

Narrawallee Beach Dog Access Area

Review of Environmental Factors

Final Report

Prepared for Shoalhaven City Council

8 May 2026

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Definitions

ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCS	NSW Biodiversity Conservation and Science
BDAR	Biodiversity Development Assessment Report
BOS	Biodiversity Offsets Scheme
CEMP	Construction Environmental Management Plan
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plan
DG	Director General
DPHI	Department of Planning, Housing and Infrastructure
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EES	NSW Environment Energy and Science
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2021</i>
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	<i>Fisheries Management Act 1994</i>
Impact area	area shown on Figure 2 and the proposed impact area within the project area.
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local Government Area
MNES	Matters of National Environmental Significance
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
POEO	<i>Protection of the Environment Operations Act 1997</i>
Project area	Area shown on Figure 1 and described in this REF
REF	Review of Environmental Factors
SEPP	State Environmental Planning Policy
SIC	Significant Impact Criteria

TEC	Threatened Ecological Communities
ToS	Test of Significance
WM Act	<i>Water Management Act 2000</i>

1 Introduction

1.1 Project overview

Biosis Pty Ltd was commissioned by Shoalhaven City Council (Council) to prepare a Review of Environmental Factors (REF) for the proposed modification of dog access arrangements at Narrawallee Beach (the activity), in Narrawallee NSW.

The majority of Narrawallee Beach is designated as a dog-prohibited area, with a limited timed off-leash zone between beach access points BA3 and BA8. Council is seeking to extend the permitted off-leash access hours within this zone during the winter period and formalise on-leash access arrangements at southern access points.

The activity aims to improve recreational access for dog owners while maintaining appropriate management of the beach environment and surrounding public reserve.

The activity will focus on refining existing access arrangements to support safe and responsible dog use, while balancing environmental considerations and the needs of other beach users. The activity will be assessed in accordance with Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) to ensure any potential environmental impacts are appropriately identified and managed.

The activity is in:

- The Shoalhaven Local Government Area (LGA).
- The suburb of Narrawallee, approximately 62 kilometres south of Nowra.
- Land zoned RE1 Public Recreation under the Shoalhaven Local Environmental Plan 2014 (LEP).

The locality is shown in Figure 1, and the study area is shown in Figure 2.

1.2 Background

In 2024, Shoalhaven City Council engaged Ecoplanning to prepare an REF (2024 REF), which assessed the environmental and social impacts of a proposal to permit dogs off-leash on a portion of Narrawallee Beach, including the installation of associated signage. Proposed hours were:

- Australian Eastern Daylight Savings Time – off leash from 4 pm to 8 am.
- Australian Eastern Standard Time – off leash from 3 pm to 10 am.

This was in response to Council's revised Access Areas for Dogs Policy and Access Areas for Dogs Policy Implementation Plan, adopted in December 2023 (CL23.463). The Policy and Plan are consistent with section 13(6) of the NSW *Companion Animals Act 1998* (CA Act), which states:

'A local authority can by order declare a public place to be an off-leash area. Such a declaration can be limited so as to apply during a particular period or periods of the day or to different periods of different days. However, there must at all times be at least one public place in the area of a local authority that is an off-leash area.'

The subject site and study area assessed in the 2024 REF comprised the sandy beach immediately below the vegetated dune, considered the landward boundary, along the entirety of Narrawallee Beach. Accordingly,

the REF assessed the direct and indirect community and environmental impacts associated with the proposed activity (inclusive of ancillary works) within the subject site.

The 2024 REF assessed the likely environmental impacts of the proposed off-leash activity and considered the most suitable boundaries for the off-leash area in terms of minimising social and environmental impacts. The assessment determined the following outcomes, which is the current dog access arrangements:

- The area north of BA8 is to be maintained as dog-prohibited, providing a buffer to Narrawallee Creek Inlet, which has high biodiversity conservation value for threatened and migratory shorebirds.
- The area south of BA3 is to be retained as dog-prohibited, to maintain a buffer to the rock shelf that provides threatened shorebird foraging habitat at the southern extend of the site, and to migrate potential social impacts on this highly used section of the beach.
- The dog off-leash access area was extended northward from BA7 to BA8, reflecting the outcomes of the environmental and social assessment.

1.3 Regulatory framework and permissibility

Council is both a public authority proponent and the determining authority (EP&A Act s. 5.1). Accordingly, the project is subject to Part 5 of the EP&A Act.

Determining authorities have a duty to consider matters affecting or likely to affect the environment by reason of that activity.

This REF has been prepared to address the requirements at Part 5 of the EP&A Act and has been prepared in accordance with section 171 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation).

The activity is permitted without consent under Section 2.73(3) of State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP). The legal permissibility of the project is discussed in Chapter 4.

1.4 Purpose of this report

This REF assesses the likely environmental impacts of the activity under the matters of consideration within Part 5, Division 5.1 of the EP&A Act.

Section 5.5 Duty to consider environmental impact

1. *For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account matters affecting or likely to affect the environment by reason of that activity.*
2. *For subsection (1), a determining authority may take into account the matters referred to in the subsection in a manner that is proportionate to the nature and risk of the activity.*
3. *Without limiting subsection (1), a determining authority shall consider the effect of an activity on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality in which the activity is intended to be carried on.*
4. *(Repealed)*

The purpose of this REF is to assess the potential environmental impacts of the proposed activity, which is prescribed by T&I SEPP as “development permitted without consent” under Part 5, Division 5.1 of the EP&A Act, and to detail the management and mitigation management measures that are to be implemented.

Council is the proponent and determining authority. This REF has been prepared in accordance with the requirements of all relevant NSW and Commonwealth legislation including the *Guidelines for Division 5.1 assessments* (DPHI 2022) (Division 5.1 Guidelines), issued pursuant to Section 170(1) of the EP&A Regulation.

1.5 Summary of recommendations

The proposed works are not likely to have a significant impact on any environmental factors, as long as the mitigation measures provided in Chapter 6 are implemented.

An environmental impact statement (EIS) is not required.

1.6 Community consultation

Council commissioned community consultation in late 2025 and early 2026, comprising a community questionnaire, stakeholder meetings, and on-site beach interviews. The current proposal has been development in response to community feedback received during the consultation program. A summary of the key findings is provided in section 5 of this REF.

2 Description of activity

2.1 Location

The activity is proposed at Narrawallee Beach, Narrawallee (Lot 7009/-/DP1116370) within the Shoalhaven LGA.

The locality of the activity is shown in Figure 1. The study area is shown in Figure 2.

The project area and surrounding lands predominantly comprise residential use associated with the towns of Narrawallee and Mollymook, dense bushland and rural areas.

The relevant attributes and regulatory controls for the impact area are summarised in Table 1.

Table 1 Site details

Site location and address	Narrawallee Beach, Narrawallee NSW 2539
Local Government Area (LGA)	Shoalhaven City Council
Lot Deposited Plan (DP)	7009/-/DP1116370
Land Zoning	RE1: Public Recreation
Land Tenure	Crown land
Land-use	Public Beach
Nearest waterway	Narrawallee Creek, Pacific Ocean
IBRA Bioregion	Sydney Basin Bioregion

2.2 Proponent details

The key information about the proponent is set out in Table 2.

Table 2 Project details

Proponent name	Shoalhaven City Council 36 Bridge Road, Nowra NSW 2541
Proponent's representative	Peter Swanson Lead – Land Management
Proponent representative contact details	02 4429 3850 Peter.swanson@shoalhaven.nsw.gov.au

2.3 Proposed activity

The proposed activity comprises an amendment to the existing dog off-leash access arrangements at Narrawallee Beach, within the designated area between BA1 and BA8, referred to as the site in this REF (Figure 1). The sandy beach, immediately below the vegetated incipient dune, is the landward boundary of the

site. This includes the area of potential direct impact on the community and the environment from the proposed activity. An area including a 50-metre buffer to the site, where direct and indirect impacts on the community and the environment may occur, has also been assessed, and is referred to as the study area.

The proposed activity includes the extension of the existing timed off-leash access to 24 hours, 7 days a week during the winter period (1 May – 30 September) in the area between BA3 and BA8. The existing access arrangements during the summer period (1 October – 30 April) would remain unchanged.

The proposal also includes the provision of on-leash dog access from the Victor Avenue steps (BA2) and Surfers Avenue steps (BA1) north to the designated off-leash area at BA3. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.

Ancillary works associated with the proposed activity will include the installation of updated signage to reflect the amended access arrangements. Signage installation will primarily involve replacing signs on existing posts.

It is a recommendation of this REF that Council consider installation and maintenance of new street signs at the intersections of Victor Avenue and Matron Porter Drive and the intersections of Surfers Avenue with Matron Porter Drive and Tallwood Avenue stating (or similar to):

Residential vehicles only – no public access to Narrawallee Beach – beach access via Matron Porter Drive.

Accordingly, this REF assesses the direct and indirect community and environmental impacts associated with the proposed activity, inclusive of ancillary works, within the site and study area.

2.4 Land ownership and management

The Narrawallee Beach foreshore (Lot 7009 DP 1116370) comprises Crown land managed by Council under the NSW *Crown Land Management Act 2016* (CL Act). The land is reserved for public recreation, as notified in the NSW Government Gazette on 8 September 1978, with Council appointed as Trust Manager (NSW Government Gazette No. 41, 23 February 2001).

In accordance with the CL Act, the land is managed as community land under the NSW *Local Government Act 1993* (LG Act). The area of Narrawallee Beach foreshore in the site was categorised as 'Natural Area' in 2020. The land is zoned RE1 Public Recreation under the LEP.

2.5 Historical context

Dog off-leash access arrangements at Narrawallee Beach have been subject to ongoing review and refinement through successive Council decisions, trials, and environmental assessments (Shoalhaven City Council 2022; Ecoplaning, 2024).

Early investigations into formalising dog off-leash access commenced in 2000, with initial recommendations proposing broad temporal access across the foreshore reserve and beach. This proposal attracted significant community concern and was not progressed following public feedback (Shoalhaven City Council 2022).

In 2005, Council adopted its first formal dog access framework, which designated several dog-prohibited areas across the locality, including Narrawallee Beach and the foreshore reserve extending from Narrawallee

Inlet Creek to Surfers Avenue. The section between Victor Avenue and the offshore rock platform known locally as Bernie's Rock remained subject to on-leash requirements under the CA Act.

From 2015 onwards, a series of staged trials were implemented to refine access arrangements. This included the establishment of an approximately 540 metre off-leash area between Bernie's Rock and the Victor Avenue access point, supported by transitional on-leash arrangements during the trial period.

Further amendments were introduced through 2019 and 2020, including short-term trials of alternative access routes and the establishment of a defined on-leash transit corridor between Surfers Avenue and Victor Avenue. Feedback from approximately 100 stakeholders and community members during this period informed subsequent Council decisions (Shoalhaven City Council 2022).

In 2021, Council resolved to adjust the boundaries of the off-leash area, extend signage across multiple access points, and refine seasonal timing provisions. Subsequent amendments later that year reinstated Victor Avenue as the southern boundary of the off-leash area while maintaining the northern extent near Parkinson Street, alongside continued on-leash transit provisions through the foreshore.

An REF by Ecoplaning (2024) further assessed the environmental and social implications of off-leash dog activity and considered appropriate boundary refinements to minimise ecological and recreational impacts.

The assessment identified key areas requiring protection, including the maintenance of a dog-prohibited buffer north of BA8 to protect the high-value ecological communities associated with Narrawallee Creek Inlet, which supports threatened and migratory shorebird habitat. It also recommended retention of a dog-prohibited buffer south of BA3 to protect rock platform foraging habitat and reduce potential user conflict in a highly utilised section of the beach. The study supported extension of the off-leash area northward from BA7 to BA8, reflecting a balance between environmental constraints and recreational demand.

In November 2023, following legal proceedings, Council resolved to remove the on-leash transit corridor between Surfers Avenue and Victor Avenue and reclassify the area between Victor Avenue (BA2) and Matron Porter Drive (BA3) as dog-prohibited. Council also resolved to update the REF and present findings and recommendations for final determination at a future Ordinary Meeting of Council.

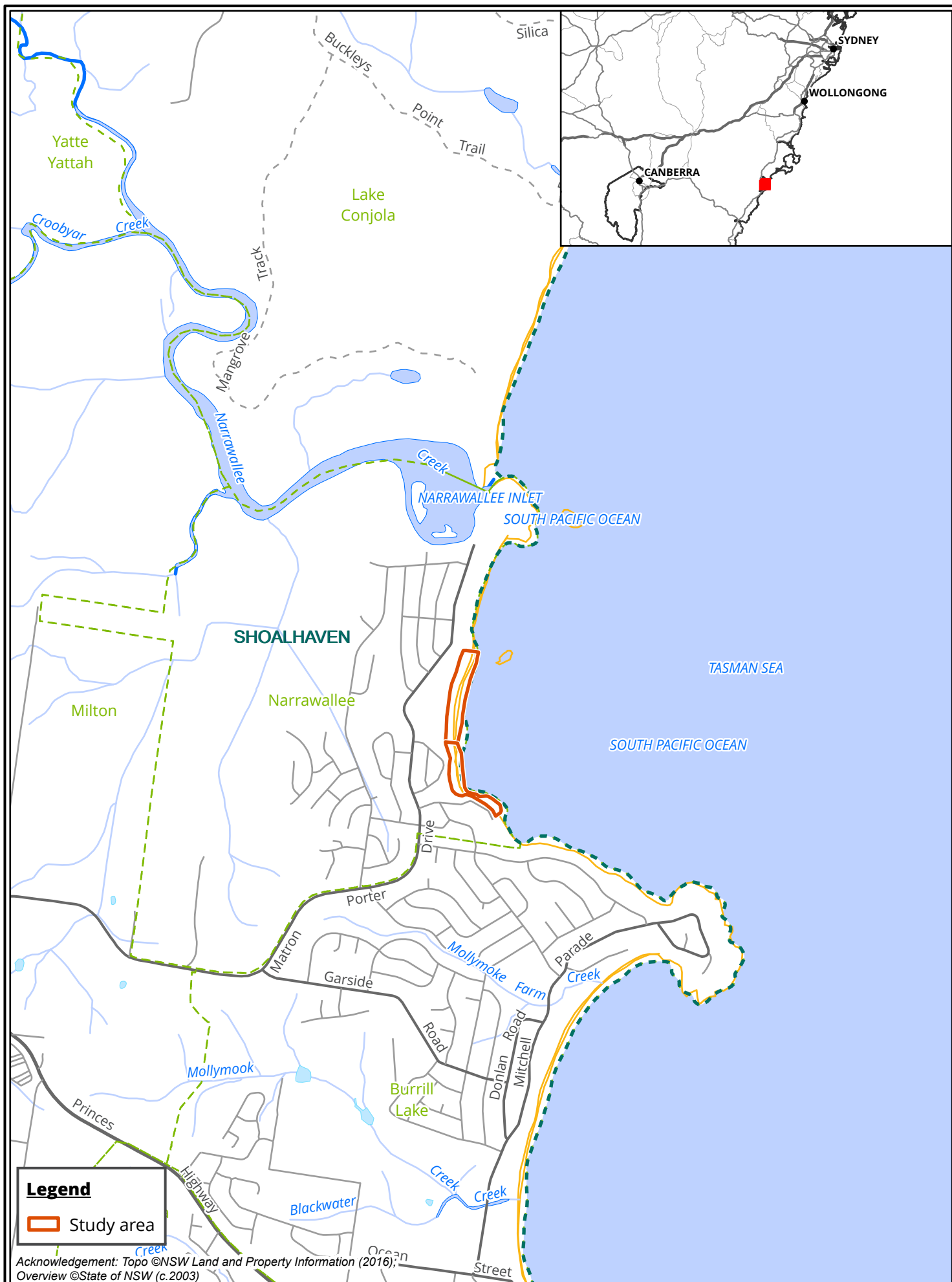


Figure 1 Location of the study area

Matter: 43836, Date: 23 April 2026,
 Prepared for: KP, Prepared by: LH, Last edited by: lharley
 Location: P:\43800s\43836\Mapping\43836_NarrawalleeBeachREF
 Layout: 43836_REF_F1_Locality



- Legend**
- Study area
 - Lot
 - Dog prohibited area
 - Existing dog off-leash activity area
 - Proposed extension of dog on-leash activity area
 - Proposed extension of dog on-leash activity area - not recommended
 - Beach access point

Figure 2 Proposal area and proposed impact footprint

0 30 60 90 120
Metres
Scale: 1:3,500@ A3
Coordinate System:
GDA2020 MGA Zone 56

biosis
APEM Group

Matter: 43836, Date: 07 May 2026,
Prepared for: KP, Prepared by: LH, Last edited by: lharley
Location: P:\43800s\43836\Mapping\
43836_NarrawalleeBeachREF,
Layout: 43836_REF_F2_ProposedWorks

3 Reason for the activity

3.1 Current Council resolution

Report CL25.254 was presented to the ordinary meeting of Council on 12 August 2025, which stated the following.

