to avoid and mitigate impacts – Assessment of significance of impacts on MNES and the requirement for offsets in accordance with the EPBC Act and associated guidelines as required

Biodiversity constraints class	Description	Implications for assessment and approval of a development
	extensive areas of similar native vegetation with the adjoining Brisbane Water National Park and would provide a buffer from the disturbance on site for the vegetation within the national park.	– Assessment of significance of biodiversity impacts and the requirement for offsets pursuant to the NSW EPA Act, BC Act and Biodiversity Offset Scheme. If works are completed in areas of high biodiversity constraint, it is unlikely an application for a BDAR waiver would be successful. GHD recommends that a BDAR be completed for any works in areas of high biodiversity constraint.

PATONGA CREEK

Data Disclaimer

Legend

- Woy Woy WMF
- Study area boundary (South cell)
- Dam boundary
- Waterways

Constraints

- Low
- Moderate
- High

Paper Size ISO A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

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Central Coast Council (NSW)
Detailed Design and Documentation for South Landfill Cell at Woy Woy

Project No. **12595244**
Revision No. **0**
Date **23/03/2023**

Biodiversity constraints

FIGURE 3

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Print date: 23 Mar 2023 - 20:08

Data source: GHD: Site Boundary (2023), Survey Data (2023). MetroMap: Imagery (Date Extracted: 28 Feb 2023; Imagery Date: 12 Sept 2022).Metromap Tile Service: . Created by: dbbanatin

6. Recommendations and conclusions

The areas of native vegetation within the study area of the Woy Woy Waste Management Facility were found to have a moderate to high biodiversity constraint. All areas of moderate and high biodiversity constraint were associated with PCT 3621 Sydney Hinterland Turpentine – Apple Gully Forest. The areas of intact native vegetation and partially disturbed native vegetation with a canopy, midstorey and understorey were considered to have a high biodiversity constraint due to their potential to provide habitat for threatened fauna species. The small area of regrowing native shrubs adjoining the intact native vegetation was considered to have a moderate biodiversity constraint as it contained a range of native species that were present in the adjoining native vegetation however its disturbed condition without hollow bearing trees or mature shrubs made it less suitable as habitat for native fauna.

The areas dominated by exotic grassland areas that were cleared or hardstand and a highly modified dam were considered to have a low biodiversity constraint due to the very limited resources these areas would offer native fauna.

If all works are to be completed in areas of low biodiversity constraint, it may be appropriate for the proponent to apply for a BDAR waiver, as the project is unlikely to have a significant impact on any biodiversity values.

If works are to be undertaken in areas of intact native vegetation mapped as PCT 3621 Sydney Hinterland Turpentine – Apple Gully Forest (medium condition), a BDAR would need to be prepared and it is likely that biodiversity offset for residual impacts resulting from the project would be required in accordance with the BAM. Further assessment of this area of vegetation would determine whether a referral for determination under the EPBC Act was required.

If works are completed in the area of PCT 3621 Sydney Hinterland Turpentine – Apple Gully Forest (poor condition), which consisted of regrowth of native shrubs and trees, an application for a BDAR waiver is unlikely to be successful. It is recommended that a BDAR be prepared, if any works are completed in this portion of the study area. Detailed assessment of vegetation in this portion of the study area in accordance with the BAM, would determine the vegetation integrity score for this vegetation zone, and whether any ecosystem credits for residual impacts on this vegetation zone would be required. Species credits, for impacts on threatened species that are associated with this vegetation zone may still be required, even if ecosystem credits are not. It is considered unlikely that the area of poor condition Sydney Hinterland Turpentine – Apple Gully Forest would require referral for determination under the EPBC Act.

Consideration of potential indirect or prescribed impacts on the adjacent National Park would also be required, and may influence the decision to apply for a BDAR waiver, or to complete a BDAR.

It is recommended that all of the areas of intact native vegetation mapped as Sydney Hinterland Turpentine – Apple Gully Forest (poor and medium condition) should be avoided where possible, in accordance with the offsetting principles of avoid, minimise, offset.

7. References

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Attachments

Attachment 1

Bionet Atlas records of threatened biota within 10 km of the study area

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.40 West: 151.21 East: 151.37 South: -33.59] recorded since 08 Mar 2003 until 08 Mar 2023 returned a total of 5,539 records of 91 species.
Report generated on 8/03/2023 4:52 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3116	*Pseudophryne australis*		Red-crowned Toadlet	V,P		119	
Animalia	Amphibia	Limnodynastidae	3042	*Heleioporus australiacus*		Giant Burrowing Frog	V,P	V	50	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	5	
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	3	
Animalia	Reptilia	Cheloniidae	2007	*Chelonia mydas*		Green Turtle	V,P	V	15	
Animalia	Reptilia	Cheloniidae	2008	*Eretmochelys imbricata*		Hawksbill Turtle	P	V	4	
Animalia	Reptilia	Dermochelyidae	2013	*Dermochelys coriacea*		Leatherback Turtle	E1,P	E	3	
Animalia	Reptilia	Varanidae	2287	*Varanus rosenbergi*		Rosenberg's Goanna	V,P		3	
Animalia	Aves	Anatidae	0200	*Nettapus coromandelianus*		Cotton Pygmy-Goose	E1,P		1	
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*		Wompoo Fruit-Dove	V,P		1	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	19	
Animalia	Aves	Diomedeidae	0086	*Diomedea exulans*		Wandering Albatross	E1,P	E	1	
Animalia	Aves	Procellariidae	0929	*Macronectes giganteus*		Southern Giant Petrel	E1,P	E	1	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		2	
Animalia	Aves	Accipitridae	0218	*Circus assimilis*		Spotted Harrier	V,P		1	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		128	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		4	
Animalia	Aves	Accipitridae	0230	*Lophoictinia isura*		Square-tailed Kite	V,P,3		7	
Animalia	Aves	Accipitridae	8739	*Pandion cristatus*		Eastern Osprey	V,P,3		76	
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*		Bush Stone-curlew	E1,P		491	
Animalia	Aves	Haematopodidae	0131	*Haematopus fuliginosus*		Sooty Oystercatcher	V,P		5	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*		Pied Oystercatcher	E1,P		146	
Animalia	Aves	Charadriidae	0141	*Charadrius leschenaultii*		Greater Sand-plover	V,P	V,C,J,K	1	
Animalia	Aves	Scolopacidae	0164	*Calidris canutus*		Red Knot	P	E,C,J,K	1	
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*		Curlew Sandpiper	E1,P	CE,C,J,K	1	
Animalia	Aves	Scolopacidae	0152	*Limosa limosa*		Black-tailed Godwit	V,P	C,J,K	1	
Animalia	Aves	Scolopacidae	0149	*Numenius madagascariensis*		Eastern Curlew	P	CE,C,J,K	99	
Animalia	Aves	Scolopacidae	0160	*Xenus cinereus*		Terek Sandpiper	V,P	C,J,K	1	
Animalia	Aves	Turnicidae	0013	*Turnix maculosus*		Red-backed Button-quail	V,P		2	
Animalia	Aves	Laridae	0117	*Sternula albifrons*		Little Tern	E1,P	C,J,K	3	
Animalia	Aves	Cacatuidae	0268	*Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3	E	1	
Animalia	Aves	Cacatuidae	0265	*^^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2	V	106	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		15	
Animalia	Aves	Psittacidae	0309	*Lathamus discolor*		Swift Parrot	E1,P	CE	15	
Animalia	Aves	Psittacidae	0302	*Neophema pulchella*		Turquoise Parrot	V,P,3		1	
Animalia	Aves	Strigidae	0246	*Ninox connivens*		Barking Owl	V,P,3		36	
Animalia	Aves	Strigidae	0248	*Ninox strenua*		Powerful Owl	V,P,3		230	
Animalia	Aves	Tytonidae	0250	*Tyto novaehollandiae*		Masked Owl	V,P,3		11	
Animalia	Aves	Tytonidae	9924	*Tyto tenebricosa*		Sooty Owl	V,P,3		8	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	2	
Animalia	Aves	Pomatostomidae	8388	*Pomatostomus temporalis temporalis*		Grey-crowned Babbler (eastern subspecies)	V,P		1	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		13	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		11	
Animalia	Aves	Petroicidae	0380	*Petroica boodang*		Scarlet Robin	V,P		2	
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*		Spotted-tailed Quoll	V,P	E	58	
Animalia	Mammalia	Peramelidae	1710	*Isoodon obesulus obesulus*		Southern Brown Bandicoot (eastern)	E1,P	E	8	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*		Koala	E1,P	E	24	
Animalia	Mammalia	Burramyidae	1150	*Cercartetus nanus*		Eastern Pygmy-possum	V,P		46	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*		Yellow-bellied Glider	V,P	V	1	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*		Squirrel Glider	V,P		1	
Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*		Southern Greater Glider	E1,P	E	3	
Animalia	Mammalia	Macropodidae	1245	*Macropus parma*		Parma Wallaby	V,P		2	

Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	132	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		5	
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P		27	
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	7	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		12	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		20	
Animalia	Mammalia	Vespertilionidae	1369	*Phoniscus papuensis*	Golden-tipped Bat	V,P		1	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		24	
Animalia	Mammalia	Vespertilionidae	1025	*Vespadelus troughtoni*	Eastern Cave Bat	V,P		5	
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		52	
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		49	
Animalia	Mammalia	Muridae	1466	*Pseudomys gracilicaudatus*	Eastern Chestnut Mouse	V,P		2	
Animalia	Mammalia	Muridae	1455	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	1	
Animalia	Mammalia	Otariidae	1543	*Arctocephalus forsteri*	New Zealand Fur-seal	V,P		2	
Animalia	Mammalia	Otariidae	1882	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V,P		2	
Animalia	Mammalia	Balaenidae	1561	*Eubalaena australis*	Southern Right Whale	E1,P	E	1	
Animalia	Insecta	Petaluridae	I007	*Petalura gigantea*	Giant Dragonfly	E1		4	
Plantae	Flora	Araliaceae	1200	*Astrotricha crassifolia*	Thick-leaf Star-hair	V	V	57	
Plantae	Flora	Dilleniaceae	2544	*Hibbertia procumbens*	Spreading Guinea Flower	E1		1734	
Plantae	Flora	Dilleniaceae	11422	*Hibbertia puberula*		E1		1	
Plantae	Flora	Elaeocarpaceae	6205	*Tetratheca glandulosa*		V		3	
Plantae	Flora	Ericaceae	7752	*Epacris purpurascens var. purpurascens*		V		2	
Plantae	Flora	Fabaceae (Mimosoideae)	3728	*Acacia bynoeana*	Bynoe's Wattle	E1	V	1	
Plantae	Flora	Lamiaceae	9885	*Prostanthera askania*	Tranquility Mintbush	E1	E	1	
Plantae	Flora	Lamiaceae	9884	*Prostanthera junonis*	Somersby Mintbush	E1	E	202	
Plantae	Flora	Myrtaceae	4007	*Callistemon linearifolius*	Netted Bottle Brush	V,3		73	
Plantae	Flora	Myrtaceae	4028	*Darwinia glaucophylla*		V		730	
Plantae	Flora	Myrtaceae	4031	*Darwinia peduncularis*		V		1	
Plantae	Flora	Myrtaceae	4067	*Eucalyptus camfieldii*	Camfield's Stringybark	V	V	7	
Plantae	Flora	Myrtaceae	6809	*Melaleuca biconvexa*	Biconvex Paperbark	V	V	49	
Plantae	Flora	Myrtaceae	4248	*Melaleuca deanei*	Deane's Paperbark	V	V	3	
Plantae	Flora	Myrtaceae	4271	*Micromyrtus blakelyi*		V	V	1	
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE	28	
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*	Native Guava	E4A	CE	1	
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	12	
Plantae	Flora	Orchidaceae	4415	*^^Cryptostylis hunteriana*	Leafless Tongue Orchid	V,P,2	V	1	
Plantae	Flora	Poaceae	4746	*Ancistrachne maidenii*		V		2	
Plantae	Flora	Proteaceae	5400	*Grevillea shiressii*		V	V	493	
Plantae	Flora	Restionaceae	10608	*Baloskion longipes*	Dense Cord-rush	V	V	2	

Attachment 2

PMST records of threatened biota within 10 km of the study area

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-Mar-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	1
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	110
Listed Migratory Species:	70

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	16
Commonwealth Heritage Places:	None
Listed Marine Species:	92
Whales and Other Cetaceans:	13
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	13
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	6
Key Ecological Features (Marine):	None
Biologically Important Areas:	5
Bioregional Assessments:	2
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

National Heritage Places [Resource Information]

Name	State	Legal Status	Buffer Status
Natural			
Ku-ring-gai Chase National Park, Lion, Long and Spectacle Island Nature Reserves	NSW	Listed place	In buffer area only

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area	In feature area
Coastal Upland Swamps in the Sydney Basin Bioregion	Endangered	Community likely to occur within area	In feature area
Eastern Suburbs Banksia Scrub of the Sydney Region	Critically Endangered	Community may occur within area	In buffer area only
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered	Community likely to occur within area	In buffer area only
Posidonia australis seagrass meadows of the Manning-Hawkesbury ecoregion	Endangered	Community likely to occur within area	In buffer area only
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat known to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat known to occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area	In buffer area only
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In buffer area only
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita			
Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini			
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
FISH			
Epinephelus daemelii			
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Hippocampus whitei			
White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Macquaria australasica			
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Prototroctes maraena			
Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Seriolella brama			
Blue Warehou [69374]	Conservation Dependent	Species or species habitat known to occur within area	In buffer area only
Thunnus maccoyii			
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
FROG			
Heleioporus australiacus			
Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria aurea			
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area	In feature area
Litoria littlejohni			
Littlejohn's Tree Frog, Heath Frog [64733]	Endangered	Species or species habitat may occur within area	In buffer area only
Mixophyes balbus			
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Mixophyes iteratus			
Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat known to occur within area	In feature area
MAMMAL			
Balaenoptera musculus			
Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eubalaena australis			
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Isoodon obesulus obesulus			
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat known to occur within area	In buffer area only
Notamacropus parma			
Parma Wallaby [89289]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus			
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
OTHER			
Dendronephthya australis			
Cauliflower Soft Coral [90325]	Endangered	Species or species habitat may occur within area	In buffer area only
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area	In feature area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Acacia terminalis subsp. terminalis MS Sunshine Wattle (Sydney region) [88882]	Endangered	Species or species habitat known to occur within area	In feature area
Asterolasia elegans [56780]	Endangered	Species or species habitat likely to occur within area	In feature area
Astrotricha crassifolia Thick-leaf Star-hair [10352]	Vulnerable	Species or species habitat known to occur within area	In feature area
Baloskion longipes Dense Cord-rush [68511]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In feature area
Darwinia biflora [14619]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diuris praecox Newcastle Doubletail [55086]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat known to occur within area	In feature area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat likely to occur within area	In feature area
Grevillea shiressii [19186]	Vulnerable	Species or species habitat known to occur within area	In feature area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area	In feature area
Haloragodendron lucasii Hal [6480]	Endangered	Species or species habitat may occur within area	In buffer area only
Kunzea rupestris [8798]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Lasiopetalum joyceae [20311]	Vulnerable	Species or species habitat known to occur within area	In feature area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area	In feature area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat known to occur within area	In feature area
Micromyrtus blakelyi [6870]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat known to occur within area	In feature area
Persoonia mollis subsp. maxima [56075]	Endangered	Species or species habitat may occur within area	In buffer area only
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prostanthera askania Tranquillity Mintbush, Tranquility Mintbush [64958]	Endangered	Species or species habitat known to occur within area	In buffer area only
Prostanthera densa Villous Mintbush [12233]	Vulnerable	Species or species habitat may occur within area	In feature area
Prostanthera junonis Somersby Mintbush [64960]	Endangered	Species or species habitat known to occur within area	In feature area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thesium australe](#) Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Hoplocephalus bungaroides](#) Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
SHARK			
[Carcharias taurus (east coast population)](#) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area	In buffer area only
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Galeorhinus galeus](#) School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
SNAIL			
Meridolum maryae Maroubra Woodland Snail, Maroubra Land Snail [89884]	Endangered	Species or species habitat known to occur within area	In buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Ardenna grisea Sooty Shearwater [82651]		Breeding known to occur within area	In buffer area only
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In buffer area only
Ardenna tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In buffer area only
[Carcharhinus longimanus](#) Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In buffer area only
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Dugong dugon](#) Dugong [28]		Species or species habitat may occur within area	In buffer area only
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Eubalaena australis as Balaena glacialis australis](#) Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Lagenorhynchus obscurus](#) Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area	In buffer area only
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
[Mobula alfredi as Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
[Mobula birostris as Manta birostris](#) Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
[Cuculus optatus](#) Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Charadrius bicinctus](#) Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
[Gallinago megala](#) Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Gallinago stenura](#) Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Numenius minutus](#) Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Numenius phaeopus](#) Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In feature area
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Tringa brevipes](#) Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Australian Postal Corporation		
Commonwealth Land - Australian Postal Commission [11776]	NSW	In buffer area only
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [11827]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11829]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11830]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [14404]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11763]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11761]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [16081]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [16092]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [11762]	NSW	In buffer area only
Defence		
Commonwealth Land - Defence Service Homes Corporation [15946]	NSW	In buffer area only
Defence - TS HAWKESBURY [10054]	NSW	In buffer area only
Defence - Defence Housing Authority		

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Director of War Service Homes [11828]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [16556]	NSW	In buffer area only
Commonwealth Land - Director of War Service Homes [11764]	NSW	In buffer area only
Unknown		
Commonwealth Land - [15941]	NSW	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Breeding known to occur within area	In buffer area only
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In buffer area only
Ardenna tenuirostris as Puffinus tenuirostris Short-tailed Shearwater [82652]		Breeding known to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area	In buffer area only
Charadrius bicinctus Double-banded Plover [895]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Eudyptula minor Little Penguin [1085]		Breeding known to occur within area	In buffer area only
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat may occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In buffer area only
Gallinago stenura Pin-tailed Snipe [841]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In buffer area only
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Foraging, feeding or related behaviour known to occur within area overfly marine area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Numenius minutus](#) Little Curlew, Little Whimbrel [848]		Foraging, feeding or related behaviour likely to occur within area overfly marine area	In buffer area only
[Numenius phaeopus](#) Whimbrel [849]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat known to occur within area	In buffer area only
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In feature area
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Stercorarius skua as Catharacta skua](#) Great Skua [823]		Species or species habitat may occur within area	In buffer area only
[Sternula albifrons as Sterna albifrons](#) Little Tern [82849]		Species or species habitat may occur within area	In buffer area only
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche bulleri platei as Thalassarche sp. nov.](#) Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche eremita](#) Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Tringa brevipes as Heteroscelus brevipes](#) Grey-tailed Tattler [851]		Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Fish			
[Acentronura tentaculata](#) Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area	In buffer area only
[Festucalex cinctus](#) Girdled Pipefish [66214]		Species or species habitat may occur within area	In buffer area only
[Filicampus tigris](#) Tiger Pipefish [66217]		Species or species habitat may occur within area	In buffer area only
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In buffer area only
[Hippichthys penicillus](#) Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area	In buffer area only
[Hippocampus abdominalis](#) Big-belly Seahorse, Eastern Potbelly Seahorse, New Zealand Potbelly Seahorse [66233]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area	In buffer area only
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In buffer area only
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In buffer area only
Notiocampus ruber Red Pipefish [66265]		Species or species habitat may occur within area	In buffer area only
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In buffer area only
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area	In buffer area only
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area	In buffer area only
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area	In buffer area only
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In buffer area only
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In buffer area only
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In buffer area only
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In buffer area only
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area	In buffer area only
Dugong dugon Dugong [28]		Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Pelamis platurus](#) Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
[Balaenoptera acutorostrata](#) Minke Whale [33]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera edeni](#) Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat may occur within area	In buffer area only
[Caperea marginata](#) Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In buffer area only
[Delphinus delphis](#) Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In buffer area only
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area	In buffer area only
[Grampus griseus](#) Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In buffer area only