On 22 July 2025, the elected Council has proposed amendments to the current dog access arrangements at Narrawallee Beach, including on-leash access to the Victor Avenue and Surfers' Avenue stairs and the potential for 24/7 off-leash beach access during winter.

Pursuant to Section 5.5(1) of the EP&A Act, Council has a duty to consider the environmental impacts of the proposed activity. This will require a new REF in accordance with Section 171 of the EP&A Regulation.

This assessment will be required to examine and take into account to the fullest extent possible the environmental impacts of the proposed amended arrangements and include consideration of the information currently available to Council and the collection of additional data.

Based on this, Council resolved in the ordinary meeting to:

1. Receive and note the report.
2. Allocates an additional budget of \$60,000 at the next Quarterly Budget Review to be funded from the Dog Off Leash Reserve for the preparation of a Review of Environmental Factors (REF), community consultation and collection of associated data.
3. Engage a suitably qualified consultant to collect necessary associated data and to prepare a Review of Environmental Factors (REF) on the proposed access and off-leash arrangements at Narrawallee Beach, as detailed in MIN25.334 in accordance with s 5.5(1) of the Environmental Planning and Assessment Act 1979 (NSW), namely:
 - a. From 2 October to 30 April timed dog off-leash access on Narrawallee Beach during the following times:
 - i. Australian Eastern Daylight Savings Time: 4pm to 8am; and
 - ii. Australian Eastern Standard Time: 3pm to 10am.
 - b. Provision of dog on-leash access from the Victor Avenue steps and the Surfers' Avenue steps to the dog off leash area.
4. Receive a report considering the draft REF before it is placed on public exhibition.

This REF has been engaged and prepared in response to this resolution.

3.2 Activity objectives

The objectives of the activity are to:

- Respond to community-expression for increased off-leash dog access during the winter period.
- Improve accessibility and amenity for all Shoalhaven dog owners.
- Provide clear and formalised on-leash access arrangements from BA2 north to BA3, improving accessibility between the residential area of Victor and Booth avenues and the designated off-leash zone.

- Maintain appropriate environmental protections, including the retention of dog-prohibited buffers to the north of BA8 and south of BA2, consistent with the biodiversity conservation values of Narrawallee Creek Inlet and the southern rock shelf.
- Ensure dog access arrangements at Narrawallee Beach are consistent with Council's obligations under relevant legislation and reflect current community needs.

3.3 Options and alternatives

In accordance with Part 5 of the EP&A Act, consideration has been given to feasible alternatives to the proposed modification of dog access arrangements at Narrawallee Beach. These alternatives have been informed by previous trials, community feedback, and environmental assessments (Shoalhaven City Council 2022; Ecoplaning 2024).

A 'do nothing' option was considered, whereby the current dog access arrangements would remain unchanged. While this option would avoid any potential incremental impacts associated with increased off-leash access, it would not respond to identified community demand for improved recreational access or build upon the outcomes of previous trials and assessments.

Alternative configurations of the off-leash area, including expansion further north or south, were also considered – it was originally proposed to extend on-leash access from BA1 to the area between BA3 and BA8.

However, previous investigations identified environmental constraints that limit the suitability of these areas. Land north of BA8 provides an important buffer to the ecologically sensitive Narrawallee Creek Inlet, which supports threatened and migratory shorebird habitat, while areas south of BA3 include rock platform environments used for foraging and are subject to higher recreational use (Ecoplaning 2024). Expansion into these areas would increase the risk of adverse ecological and social impacts.

Alternative access arrangements, including different on-leash transit routes, have been trialled and refined over time in response to community feedback and operational considerations (Shoalhaven City Council 2022). These trials informed the current access configuration and demonstrated the need to balance accessibility with environmental protection and user safety.

The preferred option, to extend off-leash access hours within the existing BA3 to BA8 area during the winter period and formalise on-leash access arrangements, builds upon previous assessments and established management boundaries. This approach avoids encroachment into environmentally sensitive areas while providing a measured improvement in recreational access. As such, it represents a balanced outcome that minimises environmental impacts while responding to community use of the beach.

4 Legislative context

This chapter provides an overview of key environmental legislation and government policy considered in this assessment.

4.1 Legal permissibility

The proposed activity is subject to Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Shoalhaven City Council is both a public authority proponent and the determining authority (EP&A Act s. 5.1).

Under section 5.5 of the EP&A Act, determining authorities have a duty to consider:

1. *For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account matters affecting or likely to affect the environment by reason of that activity.*
2. *For subsection (1), a determining authority may take into account the matters referred to in the subsection in a manner that is proportionate to the nature and risk of the activity.*
3. *Without limiting subsection (1), a determining authority shall consider the effect of an activity on any wilderness area (within the meaning of the Wilderness Act 1987) in the locality in which the activity is intended to be carried on.*
4. *(Repealed)*

This REF has been prepared to address the requirements at Part 5 of the EP&A Act and has been prepared in accordance with section 171 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation).

The activity has been assessed and is permissible under the relevant legislation listed below.

4.2 NSW legislative context

4.2.1 NSW Environmental Planning and Assessment Act 1979

The EP&A Act and EP&A Regulation were enacted to encourage the proper consideration and management of impacts of proposed development or land-use changes on the environment (both natural and built) and the community.

The EP&A Act provides the overarching structure for planning in NSW and is supported by the EP&A Regulation and other statutory environmental planning instruments (EPis), such as State environmental planning policies (SEPPs) and local environmental plans (LEPs).

Dog access on Narrawallee Beach constitutes an 'activity' as defined under Part 5 of the EP&A Act. This REF assesses all potential impacts of the proposed activity. Aspects of the proposed activity are documented in Section 2.3. Section 6 includes an assessment against factors (a) – (r) in Section 171 of the EP&A Regulation. Potential impacts of the proposed activity are detailed in Section 6 and the spatial limitations of the proposed activity and other mitigation measures are provided in Section 7.

Section 5.7 of the Environmental Planning and Assessment Act 1979 requires a determining authority to consider whether an activity is likely to significantly affect the environment, including threatened species, populations and ecological communities. Where a significant impact is likely, an Environmental Impact Statement (EIS) must be prepared.

A flora and fauna assessment has been prepared for the proposal (Appendix 2), which includes an assessment of threatened species listed under the Biodiversity Conservation Act 2016 and the Environment Protection and Biodiversity Conservation Act 1999. The assessment concludes that, with the implementation of mitigation measures outlined in Section 7, the proposal is not likely to result in a significant impact on threatened or migratory species. Accordingly, an EIS is not required.

Section 1.7 of the EP&A Act applies the provisions of Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) and Part 7A of the *Fisheries Management Act 1994* (FM Act)). Proponents and consent authorities must consider if a development will have a significant effect on threatened species, populations or communities listed under the BC Act and FM Act.

Section 7.3 of the BC Act and Part 7A of the FM Act outline the factors that must be taken into account in a test of significance (ToS). Where any ToS determines that a development will result in a significant effect to a threatened biota, a species impact statement (SIS) or biodiversity development assessment report (BDAR) is required.

Threatened species, populations and communities listed under the BC Act and FM Act are discussed in Section 6.1.

4.2.2 NSW Crown Land Management Act 2016

Council is the appointed Crown land manager of Narrawallee Beach (Crown land reserve R91246 - Lot 7009 DP 1116370) under the CL Act.

Where a plan of management (PoM) exists for Crown land, it may identify and authorise certain works that can be undertaken by a public authority and the pre-conditions (if any) for implementing those works.

The *Generic Community Plan of Management – Natural Areas* is the applicable PoM. The core objectives for management of community land categorised as foreshore that are set out in the CL Act and the PoM are:

- *To maintain the foreshore as a transition area between the aquatic and the terrestrial environment, and to protect and enhance all functions associated with the foreshores' role as a transition area, and*
- *To facilitate the ecologically sustainable use of the foreshore, and to mitigate impact on the foreshore by community use.*

The proposed activity is in line with the first objective, as it (with the implementation of mitigation measures) will not impact on the foreshores' role as a transition area between the aquatic and terrestrial environment. The proposed activity also meets the second objective, in that dogs will continue to be excluded from the sensitive environment area at Narrawallee Creek Inlet and south of BA2, where there is known threatened shorebirds habitat. The PoM, as well as Council's Foreshore Reserves Policy (POL16/242) does not preclude the proposed activity.

4.2.3 NSW Coastal Management Act 2016

The NSW *Coastal Management Act 2016* (CM Act) establishes the framework and overarching objectives for coastal management in New South Wales. The purpose of the CM Act is to manage the use and development of the coastal environment in an ecologically sustainable way. The CM Act achieves this by designating 'coastal

management areas' for the NSW coastal zone and assigning specific objectives for the management of these areas.

Narrawallee Beach is designated as both Coastal Environment Area and Coastal Use Area. Under the CM Act, the management objectives for these areas includes the protection and enhancement of the coastal environment (including but not limited to ecosystem integrity, water quality, coastal and estuarine processes), as well as the protection and enhancement of the social and cultural values of the coast (including but not limited to access to public open space for recreational activities).

The proposed activity (with the implementation of mitigation measures) does not contravene the management objectives of the CM Act.

4.2.4 NSW Companion Animals Act 1998

The principal objective of the CA Act is to provide for the effective and responsible care and management of companion animals. The CA Act is directly relevant to the proposed activity, as it provides the legislative basis for Council's power to declare and manage off-leash areas at beaches within the LGA.

Section 13(6) of the CA Act states that a local authority may, by order, declare a public place to be an off-leash area. Such a declaration can be limited so as to apply during particular periods of the day or to different periods on different days. The proposed extension of off-leash access hours during the winter period (1 May – 1 October) to 24 hours, 7 days a week, is consistent with Council's powers under this provision.

Section 14 of the CA Act prescribes several place types in which dogs are prohibited, regardless of whether they are leashed or otherwise controlled. These include children's play areas, food preparation and consumption areas, recreation areas where dogs are prohibited by order, public bathing areas where dogs are prohibited by order, school grounds, child care centres, shopping areas where dogs are prohibited, and wildlife protection areas.

Having regard to these provisions, the proposed off-leash area between BA3 and BA8 does not include any of the place types listed under Section 14. The dog-prohibited areas retained to the north of BA8 and south of BA2 are consistent with Council's obligations under this provision, providing appropriate buffers to sensitive environmental areas and ensuring the proposal does not conflict with the prohibited place categories prescribed by the Act.

The proposed activity is therefore consistent with the provisions of the CA Act and is within Council's powers as a local authority to implement by order.

4.2.5 NSW Biodiversity Conservation Act 2016

The BC Act is the key piece of legislation providing for the protection and conservation of biodiversity in NSW through the listing of threatened species and communities and key threatening processes (KTPs). Impacts to threatened species and communities are assessed under section 7.3 of the BC Act.

The proposal involves the extension of permitted hours for an existing off-leash dog area and the introduction of new on-leash access within a coastal environment. No vegetation clearing or ground disturbance is proposed as part of the works.

The existing off-leash dog area provides low condition habitat for threatened shorebirds due to the high level of existing disturbance from public use and dog activity. The intertidal zone within this area offers limited refuge at high tide and is therefore of low suitability for roosting or nesting. Higher quality shorebird habitat is located outside the study area, including a reference site at the inlet of Narrawallee Creek to the north, where

Sooty Oystercatcher and Pied Oystercatcher have historically been recorded, and a fenced shorebird protection area at the southern section of Buckleys Beach.

Within the study area, the southern section of the beach provides relatively higher value habitat at high tide; however, it is subject to regular disturbance from recreational use and is unlikely to support nesting. The area may be intermittently used for foraging. Two foraging habitats were identified, including a reef platform to the east of the Surfers Avenue access stairs and a tidal reef offshore from the northern extent of the off-leash dog area.

A ToS assessed potential impacts to threatened species. The ToS concluded that the activity is not likely to have a significant impact on threatened shorebird species or their habitat. This conclusion is based on the already disturbed nature of the site, the low suitability of habitat within the existing off-leash area, continuation of the dog prohibited area south of BA2 and the separation from higher value and protected habitats located outside the study area.

Accordingly, the proposal is not expected to significantly affect threatened species, populations or ecological communities listed under the BC Act, and the preparation of a BDAR or SIS is not required.

Threatened species and communities listed under the BC Act are discussed in Section 6.1 of this REF.

4.2.6 NSW National Parks and Wildlife Act 1974

The main aim of the NSW *National Parks and Wildlife Act 1974* (NPW Act) is to conserve the natural and cultural heritage of NSW. The NPW Act is responsible for the control and management of all national parks, historic sites, nature reserves, and Aboriginal areas in NSW (among others).

Background research included a search of the Aboriginal Heritage Information Management System (AHIMS) database and a review of relevant reports. The AHIMS search (Client Service ID: 1086831), conducted on 29 January 2026, identified 79 Aboriginal archaeological sites within a 4 x 4-kilometre search area centred on the project area. None of these sites are located within the project area; however, four sites are located within 200 metres.

An archaeological survey of the project area was undertaken by Biosis on 5 February 2026. The survey identified one new Aboriginal site (AHIMS pending / Narrawallee Beach Dog Access AS1) and an area of potential archaeological deposit (PAD).

The proposal is limited to the extension of permitted hours for off-leash dog access and the introduction of on-leash access at Victor Avenue and Surfers Avenue. No ground disturbance, excavation, or vegetation clearing is proposed. As such, the proposal will not result in direct impacts to the identified Aboriginal site or PAD.

4.2.7 NSW Heritage Act 1977

The NSW *Heritage Act 1977* makes provisions to conserve the environmental heritage of NSW. It provides for the identification and registration of items of state heritage significance, provides for the interim protection of items of state heritage significance, constitutes the Heritage Council of NSW and confers on it functions relating to the State's heritage. There are no State heritage items listed at the project area and the project area is not subject to an interim heritage order. Therefore, the provisions of this Act do not apply.

4.2.8 NSW Protection of the Environment Operations Act 1997

The NSW *Protection of the Environment Operations Act 1999* (POEO Act) regulates and controls pollution of land, air, water, and the emission of noise and provides for environment protection licenses, notices and offences.

The proposed activity (with the implementation of mitigation measures) aligns with the objects of the POEO Act as impacts associated with pollution or waste management are considered unlikely to occur.

Furthermore, the proposed activity does not constitute a scheduled activity as listed in Schedule 1 of the POEO Act and does not require an environmental protection licence.

4.2.9 NSW Local Land Services Act 2013

No clearing of vegetation is proposed. No separate authorisation under this Act is required.

4.2.10 NSW Water Management Act 2000

Local councils are exempt from section 91E(1) of the NSW *Water Management Act 2000* (WM Act) in relation to all controlled activities that they carry out in, on or under waterfront land (by virtue of section 41 of the Water Management (General) Regulation 2018).

The proposed activity would not interfere with the aquifer and therefore an interference licence is not required (section 91F).

4.2.11 NSW Aboriginal Land Rights Act 1993

There are unresolved land claims on the subject site; however, the Act does not preclude the activity taking place on the subject site. The Crown reserve has lawfully been used as a recreational area prior to the lodgement of the land claim.

The proposed activity would not affect or complicate the assessment of the land claim as it is temporary in nature and would not diminish the size or nature of the land.

Therefore, despite the proposed activity, the land would remain as 'claimable land' as defined in this Act.

4.2.12 State Environmental Planning Policies and Local Environmental Plan(s)

SEPPs are environmental planning instruments made under the EP&A Act that outline policy objectives relevant to state or regional environmental planning issues. SEPPs that are relevant to the project are detailed below.

State Environmental Planning Policy (Transport and Infrastructure) 2021

The aim of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) is to facilitate the effective delivery of infrastructure across NSW.

Pursuant to section 2.73, development for the purposes of recreation areas and outdoor recreation facilities may be carried out by or on behalf of a public authority without consent on any land, and the project is therefore assessed under Part 5 of the EP&A Act.

Consultation requirements under the T&I SEPP are described in Chapter 5.

State Environmental Planning Policy (Biodiversity and Conservation) 2021

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) provides a framework for the protection of biodiversity values and environmentally sensitive land across NSW, including provisions relating to coastal wetlands, littoral rainforests, and other mapped biodiversity areas.

The proposal relates to the modification of dog access arrangements within an existing public recreation area and does not involve vegetation clearing, earthworks, or disturbance to mapped biodiversity values. The activity is located within a coastal environment; however, it is confined to an already disturbed beach setting subject to regular public use.

Potential impacts to biodiversity, including threatened shorebird species and habitat, have been assessed in accordance with the BC Act (refer to Section 6.1 and Appendix 2). The assessment concluded that the proposal is not likely to result in significant impacts to biodiversity values, subject to the implementation of mitigation measures.

Accordingly, the proposal is considered consistent with the objectives of the Biodiversity and Conservation SEPP, as it avoids impacts to mapped biodiversity features and does not result in adverse effects on ecological values.

State Environmental Planning Policy (Resilience and Hazards) 2021

Division 3 – Coastal Environment Area – Section 2.10

Narrawallee Beach is located within the Coastal Environment Area under the State Environmental Planning Policy (Resilience and Hazards) 2021. While the proposal is assessed under Part 5 of the EP&A Act, Council has had regard to the relevant matters for consideration under Section 2.10 of the SEPP.

The proposal has been designed to avoid and minimise impacts to coastal environmental values, including ecological habitats, public access to the foreshore, and natural coastal processes. No physical works, vegetation clearing, or disturbance to coastal landforms are proposed. On this basis, the activity is considered unlikely to result in adverse impacts on the coastal environment and is consistent with the intent of this provision.

4.2.13 Shoalhaven Local Environmental Plan 2014

LEPs are created by councils in consultation with their community and guide planning decisions for local government areas. They apply either to the whole or part of a local government area and make provision for the protection or utilisation of the environment through zoning of land and development controls.

Narrawallee Beach is zoned RE1 Public Recreation under the LEP. This zone provides for public open space and recreation uses, which is consistent with the nature of the proposed activity.

In this circumstance, where development consent is not required, the LEP does not apply. However, all relevant factors of consideration as outlined in Part 8 of the EP&A Regulation are required to be complied with. This REF has been prepared having regard to all relevant matters for consideration under Part 8 of the EP&A Regulation and demonstrates that the proposed activity is consistent with the objectives of the RE1 Public Recreation zone and the broader intent of the LEP.

4.3 Commonwealth

4.3.1 Cth Environment Protection and Biodiversity Conservation Act 1999

The *Cth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (MNES) protected under the Act. Under the EPBC Act, activities that have potential to result in significant impacts on MNES must be referred to the Commonwealth Minister for the Environment and Water for assessment. Any actions that will, or are likely to, have a significant impact on MNES require referral to, and approval from, the Commonwealth Government Minister for the Environment and Water.

In 2015, under Section 45 of the EPBC Act, a bilateral agreement was made between the Australian and NSW Governments relating to environmental assessment and aligning state and federal the Biodiversity Offsets Scheme (BOS). This bilateral agreement was amended (Amending Agreement No.1) effective 24 March 2020. Under Amending Agreement No.1, the NSW Biodiversity Assessment Method (BAM) and Biodiversity Offsets Scheme (BOS), as introduced under the BC Act, are Accredited processes under the EPBC Act.

A proponent must make a Referral under section 68 of the EPBC Act if the proposed action has the potential to result in significant impacts to MNES.

A review of the Protected Matters Search Tool and ecological assessment determined that threatened and migratory species listed under the EPBC Act occur or are considered likely to occur within the study area.

The proposal involves the extension of permitted hours for an existing off-leash dog area and the introduction of on-leash access, with no vegetation clearing or habitat removal proposed. Given the low suitability of habitat due to existing disturbance, the proposal is not expected to result in a significant impact on any MNES.

Accordingly, the proposal does not constitute a controlled action under the EPBC Act, and referral to the Commonwealth Minister for the Environment is not required.

4.3.2 Cth Native Title Act 1993

The *Cth Native Title Act 1993* recognises traditional interests in land of Aboriginal and Torres Strait Islander people and provides an avenue for land title claims against Crown land.

The proposed activity can be undertaken as a valid act under Subdivision 24LA Low Impact Future Acts as the act does not consist of, authorise, or otherwise involve:

- a) The grant of a freehold estate
- b) The grant of a lease
- c) The conferral of a right of exclusive possession
- d) The excavation or clearing of any of the land or waters (see note below)
- e) Mining
- f) The construction of placing on the land, or in the waters, of any building, structure, or other thing (other than fencing or a gate), that is a fixture, or

g) The disposal or storing, on the land or in the waters, of any garbage or any poisonous, toxic or hazardous substance.

The non-extinguishment principle applies to this Act and no referral or request for comment to Native Title Service Provider for Aboriginal Traditional Owners is required.

5 Agency, community and stakeholder consultation

This section describes the agency, community and stakeholder consultation undertaken for the activity.

5.1.1 Consultation under State Environmental Planning Policy (Transport and Infrastructure) 2021

Division 1 of the TISEPP recommends consultation with affected stakeholders Table 3.

Table 3 SEPP (Transport and Infrastructure) 2021 consultation requirements

TISEPP reference	Section	Is consultation required and with who?
Section 2.10	Impacts on council-related infrastructure or services Consultation is required if the public authority is of the opinion that the development: - Will have a substantial impact on stormwater management services provided by a Council, or - Is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or - Involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a Council, or - Involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a Council, or - Involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or - Involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the <i>Roads Act 1993</i> (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).	No
Section 2.11	Impacts on local heritage Consultation is required if the development: - Is likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item in a way that is more than minor or inconsequential, and - Is development that this Policy provides may be carried out without consent.	No
Section 2.12	Impacts on flood liable land – Council In this clause, flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled Flood Risk Management Manual: the management of flood liable land published by the NSW Government and as in force from time to time	No
Section 2.13	Impacts on flood liable land – State Emergency Service In this clause, flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set	No

TISEPP reference	Section	Is consultation required and with who?
	out in the manual entitled Flood Risk Management Manual: the management of flood liable land published by the NSW Government and as in force from time to time.	
Section 2.14	Impacts on Coastal Vulnerability land Development on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program that applies to that land.	No
Section 2.15	Consultation with public authorities other than councils Consultation is required if the development is: a) Adjacent to land reserved under the <i>National Parks and Wildlife Act 1974</i> or to land acquired under Part 11 of that Act—the Office of Environment and Heritage. b) On land in Zone E1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone (except for land reserved under the NPW Act—the Office of Environment and Heritage. c) Comprises a fixed or floating structure in or over navigable waters – Transport for NSW. d) May increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map—the Director of the Observatory. a. Note. The dark sky region is land within 200 kilometres of the Siding Spring Observatory. e) On defence communications facility buffer land within the meaning of section 5.15 of the Standard Instrument—the Secretary of the Commonwealth Department of Defence. a. Note. Defence communications facility buffer land is located around the defence communications facility near Morundah. See the Defence Communications Facility Buffer Map referred to in Clause 5.15 of Lockhart Local Environmental Plan 2012, Narrandera Local Environmental Plan 2013 and Urana Local Environmental Plan 2011. f) On land in a mine subsidence district within the meaning of the <i>Coal Mine Subsidence Compensation Act 2017</i>—the NSW Mine Subsidence Advisory. g) On, or reasonably likely to have an impact on, a part of the Willandra Lakes Region World Heritage Property—the World Heritage Advisory Committee and Heritage NSW. Within a Western City operational area specified in the Western Parkland City Authority Act 2018, Schedule 2 with an estimated development cost of \$30 million or more— the Western Parkland City Authority constituted under that Act .	No

5.1.2 Agency consultation

State agency consultation

No state agency consultation has been undertaken to date.

Commonwealth agency consultation

No Commonwealth agency consultation has been undertaken. As the proposed activity will not impact upon MNES under the EPBC Act, consultation with the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) is not required.

5.1.3 Community and stakeholder consultation

Consultation Approach

Community consultation was undertaken by Becscomm on behalf of Shoalhaven City Council to inform the proposed modification of dog access arrangements at Narrawallee Beach.

A range of communication methods were implemented to ensure broad community awareness and participation. A dedicated project webpage hosted on Council's 'Get Involved' platform served as the primary information source and included project background, details of the proposed changes, an explanation of the REF process, and access to the community questionnaire. This was supported by social media posts, a media release, and printed materials (including on-site signage with QR codes), which directed community members to the project information.

Targeted notification was also undertaken through direct mail to approximately 90 residents located near key access points, including Surfers Avenue, Victor Avenue and Matron Porter Drive. Additional support was provided through Council's customer service channels and Councillor briefings.

Engagement activities were designed to capture both broad community input and targeted stakeholder perspectives. A community questionnaire was open between 6 February and 8 March 2026, receiving a total of 1,046 responses. The questionnaire was structured to capture community values, priorities, and views on environmental and management considerations, rather than simple support or opposition.

Targeted engagement included stakeholder meetings with local community groups, businesses, and the local Surf Life Saving Club, as well as on-site interviews with beach users.

Key Issues raised

The key overarching themes identified are outlined below:

- **Accessibility** – limited accessibility via Victor Avenue and Surfers Avenue stairs, constraints for reduced mobility users, reliance on vehicle access via Matron Porter Drive, concerns regarding stair condition, lighting, and safety at access points, potential user conflicts at entry locations.
- **Safety and user experience** – mixed perceptions of safety, generally effective dog control reported by some users, concerns regarding interactions between dogs and other beach users, conflicts at access points, congestion during peak periods, discomfort with off-leash dogs for some users.
- **Environmental protection** – importance of protecting shorebirds and coastal habitats, support for evidence-based environmental management and responsible dog ownership, concerns regarding wildlife disturbance near sensitive areas, localised impacts such as dog waste at access points.
- **Compliance and management** – need for clear rules, signage and enforcement, mixed views on compliance levels, reports of dogs off-leash in restricted areas, some users considering current compliance acceptable.
- **Community use and social value** – beach valued as a key recreational and social asset, dog walking as an important community activity, differing user preferences, some avoidance of the beach due to dogs, support from others for increased access.

- **Business and recreation** – supports recreational and commercial activities including surf lessons and local businesses, positive contribution of dog access to tourism and local economy, concerns regarding congestion and disruption near access points.
- **Amenity (noise and parking)** – noise generally considered typical of beach environment, concerns from nearby residents regarding barking, seasonal and time-based parking pressures, potential changes to access arrangements influencing parking demand distribution.

Consideration of feedback

Council received 1,046 questionnaire responses, supported by targeted stakeholder engagement and on-site discussions. Consultation identified key themes relating to accessibility, safety and user conflict, environmental values, compliance and management, community use, and amenity, which have informed the assessment of potential environmental and social impacts within this REF.

Feedback relating to accessibility and safety identified constraints at key access points, including Victor Avenue and Surfers Avenue, as well as concerns regarding infrastructure condition, pedestrian access, and user interactions between dogs and other beach users. Environmental protection was also consistently raised, with emphasis on shorebird habitat values and potential disturbance risks. These matters have informed the assessment of public safety, ecological sensitivity, and social impacts associated with the proposal.

Consultation also highlighted the importance of clear signage, enforcement, and education to support compliance, along with differing views on dog access reflecting competing community uses of the beach. Amenity considerations, including noise, parking demand, and impacts on surrounding land uses, have also been considered in the assessment.

The issues raised have informed the identification of potential impacts and the development of mitigation measures within this REF, specifically:

- The addition of a quantitative noise assessment to the REF scope (Appendix 4).
- Recommendation to continue dog prohibited area south of BA2 to prevent direct and indirect impacts to potential threatened shorebird foraging habitat.
- Recommendation that Council consider installation and maintenance of new street signs at the intersections of Victor Avenue and Matron Porter Drive and the intersections of Surfers Avenue with Matron Porter Drive and Tallwood Avenue stating (or similar to):

Residential vehicles only – no public access to Narrawallee Beach – beach access via Matron Porter Drive.

6 Environmental impact assessment

This section of the report describes the existing environment within the project area, based on desktop information and assessments conducted to support this REF.

6.1 Biodiversity

A flora and fauna assessment (FFA) (Biosis, 2026) was prepared to assess the potential impacts of the proposed works on the biodiversity values within and around the study area (refer to Appendix 2). Site assessment was undertaken by Biosis on 5th February 2026.