Current Scientific Name	Status	Type of Presence	Buffer Status
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In buffer area only
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In buffer area only
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In buffer area only
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In buffer area only
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Barrenjoey	Aquatic Reserve	NSW	In buffer area only
Bouddi	National Park	NSW	In buffer area only
Brisbane Water	National Park	NSW	In feature area
Cockle Bay	Nature Reserve	NSW	In buffer area only
Ku-ring-gai Chase	National Park	NSW	In buffer area only
Lion Island	Nature Reserve	NSW	In buffer area only
Long Island	Nature Reserve	NSW	In buffer area only
Muogamarra	Nature Reserve	NSW	In buffer area only
Pelican Island	Nature Reserve	NSW	In buffer area only
Popran	National Park	NSW	In buffer area only

Protected Area Name	Reserve Type	State	Buffer Status
Rileys Island	Nature Reserve	NSW	In buffer area only
Saratoga Island	Nature Reserve	NSW	In buffer area only
Spectacle Island	Nature Reserve	NSW	In buffer area only

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

Nationally Important Wetlands [Resource Information]

Wetland Name	State	Buffer Status
Brisbane Water Estuary	NSW	In buffer area only

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Vegetation Clearing North Pearl Estate section of Kahibah Creek	2003/997	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Currawong Beach residential development adjoining Ku-ring-gai Chase National Par	2008/3988	Not Controlled Action	Completed	In buffer area only
Demolition of Ablutions Block, Snapper Island, NSW	2018/8303	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Somersby Industrial Estate, Stage 1	2002/548	Not Controlled Action	Completed	In buffer area only
Referral decision				
Breeding program for Grey Nurse Sharks	2007/3245	Referral Decision	Completed	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Dolphins			
Tursiops aduncus			
Indo-Pacific/Spotted Bottlenose Dolphin [68418]	Breeding	Likely to occur	In buffer area only
Seabirds			
Ardenna pacifica			
Wedge-tailed Shearwater [84292]	Foraging	Likely to occur	In buffer area only

Scientific Name	Behaviour	Presence	Buffer Status
Ardenna tenuirostris Short-tailed Shearwater [82652]	Foraging	Likely to occur	In buffer area only
Sharks			
Carcharias taurus Grey Nurse Shark [64469]	Foraging	Known to occur	In buffer area only
Whales			
Megaptera novaeangliae Humpback Whale [38]	Foraging	Known to occur	In buffer area only

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status
Hunter	Northern Sydney Basin	BA website	In feature area
Sydney	Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
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-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

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Please feel free to provide feedback via the Contact us page.

Department of Climate Change, Energy, the Environment and Water
GPO Box 3090
Canberra ACT 2601 Australia
+61 2 6274 1111

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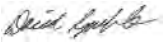
S4	0	R Goodenough M Weerakoon	K Chesnut		D Gamble		22/3/23

GHD Pty Ltd | ABN 39 008 488 373

GHD Tower, Level 3, 24 Honeysuckle Drive

Newcastle, New South Wales 2300, Australia

T 61-2-4979 9999 | **F** 61-2-4979 9988 | **E** ntlmail@ghd.com | **ghd.com**

Appendix B

Likelihood of occurrence of threatened flora and fauna

Table B.1 Likelihood of occurrence of threatened flora

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Acacia bynoeana	Bynoe's Wattle	E	V	BioNet (1 Record) and EPBC PMST	Endemic to central eastern NSW, known a limited number of locations, often comprising populations of few plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches. Flowers September to March, and fruit matures in November.	Unlikely - no suitable habitat in the project site	Nil
Acacia pubescens	Downy Wattle		V	EPBC PMST	Occurs mainly in Bankstown-Fairfield-Rookwood and Pitt Town areas, with outliers at Barden Ridge, Oakdale and Mountain Lagoon. Grows on alluviums, shales and shale/sandstone intergrades. Soils characteristically gravely, often with ironstone. Occurs in open woodland and forest, in communities including Cooks River/ Castlereagh Ironbark Forest, Shale/ Gravel Transition Forest and Cumberland Plain Woodland. Flowers from August to October.	Unlikely - no suitable habitat in the project site	Nil
Acacia terminalis subsp. terminalis MS	Sunshine Wattle		E	EPBC PMST	Occurs in near-coastal areas from northern shores of Sydney Harbour south to the northern and western shores of Botany Bay. Grows in scrub and open eucalypt woodland or forest. The species is known to occur on sandy soil on creek banks, hillslopes of in shallow soil in rock crevices and sandstone platforms on cliffs. Flowers in autumn through to early winter.	Unlikely - no suitable habitat in the project site	Nil
Ancistrachne maidenii	-	V		BioNet (2 Records)	Restricted to two disjunct areas: northern Sydney (St Albans, Mt White, Maroota and Berowra areas) and in the Shannon Creek area near Grafton, with only 7 known populations. Occurs in dry sclerophyll forest on sandstone derived soils at the transition between Hawkesbury and Watagan soil landscapes. Flowers in Summer.	Unlikely - no suitable habitat in the project site	Nil
Asterolasia elegans	-		E	EPBC PMST	Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby LGAs, may also occur in the western part of Gosford LGA with seven known populations. Occurs on Hawkesbury sandstone, commonly amongst rocky outcrops and boulders in sheltered forests on mid- to lower slopes and valleys.	Unlikely - no suitable habitat in the project site	Nil
Astrotricha crassifolia	Thick-leaf Star-hair	V	V	BioNet (57 Records) and EPBC PMST	Occurs near Patonga (Gosford LGA), and in Royal NP and on the Woronora Plateau (Sutherland and Campbelltown LGAs). There is also a record from near	Unlikely - no suitable habitat in the project site	Nil

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
					Glen Davis (Lithgow LGA). Grows on dry ridgetops to 300 m altitude, associated with very rich heath, or dry sclerophyll woodland on sandstone. Flowers in spring		
Baloskion longipes	Dense Cord-rush	V	V	BioNet (2 Records) and EPBC PMST	Occurs in small populations between the Kanangra-Boyd area to the Southern Tablelands. Commonly found in swamps or depressions in sandy alluvium, sometimes growing with sphagnum moss. It also occurs in swales within tall forest, and in Eucalyptus aggregata woodland.	Unlikely - no suitable habitat in the project site	Nil
Caladenia tessellata	Thick-lipped Spider-orchid		V	EPBC PMST	Occurs from Central Coast NSW to southern Victoria. Mostly coastal but extends inland to Braidwood in southern NSW. In NSW grows in grassy dry sclerophyll woodland on clay loam or sandy soils, and less commonly in heathland on sandy loam soils. Flowers between September and November.	Unlikely - no suitable habitat in the project site	Nil
Callistemon linearifolius	Netted Bottle Brush	V		BioNet (73 Records)	Recorded from the Georges to Hawkesbury Rivers in Sydney, and north to Nelson Bay. There is also a recent record from the northern Illawarra. Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers from spring to summer	Unlikely - no suitable habitat in the project site	Nil
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	BioNet (1 Record) and EPBC PMST	Occurs in coastal areas from East Gippsland to southern Queensland. Habitat preferences not well defined. Grows mostly in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. Prefers open areas in the understorey and is often found in association with Large Tongue Orchid and the Bonnet Orchid. Soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. Flowers November-February.	Unlikely - no suitable habitat in the project site	Nil
Cynanchum elegans	White-flowered Wax Flora		E	EPBC PMST	Occurs from Gerroa (Illawarra) to Brunswick Heads and west to Merriwa in the upper Hunter. Most common near Kempsey. Usually occurs on the edge of dry rainforest or littoral rainforest, but also occurs in Coastal Banksia Scrub, open forest and woodland, and Melaleuca scrub. Soil and geology types are not limiting. Flowering occurs between August and May, with the peak in November.	Unlikely - no suitable habitat in the project site	Nil
Darwinia biflora	-		V	EPBC PMST	Known from north and north-western Sydney, in the Ryde, Baulkham Hills, Hornsby and Ku-Ring-Gai LGAs. Grows on the edges of weathered shale-capped ridges,	Unlikely - no suitable habitat in the project site	Nil