6.1.1 Desktop assessment

Biosis reviewed literature and information relevant to the locality and the Shoalhaven LGA:

- Australian Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) Protected Matters Search Tool for matters protected by the EPBC Act.
- BirdLife Australia BirdData database, for records of bird species observations including threatened and migratory species (BirdLife Australia 2025).
- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) BioNet Atlas of NSW Wildlife, for items listed under the BC Act.
- The NSW Department of Primary Industries and Regional Development (DPIRD) Spatial Data Portal for Fisheries Management Act 1994 (FM Act) listed threatened species, populations and communities (DPIRD 2025).
- NSW DPIRD Biosecurity Act 2015 for listed priority weeds for the Southeast Local Land Services area.
- NSW DCCEEW Vegetation Information System (VIS) mapping including the NSW State Vegetation Type Map (SVTM C2.0M2.2) (NSW DCCEEW 2025b).

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- EPBC Act.
- EP&A Act.
- BC Act.
- CM Act.
- NPW Act.
- WM Act.
- FM Act.
- Biosecurity Act 2015 (Biosecurity Act).
- LEP.

6.1.2 Existing environment

The study area is located approximately three kilometres north of Ulladulla, in the township of Narrawallee. Narrawallee Beach is an open-coast beach, approximately 1.4 kilometres in length, with Narrawallee Creek Nature Reserve and Narrawallee Creek Inlet located north of the study area.

The project area comprises a sandy ocean beach to the east and an approximately 200-metre-wide vegetated dune system to the west. The dune system separates the beach from the established residential area of Narrawallee, with pedestrian access to the beach provided via a number of formal beach access points.

Vegetation communities

Observed vegetation communities are summarised in Table 4.

Table 4 Summary of vegetation communities within the project area

Plant Community Type (PCT)	EPBC Act status	BC Act / FM Act status	Associated Threatened Ecological Community (TEC)	Extent within project area
PCT 3805 – Southern Sandplain Heath	Not listed	Not listed	N/A	Occurs within study area
PCT 3410 – Spinifex Strandline Grassland	Not listed	Not listed	N/A	Occurs within study area
Bangalay Sand Forest (mapped within adjacent areas)	Not listed	Listed under BC Act	Bangalay Sand Forest in the Sydney Basin and Southeast Corner bioregions	Occurs adjacent to subject site, outside direct impact area

Terrestrial species and habitats

Thirteen threatened flora species and 135 threatened fauna species are predicted to occur within 5 kilometres of the project area.

Four threatened species has been identified as having a medium or greater likelihood of occurrence in the project area based on habitat availability (Table 5). Table 6 discusses areas of value for all species with a medium or greater likelihood of occurrence and determines the need for a ToS for species listed under the BC Act and/or a SIC assessment for species listed under the EPBC Act.

Table 5 Assessment of habitat for threatened shorebird species

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
Sandy beach areas	Threatened shorebirds use beach areas for foraging, nesting and/or roosting. Shorebirds commonly forage on small invertebrates in the swash zone or in the accumulated seaweed and debris along the shoreline. The foredunes are primarily used for nesting and roosting, providing short access to foraging resources and protection from high tides and disturbances.	The study area had low opportunities for roosting/nesting habitat due to the limited foreshore area and frequent impact from humans and storms. Based on the transient nature of threatened shorebird species and surrounding resources and connectivity to Narrawallee Creek Inlet within the landscape there is not likely to be an impact

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
		to significant impact to roosting shorebird species in this area. Foraging resources within the study area are limited, due to a narrow swash zone and increased disturbance from public use compared to the northern section of the beach and the Narrawallee Creek inlet area. As sandy beach habitats provide potential foraging resources, further assessment has been undertaken for the Little Tern, Eastern Hooded Plover, Pied Oystercatcher, and Sooty Oystercatcher. The Caspian Tern, Crested Tern and Short-tailed Shearwater do not utilise sandy beach foraging resources, therefore, further assessment of these species in relation to the study area is not required.
Intertidal reefs and Rockpools	The reefs and rockpools provide a variety of foraging resources such as molluscs crustaceans and worms to threatened shorebirds. Rock platforms and headlands are also used for roosting to provide protection from high tide and disturbances.	The study area contains two significant intertidal reefs. The first is located in the southern boundary near BA1 and a nearshore intertidal reef near BA3 (Figure 2). The foraging resources in this area is of moderate to high quality with a variety of shorebird species likely to use these resources including the Pied Oystercatcher and Sooty Oystercatcher. Further assessment is required for these species. The Eastern Hooded Plover forages within sandy beach habitats, while the Little Tern, Caspian Tern, Crested Tern and Short-tailed Shearwater forage primarily within coastal and offshore marine waters. None of these species rely on intertidal rock reefs or rockpools for foraging; therefore, further assessment in relation to indirect impacts to these habitats is not required.
Estuaries	Estuaries and coastal inlets are key foraging and roosting habitat for threatened shorebirds. The intertidal mud and sandflats are the primary foraging areas, with areas above the high-tide line such as sand spits and banks providing high quality roosting habitat. Estuaries are key habitats for migratory species to provide protection and conserve energy between migratory periods.	The study area does not contain estuary habitat, however it is present 600 metres north of the study area at Narrawallee Creek Inlet. The Narrawallee Creek Inlet has an established protected shorebird habitat area on the northern bank, with signage and fencing to minimise disturbance.

Table 6 **Threatened fauna likely to occur in the project area**

Species/community name	EPBC status	BC status	Relevance to project area and potential for impact	SIC	ToS
Fauna					
Eastern Hooded Dotterel	Listed	Critically endangered	The Eastern Hooded Dotterel has multiple recorded occurrences within the local area, including a record approximately 540 metres from the study area, indicating regular use of nearby coastal habitats. The species' reliance on open sandy beaches and adjacent dune systems for nesting and foraging suggests it may occur in or near the project area, particularly where suitable undisturbed beach habitat is present. Potential impacts include disturbance from increased human presence, noise, and movement, as well as indirect effects such as habitat modification, which may reduce breeding success through nest abandonment, trampling of eggs or chicks, or reduced site suitability.	Y	Y
Little Tern	Listed	Endangered	The Little Tern has been recorded within the local area, and within the study area, indicating potential use of nearby coastal habitats for foraging and/or breeding. Given its preference for sandy beaches, estuary mouths and sheltered coastal environments, the species may occur intermittently in or near the project area during migration and breeding periods. Potential impacts may arise if works involve disturbance to coastal or estuarine habitats, particularly through noise, increased human activity, vegetation clearing, or physical alteration of sandy substrates, which could affect nesting success or cause disturbance to breeding colonies.	N	Y
Pied Oystercatcher	Listed	Endangered	Recorded within the local 5 km search area, with the nearest record approximately 100 m from the study area (2025). The species may utilise adjacent intertidal beach habitats for foraging and occasional roosting. Potential impacts associated with the proposal are primarily indirect and relate to disturbance from increased human and dog activity along the foreshore, including displacement from foraging or roosting areas and potential disturbance during the breeding season (August–January). No confirmed nesting habitat occurs within the study area, and impacts are expected to be low with implementation of appropriate management and control measures.	N	Y

Species/community name	EPBC status	BC status	Relevance to project area and potential for impact	SIC	ToS
Sooty Oystercatcher	Listed	Vulnerable	Recorded within the local search area, including a recent record approximately 80 m from the study area (2025). The species is likely to utilise adjacent beach and intertidal habitats for foraging. Potential impacts from the proposal are primarily indirect and relate to disturbance from increased human and dog activity within the coastal foreshore, with a risk of displacement from foraging areas and disturbance during roosting or breeding periods. However, no direct breeding habitat is present within the study area, and impacts are expected to be low with appropriate management measures.	N	Y

6.1.3 Potential Impacts

Given the presence of threatened shorebird records in the local area and their reliance on coastal and sandy beach habitats, potential impacts associated with the proposal are primarily related to disturbance and habitat alteration. These may include:

- Increased human recreational activity within and around coastal areas during winter months will overlap with the start of the breeding period (August–October) for both the Little Tern and Eastern Hooded Dotterel.
- Disturbance during early breeding behaviour may lead to displacement from suitable habitat and disruption of courtship, nesting site selection, and incubation activities.
- Increased domestic dog presence during this period may result in direct disturbance to nesting birds, including flushing from nests and interruption of breeding behaviour.
- Dogs may also contribute to trampling of nests or chicks and increase the risk of predation or nest failure.
- Repeated or prolonged disturbance may reduce breeding success due to increased stress and reduced time available for feeding, incubation, and chick rearing.

These impacts have a higher likelihood of occurrence during the spring–summer breeding period if works coincide with sensitive fauna life stages.

Given the above, ToS were carried out for the shorebirds identified above (Table 7).

Table 7 Test of significance for threatened shorebirds

Test of significance for threatened shorebirds
<i>In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</i>
Suitable habitat for the Pied Oystercatcher and Sooty Oystercatcher occurs within and around Narrawallee Creek Inlet and at the southern end of Buckleys Beach. The species is also known to utilise the intertidal rocky platform at the southern extent of Narrawallee Beach, reflecting its preference for sandy beaches, intertidal flats, and exposed rock platforms. Foraging occurs primarily at low tide on sand, mudflats, and rock surfaces where invertebrate prey is

Test of significance for threatened shorebirds

available. The intertidal rocky platforms mapped in the southern section of Narrawallee Beach are observed as an important foraging resource for these species and impacts should be minimised to this area.

The Little Tern and Eastern Hooded Dotterel have a higher preference for undisturbed beach environments with the selection of higher quality roosting and foraging habitat, typically returning to the same sites in recurring years. These species are likely occupying the area of the Narrawallee Creek Inlet, with observations outside this area occurring during transitions to other less disturbed habitat options.

The proposed activities will not result in any direct impacts to shorebirds or their habitat (i.e., there will be no direct removal of habitat or vegetation). Indirect impacts from the proposed activities have potential to have an adverse effect on the life cycle of the four listed shorebirds through increased disturbance of potential low quality foraging habitat.

The indirect and cumulative impacts of the proposed activities include the potential to cause disturbance to areas identified as foraging habitat for threatened shorebirds. Narrawallee Beach currently experiences moderate levels of disturbances from public use, fishing and the existing dog access area.

It is likely that if the listed species uses the study area for roosting and foraging then they would use the entire patch of estuaries and intertidal mudflats within the locality. The site is located 600 metres to the south of Narrawallee Creek Inlet, containing high quality intertidal mudflats and estuaries that would provide greater habitat potential than the area to be indirectly impacted by the proposed activities.

The small scale of potential indirect impacts within an area containing larger continuous areas of suitable habitat, is considered unlikely to affect a viable local population of the species such that it is could be placed at risk of extinction. Additionally, the indirect impacts are to be mitigated through the recommendations of this report.

In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

1. *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
2. *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

Not applicable.

In relation to the habitat of a threatened species or ecological community:

1. *the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and*
2. *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and*
3. *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.*

The proposed activities will not result in any direct impacts to shorebirds or their habitat. The proposed activities have the potential to indirectly disturb the southern Narrawallee Beach area by increased presence of dogs between the 90 metre section of BA2 and BA3. The proposed activities may cause indirect impacts on the identified foraging shorebird habitat on the southern section of Narrawallee Beach. Recommendations contained within this report aim to minimise indirect impacts from the activities and when implemented will ensure that indirect impacts of shorebird habitat is unlikely.

The indirect impact on the southern section of Narrawallee Beach will unlikely increase fragmentation impacts within the local area. The indirect impact of potential habitat will not isolate any habitat areas and will be mitigated through the measures recommended in this report.

The area of potential habitat proposed that may be indirectly impacted would represent a small proportion of available habitat for the Shorebirds in the local area. The site is located 600 metres to the south of Narrawallee Creek Inlet, containing high quality intertidal mudflats and estuaries that would provide greater habitat potential than the area to be indirectly impacted by the proposed activities. The importance of this area within the larger extent of habitat available would be considered quite low and the species would not rely on the resources within the locality.

Whilst the potential habitat within the study area would be potentially indirectly impacted, the overall continuity of the habitat patch will be maintained through the mitigation measures recommended in this report. Therefore the potential

Test of significance for threatened shorebirds

indirect impact of the proposed activities will not have a significant impact on the long-term survival of these four species within the locality.

Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

There are no areas of outstanding biodiversity value within the study area or the broader locality.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposed activities have the potential to increase the operation of the following KTPs relevant to all four shorebirds:

- Habitat disturbance from human and animal presence (Indirect).

The indirect impacts of increased dog presences will be mitigated through the recommendations in this report including, the implementation of adequate buffers to ensure foraging resources are protected, and increased signage to raise community awareness.

Due to mitigation measures that will be implemented to prevent further habitat disturbance, it is unlikely the proposed activities will significantly increase the impact of any KTPs associated with these species.

Conclusion

In the consideration of the above five factors, it is unlikely that the proposed activities will impose a significant impact on the four listed shorebird or their habitats as any indirect impacts that may increase disturbance, will be mitigated through the recommendations in this report including, adhering to the industry guideline buffer distances and increased signage to minimise disturbance to habitat areas.

6.1.4 Safeguards and mitigation measures

Mitigation measures relating to biodiversity are outlined in Table 8 below.

Table 8 Safeguards and mitigation measures – Biodiversity

Measure	Timing	Responsibility
Exclusion Zone (BA1): Dog access should be prohibited from BA1 to establish a buffer between recreational use and the southern reef foraging habitat in accordance with the industry guidelines (DoEE 2017). This will reduce the potential for disturbance to shorebirds utilising the intertidal reef platform near Surfers Avenue.	Operation	Council
Controlled Access (BA2–BA3): Dog walking may be permitted on-leash between BA2 and BA3. This arrangement allows continued recreational use in less sensitive areas while minimising disturbance to key foraging habitats.	Operation	Council
Signage and Community Awareness: Install signage at BA1 and adjacent access points (BA2 and BA3) to inform the public of the presence of potential shorebird foraging habitat near the southern reef area. Educational messaging should encourage	Operation	Council

Measure	Timing	Responsibility
responsible dog management and awareness of shorebird sensitivity to disturbance.		

6.2 Noise

Potential noise impacts from dogs in and around the study area and vehicle movements were assessed by Muller Acoustic Consulting (MAC) (Appendix 4). The method, impacts and management measures are summarised in this section.

6.2.1 Existing environment

Noise is characterised by intermittent and short-duration sources, primarily dog vocalisation (including barking), movement of dogs along the beach, beach users, pedestrian activity and vehicle movements. These sources are generally variable and dispersed across the beach area rather than concentrated at a single point.

Council Ranger observations (2022 to 2025) identified current usage rates of up to a maximum of 60 dogs and a median of 9 dogs on Narrawallee Beach at any one time. Dogs are currently permitted on-leash 24 hours per day.

Sensitive receivers include residential dwellings fronting Matron Porter Drive, Victor Avenue, and Surfers Avenue, which have direct or partial exposure to beach-based recreational activity. The acoustic environment at these receivers is therefore influenced by both natural coastal ambient noise and intermittent recreational noise sources.

6.2.2 Summary of assessment methods

This assessment has been undertaken in accordance with the following guidelines:

- Australian Standard / New Zealand Standard AS/NZS 2107:2016 Recommended design sound levels and reverberation times for building interiors.
- NSW Department of Environment, Climate Change and Water (DECCW) – NSW Road Noise Policy (RNP), March 2011.
- NSW Environment Protection Authority (EPA), Approved methods for the measurement and analysis of environmental noise in NSW, 2022.
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures.

AS 1055:2018 was referenced for residential noise criteria. For residential buildings in suburban areas or near minor roads, AS/NZS 2107:2016 recommends the following internal noise levels:

- Living Areas: up to 40dB LAeq(period).
- Sleeping Areas: up to 35dB LAeq(period).

AS/NZS 2107:2016 does not prescribe maximum noise levels for internal spaces to minimise the potential for sleep disturbance effects. The most comprehensive advice regarding maximum noise levels events is provided by the EPA's NSW Road Noise Policy (RNP), 2011.

Section 5.4 of the RNP outlines that a maximum internal noise level of 50-55dBA is unlikely to awaken people from sleep. Taking into account a 10dB loss for a partially open window an external level of 65dBA is unlikely to awaken internal occupants.

The road traffic noise criteria are provided in the Road Noise Policy (RNP), 2011. The policy sets out noise criteria (refer Table 9) applicable to different road classifications for the purpose of quantifying traffic noise impacts.

Table 9 Road traffic noise criteria

Road category	Type of project	Assessment criteria	
		Day (7am-10pm)	Night (10pm-7am)
Local roads	Existing residences affected by additional traffic on local roads generated by land use developments	55dB LA _{eq} (1hr)	50dB LA _{eq} (1hr)

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dBA, which is generally accepted as the threshold of perceptibility to a change in noise level.

The iNoise three-dimensional model was used to predict noise from the following scenario. Where increased accessibility attracts more dog owners to Narrawallee Beach, to generate an increase in noise levels of more than 2dBA, which represents the threshold of perceptibility for most people, dog activity would need to increase by 60% to about 96 dogs at any one time.

To quantify existing noise levels from dog activity for the median and maximum usage rates, and the 60% increase in usage, the following scenarios were modelled for Narrawallee Beach (BA3 to BA8):

- 9 dogs on the beach at any one time.
- 60 dogs on the beach at any one time.
- 96 dogs on the beach at any one time.

The dog activity was modelled as an area source across the dog off-leash area between BA3 and BA8. Access to the dog off-leash area was modelled as a moving source with a typical walking speed of 5km/h. Access was spread evenly across the existing six access points between BA3 and BA8. Sound Power Levels (SWLs) were based on measurements taken by MAC of an off-leash dog park with a usage rate of 15 dogs over a 15-minute period (84dB LA_{eq}(15min)).

Additionally, Council is proposing to allow dog on-leash access from the Surfers Avenue and Victor Avenue stairs. Observations from the Council Ranger between 2021 and 2023, prior to access via Surfers Avenue

stairs and Victor Avenue stairs ceasing, identified a usage of up to 10 dogs on-leash accessing the dog off-leash area.

Road traffic along local roads was modelled as 'moving sources'. As Council does not have traffic volume data for the local road network, the assessment compared additional traffic noise levels associated with the maximum number of dog walkers accessing the dog off-leash area from Surfers Avenue and Victor Avenue (10 vehicles during a one hour period according to ranger observations) with the assessment criteria to determine whether the increase in road traffic noise levels is within the 2dB increase criterion.

Sound power levels for the dog use scenarios and vehicle movements are summarised in Table 10 and Table 11.

Table 10 Sound power levels

Parameter	Model item	Total SWL, dB LA _{eq(15min)} ¹			Constant dog barking SWL dB LA _{eq}
		9 dogs	60 dogs	96 dogs	
Off-leash area	Area source	82	90	92	n/a
Access	Moving source ²	n/a	n/a	n/a	84
Maximum noise level assessment (Lamax), nighttime periods (10pm to 7am)					
Single bark event	99				

1. SWL calculated from measurement of dogs at off-leash dog park over period of 15 minutes.

2. Modelled as a moving point source assuming dog barking constantly.

Table 11 Road traffic noise

Road	Lw dBA re 10 ⁻¹² W	Movements/hr	Speed, kmh	Source height, m above ground level
Surfers Avenue	96	10	40	0.5
Victor Avenue	96	10	40	0.5

Given this REF recommends not proceeding with proposed on-leash dog access via BA1, this assessment is therefore very conservative.

6.2.3 Potential Impacts

The proposed extension of dog off-leash access to 24 hours (BA3–BA8) and introduction of dog on-leash access via Victor Avenue and Surfers Avenue steps may result in the following potential noise impacts:

- Increased temporal distribution of dog activity across a 24-hour period, potentially extending periods of intermittent barking or vocalisation into evening and early morning periods.
- Potential redistribution of dog usage, resulting in either:
 - a reduction in peak-time noise concentration due to dispersed use, or
 - increased overall usage of the beach resulting in higher cumulative noise levels.
- Short-term increases in localised noise at beach access points associated with dog entry and exit activity.
- Potential for sleep disturbance impacts at nearby residential receivers during night/early morning periods from isolated barking events.
- Minor increases in road traffic noise associated with additional vehicle movements from dog owners accessing Victor Avenue and Surfers Avenue (low volume, short duration increases).

Noise predictions from the dog off-leash area (BA3 to BA8), including access from Matron Porter Drive have been quantified at residential receivers off Matron Porter Drive and Victor Avenue and are presented in Table 12. To determine internal noise levels, a 10dB reduction across the building façade was applied, consistent with guidance from the Noise Policy for Industry (NPI) (EPA, 2017) and Environmental Noise Management Manual (ENMM) (RTA, 2000).

The results of the assessment demonstrate that noise levels from dog off-leash activities on Narrawallee Beach are anticipated to be below the AS/NZS 2107:2016 internal design sound levels for the current median and maximum dog usage rates, as well as the 60% increase (+2dB) scenario.

Table 12 Noise predictions – all receivers – dog off-leash area

Scenario	Internal predicted noise level range, dB LA _{eq(period)}	Noise limits, dB LA _{eq(period)} ¹		Compliant?
		Living areas	Sleeping areas	
9 dogs	<25	40	35	Y
60 dogs	<25-26	40	35	Y
96 dogs	<25-28	40	35	Y

1. 10dB reduction for external to internal noise levels based on light framed building with window partially open for ventilation in accordance with NPI and ENMM.

Noise predictions from the dog on-leash access via the Surfers Avenue and Victor Avenue stairs are presented in Table 13 and Appendix B of noise report. To determine internal noise levels, a 10dB reduction across the building façade was applied, consistent with NPI and ENMM.

The results of the assessment demonstrate that noise levels from dog on-leash access to Narrawallee Beach via the Victor Avenue and Surfers Avenue stairs are anticipated to be below the AS/NZS 2107:2016 internal design sound levels at all receiver locations.

Table 13 Noise predictions – all receivers – dog on-leash access

Receiver	Internal predicted noise level range, dB LA _{eq(period)}	Noise limits, dB LA _{eq(period)} ¹		Compliant?
		Living areas	Sleeping areas	
Victor Avenue	<20	40	35	Y
Surfers Avenue	<25	40	35	Y

1. 10dB reduction for external to internal noise levels based on light framed building with window partially open for ventilation in accordance with NPI and ENMM.

In assessing the potential for sleep disturbance effects, a sound power level of 99dBA for a single bark event adopted for maximum noise level (L_{Amax}) events during the night period.

Predicted noise levels L_{Amax} events for assessed receivers are presented in Table 14. Results identify that the maximum noise trigger levels will be satisfied for all assessed receivers.

Table 14 Maximum noise level assessment

Receiver	Predicted noise level, dB LA _{max(internal)}	Maximum trigger levels, dB LA _{max(internal)}	Compliant
Victor Avenue	48	55	Y
Surfers Avenue	51	55	Y

Predicted road traffic noise levels generated by dog owners accessing the Victor Avenue and Surfers Avenue stairs are presented in Table 15. The results demonstrate that road traffic noise levels from additional traffic generated by dog owners would satisfy the RNP criteria during the day and night periods, assuming up to 10 vehicles in any one hour. Furthermore, where road traffic noise levels are already higher than the assessment criteria, the increase in road traffic noise levels would be up to 1.1dB for receivers on Victor Avenue and up to 0.9dB for receivers on Surfers Avenue. Hence, the potential increases in road traffic noise levels are expected to be below the RNP +2dB increase criterion.

Table 15 Road traffic noise levels

Receiver	Period	Assessment criteria dB LA _{eq} (period)	Calculated traffic noise dB LA _{eq} (period)	Change in traffic noise, dB	Compliant
Victor Avenue	Day	55 LA _{eq} (1hr)	44.4	0.4	Y
	Night	50 LA _{eq} (1hr)		1.1	Y
Surfers Avenue	Day	55 LA _{eq} (1hr)	43.6	0.3	Y
	Night	50 LA _{eq} (1hr)		0.9	Y

6.2.4 Safeguards and mitigation measures

Mitigation measures relating to noise are outlined in Table 16.

Table 16 Safeguards and mitigation measures – Noise and Vibration

Measure	Timing	Responsibility
Maintain existing dog control requirements under Companion Animals Act 1998; signage reinforcing responsible dog behaviour and control expectations.	Operation	Council
Continued enforcement of nuisance provisions under the Companion Animals Act 1998; Council ranger response to complaints.	Operation	Council
Signage at access points reinforcing on-leash requirements and responsible dog handling.	Operation	Council
Maintain existing beach management framework and monitoring.	Operation	Council

6.3 Aboriginal cultural heritage

6.3.1 Existing environment

An Aboriginal Heritage Information Management System (AHIMS) search undertaken on 29 January 2026 (Client Service ID: 1086831) identified 79 registered Aboriginal sites within a 4 km by 4 km search area surrounding Narrawallee Beach. Four registered sites occur within 200 metres of the project area.

An Aboriginal Due Diligence Assessment and archaeological survey (Appendix 3) identified that the study area has been subject to significant historical disturbance, including coastal erosion, vegetation removal, installation of beach access infrastructure, and construction of a sewerage pumping station. As a result, much of the study area is considered to have low archaeological potential.

Despite this disturbance history, one Aboriginal site (AHIMS pending; Narrawallee Beach Dog Access AS1) and one area of potential archaeological deposit (PAD) were identified within the broader study area. These locations are considered to retain Aboriginal cultural heritage values and should be avoided where practicable.

Further information about the heritage values in the project area is set out in the ADDA (Appendix 3).

6.3.2 Potential impacts

The proposal involves the extension of permitted off-leash dog access hours and the formalisation of on-leash access arrangements within existing beach access points. No excavation, ground disturbance, or vegetation clearing is proposed.

As such, the proposal is not expected to result in any direct physical impact to Aboriginal cultural heritage values, including the identified AHIMS pending site (Narrawallee Beach Dog Access AS1) or the recorded area of potential archaeological deposit.

6.3.3 Safeguards and mitigation measures

Although no impacts are anticipated, the following precautionary measure is recommended to ensure appropriate management in the unlikely event of unexpected Aboriginal cultural heritage finds. These measures are outlined in Table 17.

Table 17 Safeguards and mitigation measures – Aboriginal cultural heritage

Measure	Timing	Responsibility
Discovery of unanticipated Aboriginal objects All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity, and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying the Heritage NSW and Aboriginal stakeholders.	Operation / future works	Council
Discovery of Aboriginal ancestral remains Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must: • Immediately cease all work at that location and not further move or disturb the remains. • Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location. • Not recommence work at that location unless authorised in writing by Heritage NSW.	Operation / future works	Council

6.4 Historical heritage

6.4.1 Existing environment

A review of heritage listings, including the State Heritage Register and Schedule 5 of the LEP, was undertaken for the project area at Narrawallee Beach.

No items listed on the State Heritage Register under the Heritage Act 1977 are located within the project area. One local heritage item, Item 324 – Silica Wharf and Tramway, is listed under Schedule 5 of the Shoalhaven LEP 2014. This item comprises remnant infrastructure associated with historical silica transport across Narrawallee Creek Inlet and is located outside the project area.

The project area itself comprises a coastal beach and foreshore reserve that has been subject to historical disturbance associated with recreational use and is not considered to retain non-Aboriginal heritage significance.

6.4.2 Potential Impacts

The proposal involves the extension of off-leash dog access hours and formalisation of on-leash access arrangements, with no ground disturbance, excavation, or construction works proposed.

As no heritage items are located within the project area and the nearest listed item (Item 324 – Silica Wharf and Tramway) is situated outside the study area, the proposal will not result in direct or indirect impacts to non-Aboriginal heritage values. The activity will not alter the physical fabric, setting, or significance of the heritage item.

6.4.3 Safeguards and Mitigation Measures

Mitigation measures relating to historical heritage are outlined in Table 18.

Table 18 Safeguards and mitigation measures – Historical heritage

Measure	Timing	Responsibility
Records of any heritage inspections or discoveries will be maintained.	Operation	Council

6.5 Traffic, access and parking

6.5.1 Existing Environment

Narrawallee Beach is accessed predominately on foot, with residential dwellings located approximately 100-200 metres of the beach front. There are 15 points of access to Narrawallee Beach, with only 6 providing access to the designated dog off-leash area.

There is a car park at the northern end of the beach near Narrawallee Inlet. There is an off-street carpark near the intersection of Matron Porter Drive and Bangalow Street and a mix of sealed and grassed parking along most of the eastern frontage of Matron Porter Drive to Matron Porter Drive Reserve.

There is kerb parking along Victor and Surfers avenues, with no formal parking provided near the beach access stairways on these streets.

6.5.2 Potential Impacts

The proposal does not involve the construction of new infrastructure or changes to the existing road network. Physical works are limited to the installation of updated signage at existing beach access points, which will require vehicle movement for a short period during installation. As such, any traffic or access impacts associated with installation activities will be short-term and localised.

It was originally proposed to provide dog on-leash access between the Victor Avenue steps (BA2) and Surfers Avenue steps (BA1) to facilitate connection to the designated dog off-leash area. This section of beach is currently dog-prohibited; therefore, the proposal represents a minor intensification of use within this locality. However, it is no longer proposed to allow beach on-leash dog access from the Surfers Avenue stairs (BA1) and the activity will not intensify on this location. Access to the beach from BA2 would be via an existing pedestrian access point and the surrounding residential street network and no construction is proposed in this location.

Observations from the Council Ranger between 2021 and 2023, prior to access via Surfers Avenue stairs and Victor Avenue stairs ceasing, identified a usage of up to 10 dogs on-leash accessing the dog off-leash area at any one time. Whilst it was not observed if these users arrived by car or foot, assuming they all arrived by car would equate to 10 vehicles along Victor and Surfers avenues at any one time. However, these 10 users would include house occupants along the local road network, and it is highly unlikely all users arrived by vehicle. Further, on-leash dog access is no longer proposed at BA1 and a corresponding amount of vehicles will be avoided.