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
					at the intergrade with Hawkesbury Sandstone. Occurs in woodland, open forest and scrub/heath and is associated overstorey species include Scribbly Gum, Red Bloodwood and/or Scaly Bark.		
Darwinia glaucophylla	-	V		BioNet (730 Records)	Occurs between Gosford and the Hawkesbury River around Calga, Kariong and Mt Karing. Occurs entirely within the Gosford Local Government Area of the Sydney Basin Bioregion. Prefers sandy heath, scrub and woodlands often associated with sandstone rock platforms or near hanging swamps and friable sandstone shallow soils. Flowers in winter and spring	Unlikely - no suitable habitat in the project site	Nil
Darwinia peduncularis	-	V		BioNet (1 Record)	Disjunct populations in coastal NSW with isolated populations in the Blue Mountains. Recorded from Brooklyn, Berowra, Galston Gorge, Hornsby, Bargo River, Glen Davis, Mount Boonbourwa and Kings Tableland. Usually grows in dry sclerophyll forest on hillsides and ridges, on or near rocky outcrops on sandy, well drained, low nutrient soil over sandstone. Flowers in winter to early spring	Unlikely - no suitable habitat in the project site	Nil
Diuris praecox	Newcastle Doubletail		V	EPBC PMST	"Known from between Bateau Bay and Smiths Lake. Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey.	Unlikely - no suitable habitat in the project site	Nil
Epacris purpurascens var. purpurascens	-	V		BioNet (2 Records)	Occurs from Gosford in the north, Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Grows in a range of sclerophyll forest, scrubs and swamps, most of which have a strong shale soil influence.	Unlikely - no suitable habitat in the project site	Nil
Eucalyptus camfieldii	Camfield's Stringybark	V	V	BioNet (7 Records) and EPBC PMST	Occurs from Raymond Terrace to Waterfall, with populations known from Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai and the Royal NP. Occurs in exposed situations on sandstone plateaus, ridges and slopes near the coast, often on the boundary of tall coastal heaths or low open woodland. Grows in shallow sandy soils overlying Hawkesbury sandstone.	Unlikely - no suitable habitat in the project site	Nil
Genoplesium baueri	Yellow Gnat-orchid		E	EPBC PMST	Occurs from Ulladulla to Port Stephens, with only 13 known extant populations. Grows in sparse sclerophyll forest and moss gardens over sandstone. Flowers from February to March.	Unlikely - no suitable habitat in the project site	Nil

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Grevillea shiressii	-	V	V	BioNet (493 Records) and EPBC PMST	Known from only two populations near Gosford namely, Mooney Mooney Creek and Mullet Creek. Grows along creek banks in wet sclerophyll forest with a moist understorey in alluvial sandy or loamy soils. Flowers between July and December.	Unlikely - no suitable habitat in the project site	Nil
Haloragis exalata subsp. exalata	Wingless RaspworT		V	EPBC PMST	Occurs in 4 widely scattered localities in eastern NSW, disjunctly distributed in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Requires protected and shaded damp situations in riparian habitats.	Unlikely - no suitable habitat in the project site	Nil
Haloragodendron lucasii	Hal		E	EPBC PMST	Known locations are confined to a very narrow distribution on the north shore of Sydney. Associated with dry sclerophyll forest and grows in moist sandy loam soils in sheltered aspects, and on gentle slopes below cliff-lines near creeks in low open woodland. Associated with high soil moisture and relatively high soil-phosphorus levels.	Unlikely - no suitable habitat in the project site	Nil
Hibbertia procumbens	Spreading Guinea Flower	E		BioNet (1734 Records)	Known from several locations only on the Central Coast in the Gosford and Wyong LGAs in NSW. Known populations occur within Banksia ericifolia–Angophora hispida–Allocasuarina distyla scrub/heath on skeletal sandy soils. May also be found associated with 'hanging swamp' vegetation communities on sandy deposits.	Unlikely - no suitable habitat in the project site	Nil
Hibbertia puberula	-	E		BioNet (1 Record)	Distribution extending from Wollemi National Park south to Morton National Park and the south coast near Nowra. Favours low heath on sandy soils or rarely in clay, with or without rocks underneath. Habitats are typically dry sclerophyll woodland communities, although heaths are also occupied. Flowers from October to January	Unlikely - no suitable habitat in the project site	Nil
Kunzea rupestris	-		V	BioNet (178 Records) and EPBC PMST	Restricted to locations in the Maroota - Sackville - Glenorie area and one outlier in Ku-ring-gai Chase National Park, all within the Central Coast botanical subdivision of NSW. Grows in shallow depressions on large flat sandstone rock outcrops, generally found in short to tall shrubland or heathland. Characteristically found in short to tall shrubland or heathland.	Unlikely - no suitable habitat in the project site	Nil

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Lasiopetalum joyceae	-		V	BioNet (22 Records) and EPBC PMST	Has a restricted range occurring on lateritic to shaley ridgetops on the Hornsby Plateau south of the Hawkesbury River. Grows in heath on sandstone.	Unlikely - no suitable habitat in the project site	Nil
Melaleuca biconvexa	Biconvex Paperbark	V	V	BioNet (49 Records) and EPBC PMST	Scattered, disjunct populations in coastal areas from Jervis Bay to Port Macquarie, with most populations in the Gosford-Wyong areas. Grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Unlikely - no suitable habitat in the project site	Nil
Melaleuca deanei	Deane's Paperbark	V	V	BioNet (3 Records) and EPBC PMST	Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas. Isolated occurrences at Springwood (Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. Mostly grows on broad flat ridgetops, dry ridges and slopes and strongly associated with low nutrient sandy loam soils, sometimes with ironstone. Occurs in heath- open forest, often in sandstone ridgetop woodland communities.	Unlikely - no suitable habitat in the project site	Nil
Micromyrtus blakelyi	-	V	V	BioNet (1 Record) and EPBC PMST	Restricted to areas near the Hawkesbury River, north of Sydney. Distribution extends from north of Maroota in the north, to Cowan in the south. All known populations occur within the Hornsby and Baulkham Hills LGA's. Typically occurs within heathlands in shallow sandy soil in cracks and depressions of sandstone rock platforms.	Unlikely - no suitable habitat in the project site	Nil
Persicaria elatior	Knotweed		V	EPBC PMST	Recorded in south-eastern NSW from Ulladulla to the Victorian border. Known from Raymond Terrace and the Grafton area in northern NSW. Normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Unlikely - no suitable habitat in the project site	Nil
Persoonia hirsuta	Hairy Geebung		E	EPBC PMST	Scattered distribution around Sydney, distributed from Singleton in the north, along the east coast to Hilltop in the south west, Dombarton in the south east and the Blue Mountains to the west. Found in clayey and sandy soils in dry sclerophyll open forest, woodland and heath, primarily on the Mittagong Formation and on the upper Hawkesbury Sandstone.	Unlikely - no suitable habitat in the project site	Nil
Persoonia mollis subsp. maxima	-		E	EPBC PMST	Occurs in the Hornsby Heights-Mt Colah area north of Sydney. Grows in sheltered aspects of deep gullies or on the steep upper hillsides of narrow gullies on Hawkesbury Sandstone. These habitats support	Unlikely - no suitable habitat in the project site	Nil

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
					relatively moist, tall forest vegetation communities, often with mesic influences.		
Pimelea curviflora var. curviflora	-		V	EPBC PMST	Confined to the coastal area of the Sydney and Illawarra regions. Populations known between northern Sydney and Maroota in the north-west and at Croom Reserve near Albion Park in Shellharbour LGA. Grows on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands. Recorded in Illawarra Lowland Grassy Woodland habitat at Albion Park. Has an inconspicuous cryptic habit as it is fine and scraggly and often grows amongst dense grasses and sedges.	Unlikely - no suitable habitat in the project site	Nil
Prostanthera askania	Tranquility Mintbush	E	E	BioNet (1 Record) and EPBC PMST	Occurs over a very restricted geographic range (less than 12 km) in the upper reaches of creeks that flow into Tuggerah Lake or Brisbane Water within the Wyong and Gosford LGAs. Occurs adjacent to, but not immediately in, drainage lines on flat to moderately steep slopes formed on Narrabeen sandstone and alluvial soils derived from it. Occurs in moist sclerophyll forest and warm temperate rainforest communities with a mesic understorey. Associated with Sydney Blue Gum and Turpentine.	Unlikely - no suitable habitat in the project site	Nil
Prostanthera densa	Villous Mintbush		V	EPBC PMST	Recorded from the Currarong area in Jervis Bay, Royal National Park, Cronulla, Garie Beach, Port Stephens and Bass and Flinders Point in Cronulla. Generally grows in sclerophyll forest and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone, and rocky slopes near the sea.	Unlikely - no suitable habitat in the project site	Nil
Prostanthera junonis	Somersby Mintbush	E	E	BioNet (202 Records) and EPBC PMST	Has a north-south range of approximately 19 km on the Somersby Plateau in the Gosford and Wyong LGAs. Occurs on both the Somersby and Sydney Town soil landscapes on gently undulating country over weathered Hawkesbury sandstone within open forest/low woodland/open scrub. Found in both disturbed and undisturbed sites. Very difficult to identify outside flowering period.	Unlikely - no suitable habitat in the project site	Nil
Rhizanthella slateri	Eastern Underground Orchid		E	EPBC PMST	Currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to	Unlikely - no suitable habitat in the project site	Nil

Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
					occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.		
Rhodamnia rubescens	Scrub Turpentine	CE	CE	BioNet (28 Records) and EPBC PMST	"Occurs in coastal districts north from Batemans Bay in New South Wales, to areas inland of Bundaberg in Queensland. Populations typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000 -1,600 mm. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. Highly to extremely susceptible to infection by Myrtle Rust.	Unlikely - no suitable habitat in the project site	Nil
Rhodomyrtus psidioides	Native Guava	CE	CE	BioNet (1 Record) and EPBC PMST	Occurs from Broken Bay, approximately 90 km north of Sydney, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation and also occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Extremely susceptible to infection by Myrtle Rust.	Unlikely - no suitable habitat in the project site	Nil
Rutidosis heterogama	Heath Wrinklewort		V	EPBC PMST	Recorded from near Cessnock to Kurri Kurri with an outlying occurrence at Howes Valley. On the Central Coast it is located north from Wyong to Newcastle. There are north coast populations between Wooli and Evans Head in Yuraygir and Bundjalung National Parks. It also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	Unlikely - no suitable habitat in the project site	Nil
Syzygium paniculatum	Magenta Lilly Pilly	E	V	BioNet (12 Records) and EPBC PMST	Occurs in narrow coastal strip from Upper Lansdowne to Conjola State Forest. On the south coast, the species occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast, it occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Unlikely - no suitable habitat in the project site	Nil

Notes:

BC - Biodiversity and Conservation Act
EPBC – Environmental Protection and Conservation Act
PMST – Protecting Matters Search Tool
V – Vulnerable
E – Endangered
CE – Critically Endangered