Given the predominantly pedestrian nature of beach access, the availability of existing parking at Narrawallee Inlet, along Matron Porter Drive and in Matron Porter Drive Reserve, informal on-street parking along surrounding streets and removal of on-leash dog access via BA1 from the proposal, any associated increase in visitation, vehicle movements, or parking demand is not anticipated to exceed existing capacity or result in overflow impacts to the surrounding road network.

Notwithstanding, there is a recommendation below for additional signage along Victor and Surfers avenues.

Overall, the proposal is not anticipated to result in significant impacts on traffic generation, parking demand, access arrangements, or the operation of the surrounding road network.

6.5.3 Safeguards and Mitigation Measures

Signage installation works shall be undertaken in accordance with standard traffic management practices to ensure the safety of workers and the public during the installation period, including safe vehicle access, temporary works controls, and minimisation of disruption to pedestrian movement and on-street parking where applicable.

It is recommended that Council consider installation and maintenance of new street signs at the intersections of Victor Avenue and Matron Porter Drive and the intersections of Surfers Avenue with Matron Porter Drive and Tallwood Avenue stating (or similar to):

Residential vehicles only – no public access to Narrawallee Beach – beach access via Matron Porter Drive.

6.6 Public and visual amenity

6.6.1 Existing environment

The project area comprises a coastal beach and foreshore reserve at Narrawallee Beach within a predominantly low-density residential setting. The foreshore includes sandy beach areas, access tracks, and designated beach access points (BA1–BA8), with the boarder locality characterised by residential dwellings and local road networks.

The area is used for a range of recreational activities including walking, swimming, and dog exercise (within designated areas). Visual amenity is defined by the natural coastal landscape, including open ocean views, shoreline, and adjacent vegetated areas. Views are primarily experienced by beach users and nearby residents and are generally of high scenic quality.

6.6.2 Potential impacts

The proposal does not involve construction works, vegetation removal, or the introduction of new built elements. As such, no direct impacts to visual character or landscape features will occur.

Potential impacts to public amenity are limited to changes in the timing and management of dog access within the existing off-leash area. The extension of off-leash access hours during the winter period may increase the presence of dogs at certain times of the day, which has the potential to result in amenity impacts for other beach users, including perceived and actual conflicts between user groups.

The proposal retains existing controls, including dog-prohibited areas to the north and south of the off-leash area, with a minor intensification of the activity (recommencing on-leash dog access from Victor Avenue and Surfers Avenue stairs). This provides separation between different user groups and protect sensitive areas. The activity is consistent with the established recreational use of the beach and does not alter the visual character of the locality.

It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.

6.6.3 Safeguards and Mitigation Measures

Mitigation measures relating to public and visual amenity are outlined in Table 19.

Table 19 Safeguards and mitigation measures – Public and visual amenity

Measure	Timing	Responsibility
Maintain clear and consistent signage identifying dog access arrangements, including off-leash areas, on-leash zones, and dog-prohibited areas.	Operation	Council
Implement community education and awareness initiatives regarding responsible dog ownership and shared use of the beach.	Operation	Council
Maintain existing access points and pathways in a safe and orderly condition.	Operation	Council

Measure	Timing	Responsibility
Monitor community feedback and complaints in relation to dog access and amenity impacts.	Operation	Council
In addition to the monitoring in Table 15, periodic audits of dog excrement clean-up rates and consideration of installation of dog bag dispensers if required.	Operation	Council

6.7 Social impact and public safety

6.7.1 Existing environment

Narrawallee Beach is a well-utilised public coastal reserve supporting a range of recreational and social activities, including swimming, surfing, walking, passive recreation, and dog exercise. The beach is valued by the broader community as a multi-use coastal space that supports both active and passive recreation, with strong community expectations around equitable access, safety, and the preservation of amenity for all user groups.

The beach accommodates a range of diverse users, with visitation patterns varying seasonally and throughout the day. As a shared-use coastal environment, the beach reflects differing community expectations regarding levels of interaction, with some users preferring increased flexibility for dog exercise opportunities, while others prioritise separation between dogs and general recreation activities, particularly during peak visitation periods.

A central portion of the beach is designated as a dog off-leash area, with off-leash times currently limited to specified times during summer and winter and concentrated at defined access points. The existing management framework has been implemented to balance these competing interests while maintaining public safety and minimising user conflict.

Access is primarily via established pedestrian access points, with dog access currently concentrated at specific locations. Public safety is managed through signage, user compliance with local regulations, and awareness of natural coastal hazards such as surf conditions, tides, and uneven terrain.

6.7.2 Potential Impacts

The proposal to extend off-leash dog access hours during the winter period (May–October), together with the introduction of additional access points at Victor Avenue and Surfers Avenue, may result in a minor intensification of existing recreational use and increased interaction between beach users.

Potential impacts include:

- Increased likelihood of conflict between dog owners and non-dog users, particularly near access points
- Higher potential for uncontrolled or unpredictable dog behaviour.
- Increased use of Victor Avenue and Surfers Avenue access points, with potential for non-compliant off-leash dog activity prior to the designated area
- Increased use of the beach during winter months, resulting in greater overlap of user groups and activity at similar times of day.

- Potential safety risks to more vulnerable users, including children and elderly persons, due to increased dog presence.

It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited.

6.7.3 Safeguards and mitigation measures

Mitigation measures relating to social impact and public safety are outlined in Table 20.

Table 20 Safeguards and mitigation measures – Social Impact and Public Safety

Measure	Timing	Responsibility
Clear and consistent signage identifying off-leash and on-leash areas, including updated seasonal information where applicable.	Operation	Council
Reinforcement of responsible dog ownership requirements, including effective control of dogs at all times within off-leash areas.	Operation	Council
Maintenance of existing access paths to ensure safe pedestrian movement and minimise conflict points between user groups.	Operation	Council
Community awareness measures regarding shared use of the beach and seasonal increases in dog activity during winter months.	Operation	Council
Periodic safety audits of beach access points, particularly the re-instated on-leash dog access from Victor Avenue stairs.	Operation	Council
Existing monitoring and management frameworks will continue to be implemented, with their effectiveness assessed and updated on an annual basis or after an incident, whichever occurs first.	Operation	Council

6.8 Summary of environmental impacts

For the purpose of Part 5 of the EP&A Act, the factors to be taken into account when considering the likely impact of a development on the environment include those matters listed in Part 8 of the EP&A Regulation. The following (Table 21) is an assessment of the proposed development/works in accordance with clause 171 of the EP&A Regulation.

Table 21 Clause 171 of the EP&A Regulation Assessment

Matter to be taken into account	Comment
(a) The environmental impact on the community.	The proposal is expected to result in a moderate increase in recreational use of Narrawallee Beach during the winter months from dog walkers. This may improve community amenity and recreational opportunities for dog owners; however, it may also increase user interactions between dog owners and other beach users, potentially leading to social conflict

Matter to be taken into account	Comment
	or perceived safety concerns if dog control is not effectively maintained. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.
(b) The transformation of the locality.	The proposal does not involve physical works or infrastructure changes and therefore will not physically transform the locality. However, extending off-leash access hours may result in a perceptible behavioural shift in beach use patterns during winter months, with increased presence of dogs in the designated area for longer periods of the day. Existing monitoring and management frameworks will continue to be implemented, with their effectiveness assessed on an annual basis or after an incident, whichever occurs first.
(c) The environmental impact on the ecosystems of the locality.	Increased off-leash dog activity may result in greater disturbance to shoreline habitats. Potential impacts include disturbance of fauna (including shorebirds), and increased nutrient or waste inputs from dogs. These effects may be more pronounced during early breeding periods of sensitive shorebird species (August–October overlap). It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area. There will be periodic audits of dog excrement clean-up rates and consideration of installation of dog bag dispensers if required.
(d) Reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality.	The proposal may have mixed effects on recreational values. Dog owners may experience increased recreational opportunity; however, non-dog users may perceive reduced amenity due to increased dog presence. Aesthetic values may be locally reduced if increased dog activity leads to litter, disturbance, or

Matter to be taken into account	Comment
	reduced perceived naturalness of the beach environment during peak usage periods. These impacts will be avoided in the area between BA2 and the southern beach extent provided Council adopts the recommendation to keep this area off limits to dogs. Existing monitoring and management frameworks will continue to be implemented, with their effectiveness assessed on an annual basis or after an incident, whichever occurs first.
(e) The effects on any locality, place or building that has aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.	There is no identified impact on known sites of archaeological, architectural, or historical significance. However, coastal environments may hold social and cultural value for the community, and increased dog activity may slightly alter the experiential value of the beach during winter months. No direct impacts on scientific research values are anticipated.
(f) The impact on the habitat of protected animals (within the meaning of the Biodiversity Conservation Act 2016).	Four threatened species have been identified as having a medium or greater likelihood of occurrence in the project area based on habitat availability. ToS and SIC assessments were carried out for threatened fauna species listed above and concluded that the proposal is unlikely to have a significant impact on any EPBC Act or BC Act listed flora. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.
(g) The endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	While the proposal is not expected to directly endanger species, it may contribute to localised stress on threatened shorebirds if unmanaged dog activity occurs in sensitive areas. No plant species are expected to be directly endangered; however, dune vegetation may experience minor disturbance from increased foot and dog traffic. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment,

Matter to be taken into account	Comment
	to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.
(h) Long-term effects on the environment.	Long-term effects are expected to be minor if appropriate controls are maintained. However, repeated seasonal disturbance could contribute to gradual declines in habitat quality or breeding success for sensitive shorebird species if dog control and seasonal awareness measures are not effective. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.
(i) Degradation of the quality of the environment.	Potential degradation is limited to localised reduction in dune and upper beach environmental condition due to increased trampling, disturbance, and waste from dogs. These effects are expected to be low to moderate and largely confined to high-use access points. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area. There will be periodic audits of dog excrement clean-up rates and consideration of installation of dog bag dispensers if required.
(j) Risk to the safety of the environment.	No significant environmental safety risks are anticipated. However, uncontrolled dog behaviour may pose a localised risk to people and wildlife safety, particularly during breeding periods when birds are more vulnerable. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment, to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.

Matter to be taken into account	Comment
	Existing monitoring and management frameworks will continue to be implemented, with their effectiveness assessed on an annual basis or after an incident, whichever occurs first.
(k) Reduction in the range of beneficial uses of the environment.	The proposal may slightly reduce the suitability of certain beach areas for passive recreation during extended off-leash periods. However, it increases beneficial use for dog exercise and recreation.
(l) Pollution of the environment.	Potential minor pollution impacts include dog faecal waste if not properly managed, which may contribute to localised nutrient enrichment or bacterial contamination. These impacts are expected to be minor with responsible pet ownership and existing waste management provisions. There will be periodic audits of dog excrement clean-up rates and consideration of installation of dog bag dispensers if required.
(m) Environmental problems associated with the disposal of waste.	No significant waste disposal impacts are anticipated. However, increased dog usage may result in a higher demand for bin capacity and waste collection in nearby access areas if compliance with waste disposal requirements is not maintained. There will be periodic audits of dog excrement clean-up rates and consideration of installation of dog bag dispensers if required.
(n) Increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	The proposal will not increase demand on resources, that are, or are likely to become, in short supply.
(o) The cumulative environmental effect with other existing or likely future activities.	When considered alongside existing recreational use of Narrawallee Beach and surrounding coastal areas, the proposal may contribute to incremental cumulative disturbance pressure on shorebird habitat, particularly during the winter-to-spring overlap breeding period (August–October), when combined human and dog activity is elevated. It is a recommendation of this REF that access south of BA2 and from the Surfers Avenue steps (BA1) is to remain prohibited, consistent with the recommendations of the flora and fauna assessment,

Matter to be taken into account	Comment
	to provide an adequate buffer for foraging shorebirds in the southern extent of the study area.
(p) The impact on coastal processes and coastal hazards, including those under projected climate change conditions.	No direct physical works are proposed and therefore the proposal is not anticipated to impact on coastal processes.
(q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1.	The project is consistent with the legislation and relevant policies and plans identified in Chapter 4 of this REF.
(r) Other relevant environmental factors.	Key additional considerations include seasonal timing sensitivity (August–October breeding overlap), the importance of community education regarding responsible dog ownership, and the need for ongoing monitoring of shorebird activity to ensure adaptive management if impacts increase over time. Existing monitoring and management frameworks will continue to be implemented, with their effectiveness assessed on an annual basis or after an incident, whichever occurs first.

7 Summary of safeguards and mitigation measures

The mitigation measures in Table 22 are recommended to mitigate against potential impacts of the activity.

Table 22 Summary of mitigation measures

Environmental component	Mitigation	Timing	Responsibility
Biodiversity	Exclusion Zone (BA1): Dog access should be prohibited from BA1 to establish a buffer between recreational use and the southern reef foraging habitat in accordance with the industry guidelines (DoEE 2017). This will reduce the potential for disturbance to shorebirds utilising the intertidal reef platform near Surfers Avenue.	Operation	Council
	Controlled Access (BA2–BA3): Dog walking may be permitted on-leash between BA2 and BA3. This arrangement allows continued recreational use in less sensitive areas while minimising disturbance to key foraging habitats.	Operation	Council
	Signage and Community Awareness: Install signage at BA1 and adjacent access points (BA2 and BA3) to inform the public of the presence of potential shorebird foraging habitat near the southern reef area. Educational messaging should encourage responsible dog management and awareness of shorebird sensitivity to disturbance.	Operation	Council
Noise	Maintain existing dog control requirements under Companion Animals Act 1998; signage reinforcing responsible dog behaviour and control expectations.	Operation	Council
	Continued enforcement of nuisance provisions under the Companion Animals Act 1998; Council ranger response to complaints.	Operation	Council
	Signage at access points reinforcing on-leash requirements and responsible dog handling.	Operation	Council
	Maintain existing beach management framework and monitoring.	Operation	Council
Aboriginal heritage	All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity, and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying the Heritage NSW and Aboriginal stakeholders.	Operation	Council

Environmental component	Mitigation	Timing	Responsibility
	Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must: • Immediately cease all work at that location and not further move or disturb the remains. • Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location. • Not recommence work at that location unless authorised in writing by Heritage NSW.	Operation	Council
Historic cultural heritage	Records of any heritage inspections or discoveries will be maintained.	Operation	Council
Access and traffic	Signage installation works shall be undertaken in accordance with standard traffic management practices to ensure the safety of workers and the public during the installation period, including safe vehicle access, temporary works controls, and minimisation of disruption to pedestrian movement and on-street parking where applicable.	Operation	Council
	It is recommended that Council consider installation and maintenance of new street signs at the intersections of Victor Avenue and Matron Porter Drive and the intersections of Surfers Avenue with Matron Porter Drive and Tallwood Avenue stating (or similar to): <i>Residential vehicles only – no public access to Narrawallee Beach – beach access via Matron Porter Drive.</i>	Operation	Council
Public and visual amenity	Maintain clear and consistent signage identifying dog access arrangements, including off-leash areas, on-leash zones, and dog-prohibited areas.	Operation	Council
	Implement community education and awareness initiatives regarding responsible dog ownership and shared use of the beach.	Operation	Council
	Maintain existing access points and pathways in a safe and orderly condition.	Operation	Council
	Monitor community feedback and complaints in relation to dog access and amenity impacts.	Operation	Council
	Periodic audits of dog excrement clean-up rates and consideration of installation of dog bag dispensers if required.	Operation	Council

Environmental component	Mitigation	Timing	Responsibility
Social impact and public safety	Clear and consistent signage identifying off-leash and on-leash areas, including updated seasonal information where applicable.	Operation	Council
	Reinforcement of responsible dog ownership requirements, including effective control of dogs at all times within off-leash areas.	Operation	Council
	Maintenance of existing access paths to ensure safe pedestrian movement and minimise conflict points between user groups.	Operation	Council
	Community awareness measures regarding shared use of the beach and seasonal increases in dog activity during winter months.	Operation	Council
	Periodic safety audits of beach access points, particularly the re-instated on-leash dog access from Victor Avenue stairs.	Operation	Council
	Existing monitoring and management frameworks will continue to be implemented, with their effectiveness assessed and updated on an annual basis or after an incident, whichever occurs first.	Operation	Council

8 Conclusion and determination

The proposed works are considered to have a minimal environmental impact if all mitigation measures in Table 22 are implemented.

Assessments have been completed and can be summarised as follows:

- **Biodiversity:** The proposal does not trigger the Biodiversity Offsets Scheme (BOS) as it is:
 - Unlikely to result in a significant effect on threatened species, populations or communities listed under the EPBC Act, BC Act or the FM Act.
 - Limited to an already disturbed coastal environment, with higher value habitats retained outside the off-leash area through the maintenance of dog-prohibited zones to the north of BA8 and south of BA3, and the retention of existing access restrictions outside the designated off-leash area.
- **Aboriginal Cultural Heritage:** No impacts to Aboriginal cultural heritage are likely to occur. One Aboriginal site (AHIMS pending/Narrawallee Beach Dog Access AS1) and one area of potential archaeological deposit were identified; however, no ground disturbance is proposed, and these areas will be avoided.
 - No further archaeological work is required in parts of the project area assessed as having low archaeological potential.
- **Noise:** Noise impacts associated with dog activity are predicted to comply with relevant criteria and are not expected to adversely impact nearby receivers. The proposal is consistent with the existing recreational use of Narrawallee Beach, and amenity impacts are considered manageable through standard management measures.
- **Community and land use:** Community consultation identified a range of perspectives, with an overall need to balance recreational access, environmental protection, and user safety. The proposal reflects this balance by limiting changes to temporal access (winter period), retaining spatial boundaries, and not extending access through BA1, thereby maintaining appropriate buffers and minimising potential conflict and environmental impact.

The proposed activity is not likely to have a significant impact on any aspect of the environment, provided the recommended mitigation measures are implemented. Accordingly, an Environmental Impact Statement is not required under Part 5 of the Environmental Planning and Assessment Act 1979.

8.1 Assessor declaration

I as the assessor have considered all environmental impacts and safeguards to the best of my knowledge.

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

Table 23 Assessor declaration

Assessor details	
Name	Mark Roberts
Position	Principal Environmental Planner
Company	Biosis Pty Ltd

Assessor details	
Qualifications	Bachelor of Environmental Science, University of Western Sydney, 2005. Graduate Diploma in Environmental Studies, Macquarie University, 2010. Graduate Diploma in Bushfire Protection, University of Western Sydney, 2014.
Contact details	mark.roberts@biosis.com.au
Signature and date	 1/05/2026

8.2 Determiner declaration and approval

I have reviewed the REF and any attached documents and am satisfied that the assessment has been prepared by a reasonably qualified person and a suitable assessment was undertaken for the proposed project. I consider that the project will not have a significant impact and approve that the project can proceed subject to the controls outlined in this REF.

Table 24 Determiner declaration

Determiner details	
Name	Michael Berzins - Acting on behalf of Shoalhaven City Council in accordance with Council Resolution MIN26.193
Position	Acting Director - City Services
Company	Shoalhaven City Council
Contact details	michael.berzins@shoalhaven.nsw.gov.au
Signature and date	 09/07/2026

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Appendices

Appendix 1 Communication and engagement report

SHOALHAVEN COUNCIL

APRIL 2026

*Communication and engagement report
Consultation to inform the Review of
Environmental Factors – dog access on
Narrawallee Beach.*



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EXECUTIVE SUMMARY

Shoalhaven City Council undertook a structured program of community engagement to inform the Review of Environmental Factors (REF) for proposed changes to dog access arrangements at Narrawallee Beach.

The proposed changes being assessed include 24-hour off-leash access in the existing dog area during the low season (1 May – 1 October) and on-leash dog access via the Victor Avenue and Surfers Avenue stairs.

Sections of Narrawallee Beach are currently subject to established dog access arrangements that define where and when dogs are permitted. Council is undertaking the REF to assess potential amendments to these arrangements, including whether proposed changes are likely to have environmental or social impacts and whether those impacts can be appropriately managed. The REF does not assume that changes will occur; rather, it evaluates potential impacts and identifies mitigation measures where relevant.

The purpose of engagement was to support the REF by providing an evidence base of community values, experiences and considerations relevant to the assessment of environmental, social and operational impacts. Community engagement forms one component of this assessment and is considered alongside technical and environmental analysis. Consistent with environmental assessment processes, engagement is intended to inform decision-making through understanding impacts, behaviours and management considerations, rather than determining outcomes through majority preference.

A staged engagement approach was implemented, combining an online community questionnaire, targeted stakeholder meetings, on-site beach interviews and supporting communication material. These activities were designed to educate the community about the REF process, provide opportunities for participation and capture a range of perspectives from different people in the community.

Engagement identified a range of perspectives across the community, with feedback highlighting both shared priorities and differing views. Accessibility and inclusion were consistently identified as important, with some participants supporting improved access for people with dogs, while others raised concerns about the suitability and safety of certain access points. Safety and user experience also emerged as key considerations, with views ranging from current arrangements being generally manageable to concerns about congestion, off-leash dogs and conflict between beach users, particularly during busy periods.

Environmental protection was a strong and consistent theme, with broad support for protecting wildlife and the coastal environment, alongside differing views on whether increased dog access could be effectively managed. There was general agreement on the importance of effective management, including clear rules, signage and enforcement, regardless of the access arrangements in place.

Feedback also highlighted the social and recreational value of the beach, including its role in supporting wellbeing, community interaction and local economic activity. Some participants noted potential benefits of increased flexibility in dog access, while others raised concerns about amenity impacts such as noise and parking.

Overall, engagement findings reflect competing priorities, with perspectives ranging from support for increased flexibility in dog access to support for maintaining existing arrangements. A relatively small number of participants advocated for reduced access for dogs.

A summary of key themes is provided in this report and detailed summary from each engagement activity is provided in the appendices, including a questionnaire results, summaries of themes from stakeholder meetings and on-site beach interviews.

ENGAGEMENT OVERVIEW

The purpose of engagement was to inform the REF by capturing community input relevant to the assessment of proposed changes to dog access arrangements at Narrawallee Beach.

Engagement was designed to support an evidence-based assessment process. It was not intended to determine community preference through voting or polling. Instead, engagement outcomes provide input to be considered alongside environmental studies, technical assessments, and relevant legislative and policy requirements.

This approach aligns with the role of community engagement in environmental assessment processes, where feedback informs decision-making but does not replace it.

Specifically, engagement sought to:

- Understand how the beach is currently used by different groups
- Identify community values associated with beach use
- Explore experiences of existing dog access arrangements
- Capture potential impacts and considerations associated with proposed changes
- Identify practical issues relating to access, safety, compliance and amenity.

Engagement approach

Engagement was designed and delivered in accordance with recognised best practice principles for public participation and environmental assessment, including:

- Accessibility
- Transparency
- Consistency of information
- Clear communication of purpose
- Separation between engagement and decision-making.

An engagement strategy was developed by the engagement consultant and endorsed by Council prior to the release of information and engagement with the public.

As outlined the engagement strategy, a staged approach was adopted to ensure that community members had the opportunity to understand the project, consider the issues, and provide informed input. The key phases of the engagement included:

Stage 1 – Education and awareness to build an understanding within the community of the REF and why it is required. This phase involved key messaging on the Council website, a suite of FAQs and information about opportunities for the community to participate in the engagement phase.

Stage 2 – Online community questionnaire to identify community values and priorities relating to the proposed dog access changes.

Stage 3 – Community and stakeholder consultation, involving meeting with key stakeholder groups and on-site beach interviews with community members on and around Narrawallee beach over a two-day period.

Communication methods

A range of communication methods were used to inform the community and encourage participation. These methods were selected to ensure information was accessible to a broad range of community members, including those who may not typically engage through online platforms.

Project webpage

A dedicated project page that served as the primary source of community information was established on Council's Get Involved platform. This included:

- Project background information
- Explanation of the REF process
- Details of the proposed changes
- Access to the questionnaire
- Frequently asked questions.

Social media

Council social media channels supported broad awareness and encouraged participation and posts were used to:

- Announce the opening of the questionnaire
- Direct users to the project webpage
- Provide reminders during the engagement period.

Media release

A media release was issued at the commencement of engagement to:

- Formally announce the consultation
- Explain the purpose of the questionnaire
- Direct community members to further information.

Printed materials

Printed materials were used to support local awareness, including:

- A3 posters installed at Narrawallee Beach and nearby locations that included a QR code linking directly to the questionnaire
- Printed copies of the questionnaire were available at the Ulladulla Library to support participation by community members who prefer non-digital engagement.

Direct mail

Letters were distributed to approximately 90 directly affected residents near the Surfers Avenue, Victor Avenue and Matron Porter Drive access points to inform them of the consultation, explain the REF process and provide information on how to participate.

Customer service support

Customer service staff were provided with briefing materials and responses to ensure consistent information was provided to the community and so enquiries were managed appropriately.

Councillor communications

Information was provided to Councillors to support awareness of the engagement process and ensure consistent messaging.

Engagement methods

Engagement activities were designed to capture both broad community input and targeted stakeholder perspectives.

Community questionnaire

A total of 1,046 unique responses were received between 6 February and 8 March. The questionnaire was structured to avoid binary support/opposition framing and instead focus on issues

relevant to environmental assessment including community values and priorities and views on management considerations.

Stakeholder meetings

Stakeholder meetings provided an opportunity for in-depth discussion and detailed feedback. Six stakeholder meetings were undertaken with community and advocacy groups, local businesses and the local Surf Life Saving Club.

On-site beach interviews

Face-to-face discussions were undertaken with 37 community members on and near Narrawallee beach at various times over a two-day period to capture real-time experiences; engage with users who may not normally participate or who can't engage through online channels and to encourage one-on-one discussions outside of a group environment.

How feedback will be used

Community and stakeholder feedback will be considered as part of the REF assessment alongside technical, environmental and legislative considerations. Feedback provides context to the assessment of environmental and social impacts and informs identification of issues and potential management measures.

Limitations

Participation in the engagement process was voluntary, and not all community members participated. The combination of methods was designed to capture a range of perspectives, including both regular beach users and broader community members, acknowledging that each method has inherent limitations.

Additional questions were introduced into the questionnaire while the consultation phase was underway. This was led by Council to capture specific information required for Council's decision-making. Responses to these questions have been analysed and reported separately within this report to maintain transparency and methodological integrity.

Further, beach interviews were qualitative in nature and not statistically representative.

Accordingly, it is important engagement outcomes are considered alongside other sources of information.

WHAT WE HEARD

Summary of outcomes from engagement activities

Community questionnaire

The community questionnaire provided broad evidence base of community values, priorities and experiences, with 1,046 unique responses received. Results indicate most respondents (72%) are local residents, and many identified as dog owners (71%). Many visit the beach daily or weekly and around three quarters of respondents said their visitation remains the same throughout year. The most popular activities on the beach are walking or exercising, swimming or water-based activities, followed by dog walking.

Most indicated that dog on-leash and off-leash areas, shared use and protection of natural areas are 'important' and 'very important'.

Around 20% of respondents said mobility or accessibility influence how they access or use the beach. Responses also showed that accessibility for people of all ages and abilities, recreational use and safety consistently identified as 'important' or 'very important' considerations.

Responses showed a general preference among respondents for increased dog access arrangements, with 69% supporting an increase to the existing off-leash area, 66% supporting an increase during off-peak and 61% supporting an increase during peak periods. Around 20% of participants supported maintaining the same arrangements across all categories. A smaller portion preferred a decrease in current arrangements.

Stakeholder meetings

Stakeholder meetings provided detailed, experience-based insights from a range of groups. Feedback reflected differing perspectives, with some stakeholders strongly supporting increased access to improve accessibility, community wellbeing and local economic activity, while others expressed strong opposition due to concerns about safety, environmental impacts and amenity including noise from dog barking.

Across all groups, there was a consistent emphasis on the importance of effective management, including clear rules, signage and enforcement. Stakeholder feedback highlighted the complexity of the issue and the need to balance competing priorities.

On-site beach interviews

On-site beach interviews captured real-time insights from 37 beach users, including dog owners and non-dog owners. Participants generally supported improved access via the Victor Avenue and Surfers Avenue stairs, citing convenience and accessibility benefits. Views on broader dog access arrangements were mixed, with some supporting increased flexibility and others preferring to retain existing arrangements.

Key issues raised included lack of compliance with existing rules, safety at access points, and the need for clearer communication and enforcement. Feedback also highlighted the divisive nature of the issue within the community and reinforced the need to balance access, safety, environmental protection and community expectations.

Overarching themes

Accessibility

Across all engagement activities accessibility was a reoccurring theme, with differing views on how it should be managed.

Feedback indicated:

- Dog access via Victor Avenue and Surfers Avenue stairs would support people who have reduced mobility who want to access the beach at these locations with a dog.

- Dog access via these stairs would provide convenient walking access for nearby residents wanting to use the beach with a dog. It was noted that the current arrangements limited boarder dog walking links such as Bannisters Head Road to Narrawallee Beach.
- Current arrangements at Victor Avenue and Surfers Avenue stairs have resulted in a reduced use of the beach for some community members with dogs.
- Restricting access to these access points has resulted in an increase of people using their car to access the beach with their dog from Matron Porter Drive beach access track, which they found inconvenient.

Concerns relating to access included:

- The condition and the suitability of the Victor Avenue stairs, particularly around accommodating dogs and people with beach paraphernalia and small children.
- That access at Matron Porter Drive is poorly lit and is potentially hazardous with tree roots and fallen debris.
- Lack of dog compliance at the stairs access points. Some participants noted that they have observed dogs off-leash running from the top of the stairs onto the beach, causing conflict with other beach users while using the stairs.

Safety and user experience

Feedback highlighted that perceptions of safety vary significantly across users and influence how and when people use the beach.

Feedback indicated:

- Dogs generally are under effective control at Narrawallee Beach, although there were some observations by stakeholders and beach-users of non-compliance.
- Shared use of the beach is generally manageable with the current arrangements in place.
- Dog presence has not historically impacted surf patrols, emergency response operations or business operations where dogs are appropriately controlled.