Table B.2 Likelihood of occurrence of threatened fauna

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Bird	Anthochaera phrygia	Regent Honeyeater	CE	CE	BioNet (2 Records) and EPBC PMST	Mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Found in drier coastal woodlands and forests in some years. Only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. Very patchy distribution in NSW, mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. Feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important nectar flows at times. Nectar and fruit from the mistletoes Amyema miquelii, A. pendula and A. cambagei are also utilised.	Unlikely - no suitable habitat in the project site	Nil
Bird	Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		BioNet (11 Records)	Occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range. Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.		
Bird	Botaurus poiciloptilus	Australasian Bittern		E	EPBC PMST	Widespread but uncommon over south-eastern Australia. Found over most of NSW except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleocharis spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. May construct feeding platforms over deeper water from reeds trampled by the bird; platforms are often littered with prey remains.	Unlikely - no suitable habitat in the project site	Nil
Bird	Burhinus grallarius	Bush Stone-curlew	E		BioNet (491 Records)	Found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Largely nocturnal, being especially active on moonlit nights and nests on the ground in a scrape or small bare patch.	Unlikely - no suitable habitat in the project site	Nil
Bird	Calidris canutus	Red Knot		E	BioNet (1 Record) and EPBC PMST	Breeds in northern hemisphere. Occurs in coastal areas around Australia, with important sites in VIC, SA, WA, NT and Qld. Mainly inhabits intertidal mudflats, sandflats and sandy beaches. Occasionally seen in terrestrial saline wetlands but rarely in freshwater wetlands. Forage in soft substrates in intertidal areas.	Unlikely - no suitable habitat in the project site	Nil
Bird	Calidris ferruginea	Curlew Sandpiper	E	CE	BioNet (1 Record) and EPBC PMST	Distributed around most of the Australian coastline. Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. Breeds in Siberia and migrates to Australia for the non-breeding period, arriving in	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						Australia between August and November, and departing between March and mid-April. Generally occupies littoral and estuarine habitats, and is mainly found in intertidal mudflats of sheltered coasts in NSW. Also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. Forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.		
Bird	Calidris melanotos	Pectoral Sandpiper			EPBC PMST	Widespread but scattered records across NSW, east of the divide and in the Riverina and Lower Western regions. Breeds in the northern hemisphere. In Australasia, prefers shallow fresh to saline wetlands and is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Usually in coastal or near-coastal habitats, and prefers wetlands with open mudflats and low emergent or fringing vegetation such as grass or samphire.	Unlikely - no suitable habitat in the project site	Nil
Bird	Callocephalon fimbriatum	Gang-gang Cockatoo	V	E	BioNet (1 Record) and EPBC PMST	In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer the species is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas.	Unlikely - no suitable habitat in the project site	Nil
Bird	Calonectris leucomelas	Streaked Shearwater			EPBC PMST	The Streaked Shearwater is found in the western Pacific, breeding on the coast and on offshore islands of Japan, Russia, and on	Unlikely - no suitable	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						islands off the coasts of China, North Korea and South Korea. It migrates south during winter, being found off the coasts of Vietnam, New Guinea, the Philippines, Australia, southern India and Sri Lanka. This marine species can be found over both pelagic and inshore waters. It feeds mainly on fish and squid which it catches by surface-seizing and shallow plunges. It often associates with other seabirds and will follow fishing boats.	habitat in the project site	
Bird	Calyptorhynchus lathami	Glossy Black-Cockatoo	V	V	BioNet (106 Records) and EPBC PMST	The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. It inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak (Allocasuarina littoralis) and Forest Sheoak (A. torulosa) are important foods. Inland populations feed on a wide range of sheoaks, including Drooping Sheoak, Allocasuaraina diminuta, and A. gymnathera. Belah is also utilised and may be a critical food source for some populations. The species is dependent on large hollow-bearing eucalypts for nest sites.	Unlikely - no suitable habitat in the project site	Nil
Bird	Charadrius leschenaultii	Greater Sand-plover	V	V	BioNet (1 Record) and EPBC PMST	Breeds in central Asia from Armenia to Mongolia, moving further south for winter. In Australia the species is commonly recorded in parties of 10-20 on the west coast, with the far northwest being the stronghold of the population. The species is apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. The species is almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Bird	Circus assimilis	Spotted Harrier	V		BioNet (1 Record)	Occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. Found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Unlikely - no suitable habitat in the project site	Nil
Bird	Daphoenositta chrysoptera	Varied Sittella	V		BioNet (13 Records)	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The species inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland.	Unlikely - no suitable habitat in the project site	Nil
Bird	Dasyornis brachypterus	Eastern Bristlebird		E	EPBC PMST	Occurs in three disjunct areas, in southern Queensland/northern NSW, the Illawarra Region and in the vicinity of the NSW/Victorian border. Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. Habitat in northern NSW occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone. The age of habitat since fires (fire-age) is of paramount importance to this species. The Illawarra and southern populations reach maximum densities in habitat that has not been burnt for at least 15 years. Habitat in northern NSW requires frequent fires to maintain habitat condition and suitability. The northern fire regimes is between 3-6 years and of variable intensity depending on the habitat condition.	Unlikely - no suitable habitat in the project site	Nil
Bird	Diomedea antipodensis	Antipodean Albatross		V	EPBC PMST	The Antipodean Albatross is endemic to New Zealand, however forages widely in open water in the south-west Pacific Ocean, Southern	Unlikely - no suitable	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						Ocean and the Tasman Sea, notably off the coast of NSW. he Antipodean Albatross is marine, pelagic and aerial. It rarely enters the belt of icebergs region of Antarctica, but in late summer, it may approach the edge of pack-ice. It sleeps and rests on ocean waters when not breeding.	habitat in the project site	
Bird	Diomedea antipodensis gibsoni	Gibson's Albatross		V	EPBC PMST	In Australian territory, Gibson's Albatross has been recorded foraging between Coffs Harbour, NSW, and Wilson's Promontory, Victoria. There are no breeding colonies of Gibson's Albatross in Australian territory. This albatross visits Australian waters while foraging and during the non-breeding season. Gibson's Albatross is marine, pelagic and aerial. In the Antarctic, it occurs in open water, and rarely enters the belt of icebergs region.	Unlikely - no suitable habitat in the project site	Nil
Bird	Diomedea epomophora	Southern Royal Albatross		V	EPBC PMST	Over 99% of the Southern Royal Albatross population breeds on Campbell Island, and a small proportion on the Auckland Islands. Southern royal albatrosses are generally solitary at sea. Young birds gather to display in gams on the breeding grounds. Non-breeding birds and juveniles cross the Southern Ocean to feed in South American waters before returning to the breeding areas by circumnavigating the globe.	Unlikely - no suitable habitat in the project site	Nil
Bird	Diomedea exulans	Wandering Albatross	E	E	BioNet (1 Record) and EPBC PMST	The Wandering Albatross visits Australian waters extending from Fremantle, Western Australia, across the southern water to the Whitsunday Islands in Queensland between June and September. It has been recorded along the length of the NSW coast. At other times birds roam the southern oceans and commonly follow fishing vessels for several days. The species spend the majority of its time in flight, soaring over the southern oceans.	Unlikely - no suitable habitat in the project site	Nil
Bird	Diomedea sanfordi	Northern Royal Albatross		E	EPBC PMST	The Northern Royal Albatross breeds in New Zealand waters. The main population (estimated at 6,500 to 7,000 pairs) nests on islands off the Chatham Islands, and up to 50 pairs nest at Taiaroa Head on the South Island. Most the	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						population spends the non-breeding period off both coasts of southern South America, especially off Chile and Argentina. It is a rare visitor to NSW waters, predominantly visiting southern waters in the winter and early spring period. The Northern Royal Albatross primarily forages in inshore and offshore waters over the continental shelf to the shelf edge.		
Bird	Erythrotriorchis radiatus	Red Goshawk		V	EPBC PMST	Very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens. Inhabits open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. Preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	Unlikely - no suitable habitat in the project site	Nil
Bird	Falco hypoleucos	Grey Falcon		V	EPBC PMST	Sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Unlikely - no suitable habitat in the project site	Nil
Bird	Glossopsitta pusilla	Little Lorikeet	V		BioNet (15 Records)	Distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						used, due to higher soil fertility and hence greater productivity.		
Bird	Grantiella picta	Painted Honeyeater		V	EPBC PMST	Nomadic species occurring at low densities throughout its range. Most commonly found on the inland slopes of the Great Dividing Range in NSW, where almost all breeding occurs. More likely to be found in the north of its distribution in winter. Inhabits Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests. Specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema.	Unlikely - no suitable habitat in the project site	Nil
Bird	Haematopus fuliginosus	Sooty Oystercatcher	V		BioNet (5 Records)	Evenly distributed along NSW coast, including offshore islands. Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide. Breeds almost exclusively on offshore islands, and occasionally on isolated promontories.	Unlikely - no suitable habitat in the project site	Nil
Bird	Haematopus longirostris	Pied Oystercatcher	E		BioNet (146 Records)	Thinly scattered along the entire coast of NSW, with fewer than 200 breeding pairs estimated to occur in the State. Favours intertidal flats of inlets and bays, open beaches and sandbanks and forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. Nests mostly on coastal or estuarine beaches although occasionally uses saltmarsh or grassy areas.	Unlikely - no suitable habitat in the project site	Nil
Bird	Haliaeetus leucogaster	White-bellied Sea-Eagle	V		BioNet (128 Records)	Widespread along the NSW coast, and along all major inland rivers and waterways. Habitats characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat.		
Bird	Hieraaetus morphnoides	Little Eagle	V		BioNet (4 Records)	Found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. Occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. Also found in Sheoak or Acacia woodlands and riparian woodlands of inland NSW. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Unlikely - no suitable habitat in the project site	Nil
Bird	Hirundapus caudacutus	White-throated Needletail		V	BioNet (19 Records) and EPBC PMST	Migrates to eastern Australia from October to April. Almost exclusively aerial and most often seen before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. Occurs over most types of habitat, but mostly recorded above wooded areas, including open forest and rainforest. May also fly between trees or in clearings, below the canopy. Recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.	Unlikely - no suitable habitat in the project site	Nil
Bird	Ixobrychus flavicollis	Black Bittern	V		EPBC PMST	Scattered records along the east coast of NSW, with individuals rarely being recorded south of Sydney or inland. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. May occur in flooded grassland, forest, woodland, rainforest and mangroves, where permanent water is present.	Unlikely - no suitable habitat in the project site	Nil
Bird	Lathamus discolor	Swift Parrot	E	CE	BioNet (15 Records) and EPBC PMST	Migrates from Tasmania to south-eastern Australia in the autumn and winter months. Mostly occurs on the coast and south west slopes in NSW. Occurs on the mainland in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany Eucalyptus robusta, Spotted Gum Corymbia maculata, Red Bloodwood C.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						gummifera, Forest Red Gum E. tereticornis, Mugga Ironbark E. sideroxylon, and White Box E. albens.		
Bird	Limosa lapponica	Bar-tailed Godwit			EPBC PMST	Recorded in the coastal areas of all Australian states. Widespread along the east and south-east coasts of NSW, including the offshore islands. Few inland records from NSW. Inhabit estuarine mudflats, beaches and mangroves. Common in coastal areas around Australia. Social birds, often seen in large flocks and in the company of other waders.	Unlikely - no suitable habitat in the project site	Nil
Bird	Limosa lapponica baueri	Nunivak Bar-tailed Godwit		V	EPBC PMST	Recorded in the coastal areas of all Australian states. It is widespread in the Torres Strait and along the east and south-east coasts of Queensland, NSW and Victoria. The bar-tailed godwit is a regular migrant to Christmas Island, Norfolk Island, Lord Howe Island. During the non-breeding period, the distribution of bar-tailed godwit (western Alaskan) is predominately New Zealand, northern and eastern Australia. In Australia, L. l. baueri mainly occur along the north and east coasts.	Unlikely - no suitable habitat in the project site	Nil
Bird	Limosa limosa	Black-tailed Godwit	V		BioNet (1 Record)	Most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the coast, and inland in NSW. May occur around any of the large lakes in the western areas during summer, when the muddy shores are exposed. Also recorded within the Murray-Darling Basin, on the western slopes of the Northern Tablelands and in the far north-western corner of the state. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps.	Unlikely - no suitable habitat in the project site	Nil
Bird	Lophoictinia isura	Square-tailed Kite	V		BioNet (7 Records)	Ranges along coastal and subcoastal areas from south-western to northern Australia. Scattered records throughout NSW indicate that the species is a regular resident in the north, north-east and along the major west-flowing	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						river systems. Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests and shows a particular preference for timbered watercourses. Observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland in arid north-western NSW.		
Bird	Macronectes giganteus	Southern Giant Petrel	E	E	BioNet (1 Record) and EPBC PMST	Circumpolar pelagic range from Antarctica to approximately 20° S and common visitor off the coast of NSW.	Unlikely - no suitable habitat in the project site	Nil
Bird	Macronectes halli	Northern Giant Petrel		V	EPBC PMST	Circumpolar pelagic distribution, usually between 40-64ºS in open oceans. Their range extends into subtropical waters (to 28ºS) in winter and early spring. Common visitor in NSW waters, predominantly along the south-east coast during winter and autumn. Breeding in Australian territory is limited to Macquarie Island and occurs during spring and summer.	Unlikely - no suitable habitat in the project site	Nil
Bird	Monarcha melanopsis	Black-faced Monarch			EPBC PMST	Found along the coast of eastern Australia, becoming less common further south. Occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberralt. Found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	Unlikely - no suitable habitat in the project site	Nil
Bird	Motacilla flava	Yellow Wagtail			EPBC PMST	Occurs within Australia in open country habitat with disturbed ground and some water. Recorded in short grass and bare ground, swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land and town lawns. Breeds in temperate Europe and Asia.	Unlikely - no suitable habitat in the project site	Nil
Bird	Myiagra cyanoleuca	Satin Flycatcher			EPBC PMST	Found along the east coast of Australia from far northern Queensland to Tasmania. Uncommonly seen species, especially in the far south of its range, where it is a summer	Unlikely - no suitable	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						breeding migrant. Inhabits heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	habitat in the project site	
Bird	Neophema pulchella	Turquoise Parrot	V		BioNet (1 Record)	Extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Typically lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Unlikely - no suitable habitat in the project site	Nil
Bird	Nettapus coromandelianus	Cotton Pygmy-Goose	E		BioNet (1 Record)	Once found from north Queensland to the Hunter River in NSW, the species is now only a rare visitor to NSW. Occurs in freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. Uses tall standing dead trees with hollows located close to water for roosting and breeding.	Unlikely - no suitable habitat in the project site	Nil
Bird	Ninox connivens	Barking Owl	V		BioNet (36 Records)	Found throughout continental Australia except for the central arid regions. Occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Sometimes extends home range into urban areas. Inhabit woodland and open forest, including fragmented remnants and partly cleared farmland. Flexible in its habitat use, hunting can extend in to closed forest and more open areas. Typically roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species.	Unlikely - no suitable habitat in the project site	Nil
Bird	Ninox strenua	Powerful Owl	V		BioNet (230 Records)	Widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains. Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. Requires large tracts of forest or woodland habitat but can also occur in fragmented landscapes. Breeds and	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. Roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species.		
Bird	Numenius madagascariensis	Eastern Curlew		CE	BioNet (99 Records) and EPBC PMST	Occurs across the entire coast but is mainly found in estuaries such as the Hunter River, Port Stephens, Clarence River, Richmond River and ICOLLs of the south coast. Generally occupies coastal lakes, inlets, bays and estuarine habitats, and is mainly found in intertidal mudflats and sometimes saltmarsh of sheltered coasts in NSW. Rarely seen inland.	Unlikely - no suitable habitat in the project site	Nil
Bird	Pandion cristatus	Eastern Osprey	V		BioNet (76 Records)	Found right around the Australian coast line, except for Victoria and Tasmania. Common around the northern coast, especially on rocky shorelines, islands and reefs. Uncommon to rare or absent from closely settled parts of south-eastern Australia. Rare records from inland areas. Favours coastal areas, especially the mouths of large rivers, lagoons and lakes. Breeds in NSW from July to September. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Unlikely - no suitable habitat in the project site	Nil
Bird	Petroica boodang	Scarlet Robin	V		BioNet (2 Records)	Occurs from the coast to the inland slopes in NSW. Disperses to the lower valleys and plains of the tablelands and slopes after breeding. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. Found in dry eucalypt forests and woodlands with usually open and grassy understorey with few scattered shrubs. Lives in both mature and regrowth vegetation and occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Abundant logs and fallen timber are important components of its habitat.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Bird	Phaethon lepturus	White-tailed Tropicbird			EPBC PMST	Breeds in the Cocos-Keeling Islands, Ashmore reef and Rowley Shoals off the northern coast of WA. In Australia, the White-tailed Tropicbird (Indian Ocean) nests in Pisonia trees amongst Pisonia-coconut vegetation, and on sandy ground.	Unlikely - no suitable habitat in the project site	Nil
Bird	Phoebetria fusca	Sooty Albatross		V	EPBC PMST	Generally recorded in winter off the south coast from Tasmania to Western Australia, while there are occasional sightings off the NSW coast, north of Grafton. Inhabits subantarctic and subtropical marine waters, spending the majority of its time at sea, and rarely occurs in continental shelf waters.	Unlikely - no suitable habitat in the project site	Nil
Bird	Pluvialis fulva	Pacific Golden Plover			EPBC PMST	Breeds on the Arctic tundra in western Alaska. It winters in South America and islands of the Pacific Ocean to India, Indonesia and Australia. Widespread along the coastline in Australia. Found on muddy, rocky and sandy wetlands, shores, paddocks, saltmarsh, coastal golf courses, estuaries and lagoons.	Unlikely - no suitable habitat in the project site	Nil
Bird	Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V		BioNet (1 Record)	Occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. Also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. Inhabits open Box-Gum Woodlands on the slopes, Box-Cypress-pine and open Box Woodlands on alluvial plains and woodlands on fertile soils in coastal regions.	Unlikely - no suitable habitat in the project site	Nil
Bird	Pterodroma leucoptera leucoptera	Gould's Petrel		E	EPBC PMST	Breeds on both Cabbage Tree Island, 1.4 km offshore from Port Stephens and on nearby Boondelbah island. The range and feeding areas of non-breeding petrels are unknown. Principal nesting habitat is located within two gullies which are characterised by steeply, sloping rock scree with a canopy of Cabbage Tree Palms. Nest predominantly in natural rock crevices among the rock scree and also in hollow fallen palm trunks, under mats of fallen palm fronds and in cavities among the buttresses of fig trees.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Bird	Pterodroma neglecta neglecta	Kermadec Petrel (western)		V	EPBC PMST	Ranges over subtropical and tropical waters of the South Pacific. Balls Pyramid (near Lord Howe Island) and Phillip Island (near Norfolk Island) are the only known breeding sites in Australian waters. Vagrant birds occur in coastal NSW waters, particularly after storm events.	Unlikely - no suitable habitat in the project site	Nil
Bird	Ptilinopus magnificus	Wompoo Fruit-Dove	V		BioNet (1 Record)	Occurs along the coast and coastal ranges from the Hunter River in NSW to Cape York Peninsula. Rare south of Coffs Harbour, it used to occur in the Illawarra, though there are no recent records. Occurs in, or near rainforest, low elevation moist eucalypt forest and brush box forests. Feeds on a diverse range of tree and vine fruits and is locally nomadic - following ripening fruit.	Unlikely - no suitable habitat in the project site	Nil
Bird	Rhipidura rufifrons	Rufous Fantail			EPBC PMST	Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas.	Unlikely - no suitable habitat in the project site	Nil
Bird	Rostratula australis	Australian Painted Snipe		E	EPBC PMST	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River, the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Forages nocturnally on mud-flats and in shallow water.	Unlikely - no suitable habitat in the project site	Nil
Bird	Sternula albifrons	Little Tern	E		BioNet (3 Records) and EPBC PMST	Migrates to NSW from September to November, occurring mainly north of Sydney. Breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers. Nests in small, scattered colonies in low dunes or on sandy	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands.		
Bird	Thalassarche bulleri platei	Northern Buller's Albatross		V	EPBC PMST	Occurs in subtropical and subantarctic waters of the South Pacific Ocean. Habitat preferences are poorly known. Occurs over inshore, offshore and pelagic waters and off the coast of south-east Tasmania. Prefers waters of the East Australia Current where sea surface-temperatures are greater than 16.5 °C. Breeds on subtropical and subantarctic islands and rock stacks in the New Zealand region, on sparsely vegetated slopes, cliff tops and ledges on rocky islands or stacks.	Unlikely - no suitable habitat in the project site	Nil
Bird	Thalassarche carteri	Indian Yellow-nosed Albatross		V	EPBC PMST	The Indian Yellow-nosed Albatross forages mostly in the southern Indian Ocean where it is particularly abundant off Western Australia. It has been observed over waters of surface-temperature 10° to 23°C, but is most abundant over the warmer parts of the subtropical zone. In breeding and non-breeding seasons, the species concentrates over the productive waters of continental shelves, often at coastal upwellings and the boundaries of currents. Birds breeding south of the Subtropical Convergence may be pelagic and travel far to subtropical feeding grounds.	Unlikely - no suitable habitat in the project site	Nil
Bird	Thalassarche cauta	Shy Albatross		E	EPBC PMST	Remains in the waters off southeast Australia all year round, and seldom venture more than 600km from the breeding colony. Uncommon north of Sydney but commonly recorded off southeast NSW, particularly between July and November, and has been recorded in Ben Boyd National Park. Breeding occurs on Albatross Island, Bass Strait, and Mewstone and Pedra Branca, off southern Tasmania.	Unlikely - no suitable habitat in the project site	Nil
Bird	Thalassarche eremita	Chatham Albatross		E	EPBC PMST	"Breeding restricted to Pyramid Rock, Chatham Islands, off the coast of New Zealand. Commonly seen foraging range in coastal waters off eastern and southern New Zealand, and Tasmania. Found in shelf-waters around breeding islands, over continental shelves	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						during the non-breeding season, and occurs inshore and offshore. Enters harbours and bays and is scarce in pelagic waters.		
Bird	Thalassarche impavida	Campbell Albatross		V	EPBC PMST	Non-breeding visitor to Australian waters. Commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales. Inhabits sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats. Nests only at Campbell Island and the adjacent Isle de Jeanette Marie south of New Zealand	Unlikely - no suitable habitat in the project site	Nil
Bird	Thalassarche melanophris	Black-browed Albatross		V	EPBC PMST	Circumpolar range over the southern oceans, and are seen off the southern Australian coast mainly during winter. Migrates to waters off the continental shelf from approximately May to November and is regularly recorded off the NSW coast during this period. Previously recorded in Botany Bay National Park. Inhabits antarctic, subantarctic, subtropical marine and coastal waters over upwellings and boundaries of currents.	Unlikely - no suitable habitat in the project site	Nil
Bird	Thalassarche salvini	Salvin's Albatross		V	EPBC PMST	Non-breeding visitor to Australian waters. Ranges widely through the south Pacific. During the non-breeding season, the species occurs over continental shelves around continents. Occurs both inshore and offshore and enters harbours and bays.	Unlikely - no suitable habitat in the project site	Nil
Bird	Thalassarche steadi	White-capped Albatross		V	EPBC PMST	Probably common off the coast of south-east Australia throughout the year. This species is similar to the Shy Albatross and can be difficult to identify, especially at sea and as a juvenile. It has been observed that juveniles are common off south-east Australia. Breeding colonies occur on islands south of New Zealand. It has been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, birds have been observed over continental shelves around continents. The species occurs both inshore and offshore and enters harbours and bays Birds gather to scavenge at commercial fishing grounds and	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						nest on slopes vegetated with tussock and succulents on Auckland Island		
Bird	Tringa brevipes	Grey-tailed Tattler			EPBC PMST	In NSW occurs along the coast from the Queensland border south to Tilba Lake, and has been recorded as far south as Gippsland. Recorded more frequently north of Sydney. Found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. Inland records are rare. Forages in shallow water in intertidal areas. Usually roosts in the branches of mangroves or rocks which may be partly submerged. Also rarely recorded in dense shrubs, on driftwood or sand dunes.	Unlikely - no suitable habitat in the project site	Nil
Bird	Tringa nebularia	Common Greenshank			EPBC PMST	Common throughout Australia in the summer. In NSW, the species has been recorded in most coastal regions. It is widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions. Found both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops.	Unlikely - no suitable habitat in the project site	Nil
Bird	Turnix maculosus	Red-backed Button-quail	V		BioNet (2 Records)	Recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW. The population around Sydney was last recorded in 1912. In NSW, the Red-backed Button-quail is said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): speargrass Heteropogon, Blady Grass Imperata cylindrica, Triodia, Sorghum, and Buffel Grass Cenchrus ciliaris.	Unlikely - no suitable habitat in the project site	Nil
Bird	Tyto novaehollandiae	Masked Owl	V		BioNet (11 Records)	Extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of	Unlikely - no suitable	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						NSW, excluding the most arid north-western corner. Lives in dry eucalypt forests and woodlands from sea level to 1100 m and often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	habitat in the project site	
Bird	Tyto tenebricosa	Sooty Owl	V		BioNet (8 Records)	Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Found in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Roost by day in the hollow of a tall forest tree or in heavy vegetation and nest in very large tree hollows.	Unlikely - no suitable habitat in the project site	Nil
Bird	Xenus cinereus	Terek Sandpiper	V		BioNet (1 Record)	Found in two main sites, the Richmond River estuary and the Hunter River estuary. Recorded on coastal mudflats, lagoons, creeks and estuaries, and favours mudbanks and sandbanks located near mangroves, but may also be observed on rocky pools and reefs, and occasionally up to 10 km inland around brackish pools.	Unlikely - no suitable habitat in the project site	Nil
Frog	Heleioporus australiacus	Giant Burrowing Frog	V	V	BioNet (50 Records)	Distributed in south eastern NSW as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely - no suitable habitat in the project site	Nil
Frog	Heleioporus australiacus	Giant Burrowing Frog		V	BioNet (1 Record)	Distributed in south eastern NSW as two distinct populations: a northern population largely confined to the sandstone geology of the Sydney Basin and extending as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Frog	Litoria aurea	Green and Golden Bell Frog	E	V	BioNet (5 Records) and EPBC PMST	Approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. Large populations are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast. Only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimal habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Also recorded in highly disturbed areas.	Unlikely - no suitable habitat in the project site	Nil
Frog	Litoria littlejohni	Littlejohn's Tree Frog		E	EPBC PMST	Distribution includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) and south to Buchan in Victoria. Most records are within the Sydney Basin Bioregion with only scattered records south to the Victorian border. Records are isolated and tend to be at high altitude. Breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation.	Unlikely - no suitable habitat in the project site	Nil
Frog	Mixophyes balbus	Stuttering Frog		V	BioNet (26 Records) and EPBC PMST	Occurs along the east coast of Australia from southern Queensland to north-eastern Victoria. Stronghold in the Dorrigo region, in north-east NSW. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Breeds in streams during summer after heavy rain.	Unlikely - no suitable habitat in the project site	Nil
Frog	Mixophyes iteratus	Giant Barred Frog		V	EPBC PMST	Distributed along the coast and ranges from Eumundi in south-east Queensland to Warrimoo in the Blue Mountains. Stronghold in northern NSW, particularly the Coffs Harbour-Dorrigo area. Typically found along freshwater streams	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						with permanent or semi-permanent water, generally at lower elevation. Favours moist riparian habitats such as rainforest or wet sclerophyll forest for the deep leaf litter which provides shelter and foraging. Sometimes occur in other riparian habitats with drier forest or degraded riparian remnants, and occasionally around dams.		
Frog	Pseudophryne australis	Red-crowned Toadlet	V		BioNet (119 Records)	Restricted distribution, confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains. Occurs in open forests, mostly on Hawkesbury and Narrabeen Sandstones. Inhabits periodically wet drainage lines below sandstone ridges that often have shale lenses or cappings. Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter.	Unlikely - no suitable habitat in the project site	Nil
Insect	Petalura gigantea	Giant Dragonfly	E		BioNet (4 Records)	"Found along the east coast of NSW from the Victorian border to northern NSW, not found west of the Great Dividing Range. Known occurrences in the Blue Mountains and Southern Highlands, in the Clarence River catchment, and on a few coastal swamps from north of Coffs Harbour to Nadgee in the south. Lives in permanent swamps and bogs with some free water and open vegetation. Adults emerge from late October and are short-lived, surviving for one summer after emergence.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Cercartetus nanus	Eastern Pygmy-possum	V		BioNet (46 Records)	Found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes and is an	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						important pollinator of heathland plants such as banksias.		
Mammal	Chalinolobus dwyeri	Large-eared Pied Bat	V	V	BioNet (7 Records) and EPBC PMST	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. Generally rare with a very patchy distribution in NSW and scattered records from the New England Tablelands and North West Slopes. Roosts in caves, crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Dasyurus maculatus	Spotted-tailed Quoll	V	E	BioNet (58 Records) and EPBC PMST	Found in eastern NSW, the species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Uses hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares. Known to traverse their home ranges along densely vegetated creeklines.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		BioNet (12 Records)	Found on the south-east coast and ranges of Australia, from southern Queensland to Victoria. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Isoodon obesulus obesulus	Southern Brown Bandicoot (eastern)	E	E	BioNet (8 Records) and EPBC PMST	Patchy distribution, found in south-eastern NSW, east of the Great Dividing Range south from the Hawkesbury River. Generally only found in heath or open forest with a heathy understorey on sandy or friable soils. Nest during the day in a shallow depression in the ground covered by leaf litter, grass or other plant material.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Mammal	Macropus parma	Parma Wallaby	V		BioNet (2 Records)	Range confined to the coast and ranges of central and northern NSW from the Gosford district to south of the Bruxner Highway between Tenterfield and Casino. Prefers moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V		BioNet (27 Records)	Found along the east coast from south Queensland to southern NSW. Occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark or in man-made structures.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Miniopterus australis	Little Bent-winged Bat	V		BioNet (52 Records)	Occurs along the east coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Prefers moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Roosts in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day. Forages for small insects beneath the canopy of densely vegetated habitats.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Miniopterus orianae oceanensis	Large Bent-winged Bat	V		BioNet (1 Record) and EPBC PMST	Occurs along the east and north-west coasts of Australia. Uses caves as the primary roosting habitat, but also uses derelict mines, storm-water tunnels, buildings and other man-made structures. Hunts in forested areas, catching moths and other flying insects above the tree tops.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Myotis macropus	Southern Myotis	V		BioNet (20 Records)	Mainly coastal but may occur inland along large river systems. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and watercourses feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees,	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						stormwater channels, buildings, under bridges and in dense foliage, typically in close proximity to water.		
Mammal	Petauroides volans	Southern Greater Glider	E	E	BioNet (3 Records) and EPBC PMST	Restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1200 m above sea level. Prefers taller montane, moist eucalypt forest with relatively old trees and abundant hollows.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Petaurus australis	Yellow-bellied Glider	V	V	BioNet (1 Record) and EPBC PMST	Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Vegetation preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Den, often in family groups, in hollows of large trees.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Petaurus norfolcensis	Squirrel Glider	V		BioNet (1 Record)	Widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. Require abundant tree hollows for refuge and nest sites.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Petrogale penicillata	Brush-tailed Rock-wallaby		V	EPBC PMST	Occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. It typically shelters or basks during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas.	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
Mammal	Phascolarctos cinereus	Koala	E	E	BioNet (24 Records) and EPBC PMST	Found on the central and north coasts, southern highlands, southern and northern tablelands, Blue Mountains, southern coastal forests of NSW, with some smaller populations on the plains west of the Great Dividing Range. Inhabits eucalypt woodlands and forests, and feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but will select preferred browse species in any one area.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Phoniscus papuensis	Golden-tipped Bat	V		BioNet (1 Record)	Distributed along the east coast of Australia in scattered locations from Cape York Peninsula in Queensland to south of Eden in southern NSW. Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000m. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests. Roosts mainly in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests modified with an access hole on the underside. Bats may also roost under thick moss on tree trunks, in tree hollows, dense foliage and epiphytes.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)		V	BioNet (41 Records) and EPBC PMST	Generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V		BioNet (2 Records)	Mainly occurs north from the Hawkesbury River area as scattered records along to coast and eastern fall of the Great Dividing Range extending north into Queensland. Isolated records in the Jervis bay area. Found in heathland in low numbers and most common in dense, wet heath and swamps. Optimal habitat appears to be in vigorously regenerating	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						heathland burnt from 18 months to four years previously.		
Mammal	Pseudomys novaehollandiae	New Holland Mouse		V	BioNet (1 Record) and EPBC PMST	Largely restricted to the coast of central and northern NSW, with one inland occurrence near Parkes. Known from Royal National Park (NP), the Kangaroo Valley, Kuringai Chase NP, and Port Stephens to Evans Head near the Queensland border. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. Soil type may be an important indicator of suitability of habitat, with deeper top soils and softer substrates being preferred for digging burrows.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Pteropus poliocephalus	Grey-headed Flying-fox	V	V	BioNet (132 Records) and EPBC PMST	Generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. May be found in unusual locations in times of natural resource shortage. Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V		BioNet (5 Records)	Wide-ranging species found across northern and eastern Australia. Rare visitor of south-western NSW in late summer and autumn. Scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. It forages in most habitats across its very wide range, with and without trees.	Unlikely - no suitable habitat in the project site	Nil
Mammal	Scoteanax rueppellii	Greater Broad-nosed Bat	V		BioNet (24 Records)	Found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. Widespread on the New England Tablelands in	Unlikely - no suitable habitat in the project site	Nil

Class	Scientific Name	Common Name	BC Status	EPBC Status	Source	Habitat association	Likelihood of occurrence	Likelihood of impact
						NSW, however does not occur at altitudes above 500 m. Found in a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, most commonly found in tall wet forest. Usually roosts in tree hollows but also found in buildings.		
Mammal	Vespadelus troughtoni	Eastern Cave Bat	V		BioNet (5 Records)	Found on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; recorded roosting in disused mine workings. Occasionally found along cliff-lines in wet eucalypt forest and rainforest. Forage over a small area, but are capable of flying 500 m over clear paddocks.	Unlikely - no suitable habitat in the project site	Nil
Reptile	Hoplocephalus bungaroides	Broad-headed Snake		V	EPBC PMST	Largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Unlikely - no suitable habitat in the project site	Nil
Reptile	Varanus rosenbergi	Rosenberg's Goanna	V		BioNet (3 Records)	Occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn, near Cooma in the south. There are records from the South West Slopes near Khancoban and Tooma River. Found in heath, open forest and woodland. Associated with termite mounds, which are a critical habitat component. Individuals require large areas of habitat and shelters in hollow logs, rock crevices and in burrows. Feeds on carrion, birds, eggs, reptiles and small mammals.	Unlikely - no suitable habitat in the project site	Nil

Notes:

BC - Biodiversity and Conservation Act

EPBC – Environmental Protection and Conservation Act
PMST – Protecting Matters Search Tool
V – Vulnerable
E – Endangered
CE – Critically Endangered

Appendix C

Project site photographs

Photo C.1 *View of the project site (looking south) including the exotic grassland in the foreground*

Photo C.2 *View of the project site (looking west) showing the reworked surface devoid of topsoil*

Photo C.3 *View of the southern portion of the project site (facing west) showing the heavily altered landscape*

Photo C.4 *View of the project site (facing northwest) showing the heavily altered landscape*

Photo C.5 *View of the sediment pond in the south west of the project site (facing south)*

Photo C.6 *View of one of the patches of exotic grassland in the north of the project site (facing northeast)*

Photo C.7 *View of the project site (facing southeast) showing the highly altered landscape*

Photo C.8 *View of the 'structures' on the project site – AST and storage tanks*

Photo C.9 ***View of the project site (facing east) from bushland outside of the project site***

Appendix D

References

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