Concerns relating to safety and user experience included:

- Some expressed that reinstating dog access at the stair access points would further increase beach congestion and potentially cause safety issues between dogs and beach users during busy periods.
- Off-leash dogs can create perceived or actual safety concerns, particularly for people who are afraid of dogs or who have had a negative experience with a dog in the past. As a result, some avoid the beach at certain times of the day to avoid interactions with dogs.
- Conflict can occur amongst beach users regarding dog access arrangements and non-compliance issues.

Environmental protection

Environmental protection of Narrawallee Beach was a key consideration and was raised as an important consideration across all engagement activities.

Feedback indicated:

- Agreement that environmental impacts should be assessed based on evidence.
- Agreement that responsible dog ownership and appropriate beach access can effectively manage impacts to the environment.
- It was expressed that many participants that dog owners respected environmental sensitivity of the area and took measures including picking up after their dogs and staying within allocated zones.

Concerns relating to environmental management included:

- An increase in dog access around the Surfers Avenue and Victor Avenue stairs may have on the environment including shorebirds and other wildlife as well as disturbance to feeding and roosting areas.
- Observations of dogs defecating at the bottom of the access tracks as soon as they get on the beach.
- Observations of lack of Council supplied dog bags and bins for dog related rubbish.

Compliance and management

The issue of compliance was a was raised as an important consideration across all engagement activities.

Feedback indicated:

- Agreement that it was important that dogs were under effective control while using the beach.
- Agreement that effective management, clear rules, boundaries, signage and enforcement is critical regardless of the dog access arrangements in place.
- Feedback was inconsistent about the current compliance levels. Some participants reporting regular instances of non-compliance such as dogs off-leash in on-leash or prohibited zones, or a disregard of the rules around off-leash times. Others indicated that most dog owners follow the rules and there are few instances of non-compliance.

Concerns relating to compliance and management included:

- Signage is confusing, overwhelming or 'not welcoming' to visitors with dog, and that visitors can be caught unaware or confused by the rules.
- There were several examples of conflict occurring on the beach about dog access rules both with rangers and members of the public.

Community use and social value

Fair, shared use and accessibility was a reoccurring theme and important to many participants.

Feedback indicated:

- The beach is an important and valued source of social interaction and recreation for many within the community – both for dog owners and non-dog owners.
- Some stated that dog walking on the beach is important social activity within the community and that rock platform areas near stair access points were previously a place for people to meet and interact with dogs.
- It was noted by several participants that the dog access debate has caused considerable divide within the community, and many questioned why this issue has been raised again as the current arrangements seem to be working.

Concerns relating to community and social value include:

- A few participants said they avoid the beach entirely as a place for recreation due to the presence of dogs.
- A few participants were concerned if access was increased in the off-peaks season some may use the beach less during those months in order to avoid interactions with off-leash dogs.

Business and recreation considerations

The role of Narrawallee Beach in supporting local business and planned recreational activities was a key theme.

Feedback indicated:

- The beach is used for surf lessons, organised activities (e.g fitness classes) and is patrolled during the summer holiday period, which encourages visitors and tourists to the area.
- Families and visitors use the beach for extended periods and is an important place for swimming, surfing, walking, exercising and dog walking. A coffee cart on Matron Porter Drive is regularly open, and the area is a hub of activity in the mornings, afternoons and on weekends.
- Dog access at Surfers Avenue and Victor Avenue stairs would allow families to stay and watch beach activities (e.g surf lessons and other organised activities) with dogs.
- Increasing access for dogs would provide more flexibility for tourists visiting the area with dogs and provide economic value to the local businesses who are based at the beach.

Concerns around recreation use included

- Some residents near to the beach access tracks raised concerns of current levels of disruption and congestion in the area and stated that an increase in dog access may cause an increase in disruption (noise and congestion) from dogs and beach users.

Amenity (noise and parking)

Feedback indicated that overall beach experience, including noise, crowding and parking is an important consideration.

Feedback indicated that:

- Beaches are active recreational environments with noise from all types of beach users and activities which is generally to be expected near a popular beach environment.
- Parking impacts can vary depending on time of day and season, some participants expressed that increasing dog access points and times may disperse the parking congestion issue.
- Many participants, including some who reside near beach access tracks, suggested that noise from dogs was not a concern and that it was generally expected on the beach during busy periods and it was mixed noise from cars, people and dogs.

Concerns relating to amenity included:

- Impacts on nearby residents including noise from dogs barking and noise from associated activities. Some participants expressed concerns with noise from ongoing dog barking, which impacts wellbeing.
- Localised parking pressure near access points, with some stating that increasing dog access would make parking worse in certain locations.

APPENDIX A QUESTIONNAIRE RESULTS

This appendix presents a summary of responses to the community questionnaire developed by the engagement consultant.

The questionnaire was designed to capture community values, priorities and management considerations relevant to the Review of Environmental Factors (REF).

A total of 1,046 responses were received.

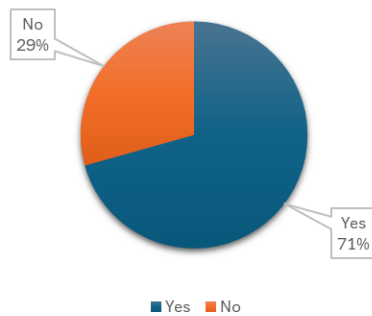
Results presented are indicative only and reflect the views of those who chose to participate.

The online questionnaire was hosted using Council's online platform. Response data was provided to the engagement consultant by Council for the purpose of analysis and reporting.

Section 1 Respondent profile													
Question 1: Most respondents identified as local residents (72%), followed by holiday homeowners (16%) and visitors (10%).	WHICH BEST DESCRIBES YOU? <table border="1"> <thead> <tr> <th>Respondent type</th> <th>Total Surveys</th> </tr> </thead> <tbody> <tr> <td>Holiday homeowner</td> <td>167</td> </tr> <tr> <td>Local resident</td> <td>752</td> </tr> <tr> <td>Visitor</td> <td>105</td> </tr> <tr> <td>Prefer not to say</td> <td>22</td> </tr> </tbody> </table>	Respondent type	Total Surveys	Holiday homeowner	167	Local resident	752	Visitor	105	Prefer not to say	22		
Respondent type	Total Surveys												
Holiday homeowner	167												
Local resident	752												
Visitor	105												
Prefer not to say	22												
Question 2: The age profile of respondents was broadly distributed, with the largest representation from the 55–74 age group (56%), followed by the 25–54 age group (34%).	WHAT IS YOUR AGE GROUP? <table border="1"> <thead> <tr> <th>Age Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>18 - 24</td> <td>1%</td> </tr> <tr> <td>25 - 54</td> <td>34%</td> </tr> <tr> <td>55 - 74</td> <td>56%</td> </tr> <tr> <td>75+</td> <td>8%</td> </tr> <tr> <td>Prefer not to say</td> <td>1%</td> </tr> </tbody> </table>	Age Group	Percentage	18 - 24	1%	25 - 54	34%	55 - 74	56%	75+	8%	Prefer not to say	1%
Age Group	Percentage												
18 - 24	1%												
25 - 54	34%												
55 - 74	56%												
75+	8%												
Prefer not to say	1%												
Question 3: Most respondents indicated they were 'aware' or 'very aware' of the current dog access arrangements (96% combined).	HOW AWARE ARE YOU OF CURRENT DOG ACCESS ARRANGEMENTS AT NARRAWALLEE? <table border="1"> <thead> <tr> <th>Awareness Level</th> <th>Total Surveys</th> </tr> </thead> <tbody> <tr> <td>Aware</td> <td>278</td> </tr> <tr> <td>Not aware</td> <td>5</td> </tr> <tr> <td>Slightly aware</td> <td>38</td> </tr> <tr> <td>Very aware</td> <td>725</td> </tr> <tr> <td>Prefer not to say</td> <td>0</td> </tr> </tbody> </table>	Awareness Level	Total Surveys	Aware	278	Not aware	5	Slightly aware	38	Very aware	725	Prefer not to say	0
Awareness Level	Total Surveys												
Aware	278												
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Slightly aware	38												
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Prefer not to say	0												

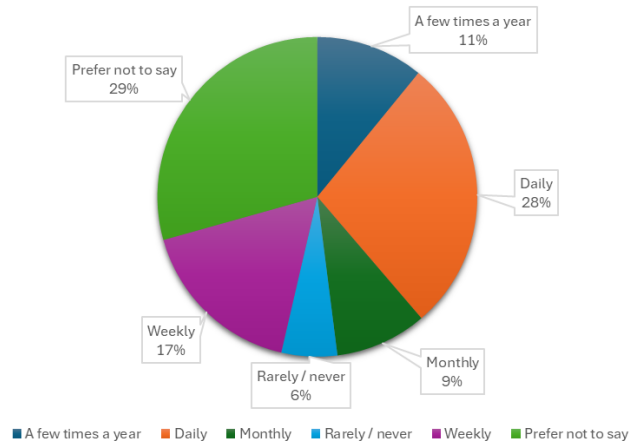
Question 4: Most respondents (71%) indicated they own a dog.

DO YOU CURRENTLY OWN A DOG?



Question 5: Many respondents walk their dog daily (28%) and weekly (17%) weekly, however around a third preferred not to say.

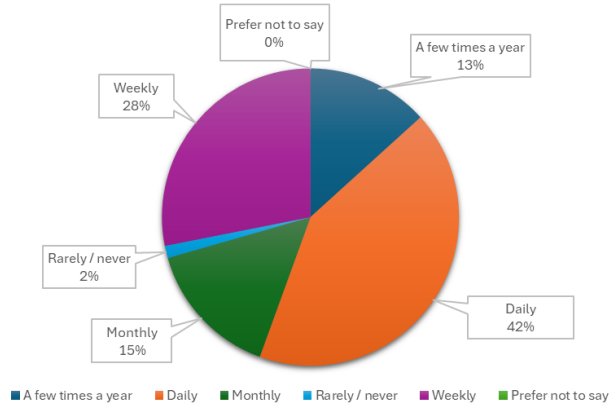
HOW OFTEN DO YOU WALK YOUR DOG AT NARRAWALLEE BEACH?



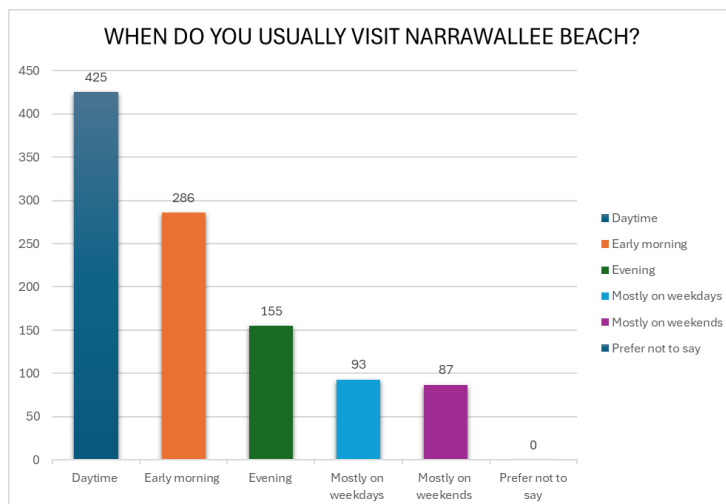
Section 2 Beach use and activities

Question 6: Responses indicated that 42% use visit the beach daily and 28% use it weekly.

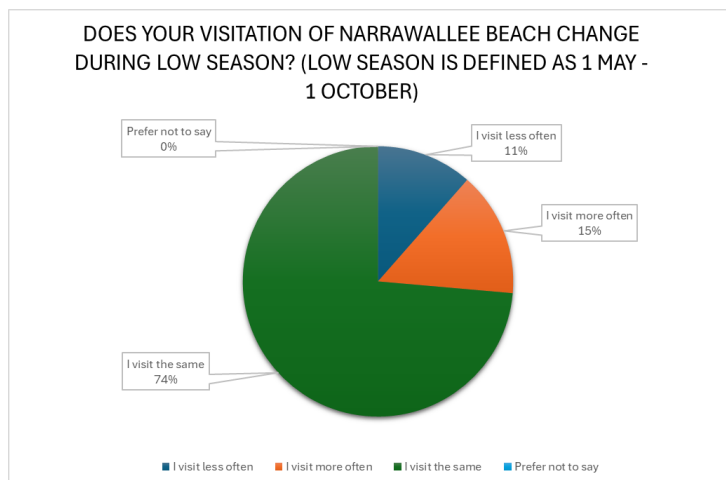
HOW OFTEN DO YOU VISIT NARRAWALLEE BEACH?



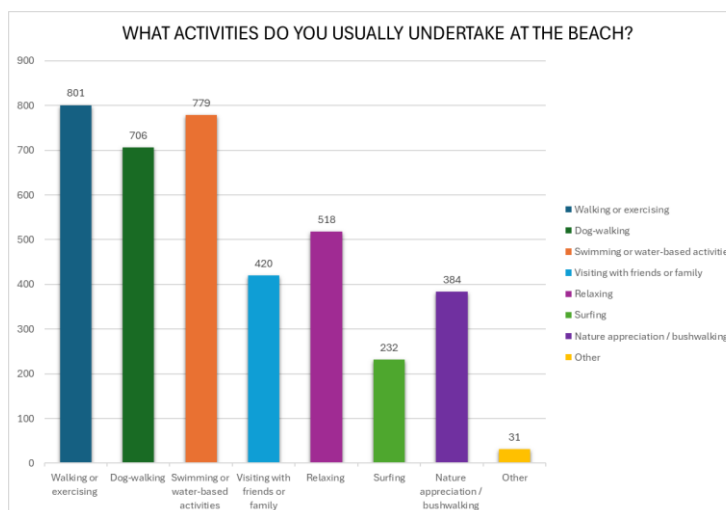
Question 7: 41% respondents reported that they usually visit the beach during the daytime, with around a third visiting in the early morning.



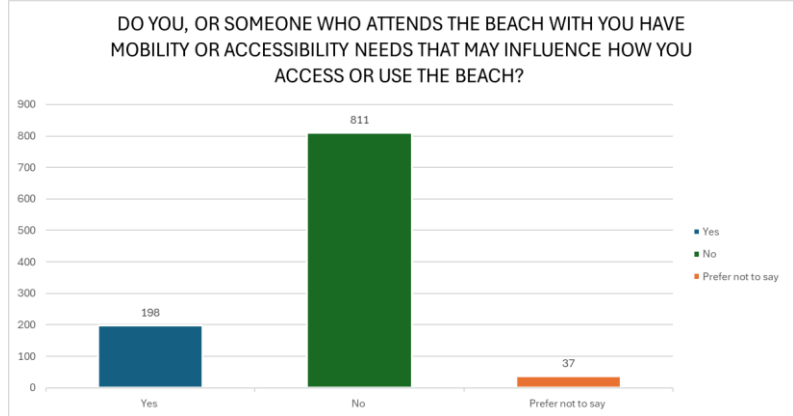
Question 8: Most respondents indicated that their visitation patterns do not change significantly during the low season.



Question 9: Respondents reported a wide range of activities undertaken at the beach including walking or exercising, swimming or water-based activities and dog walking.



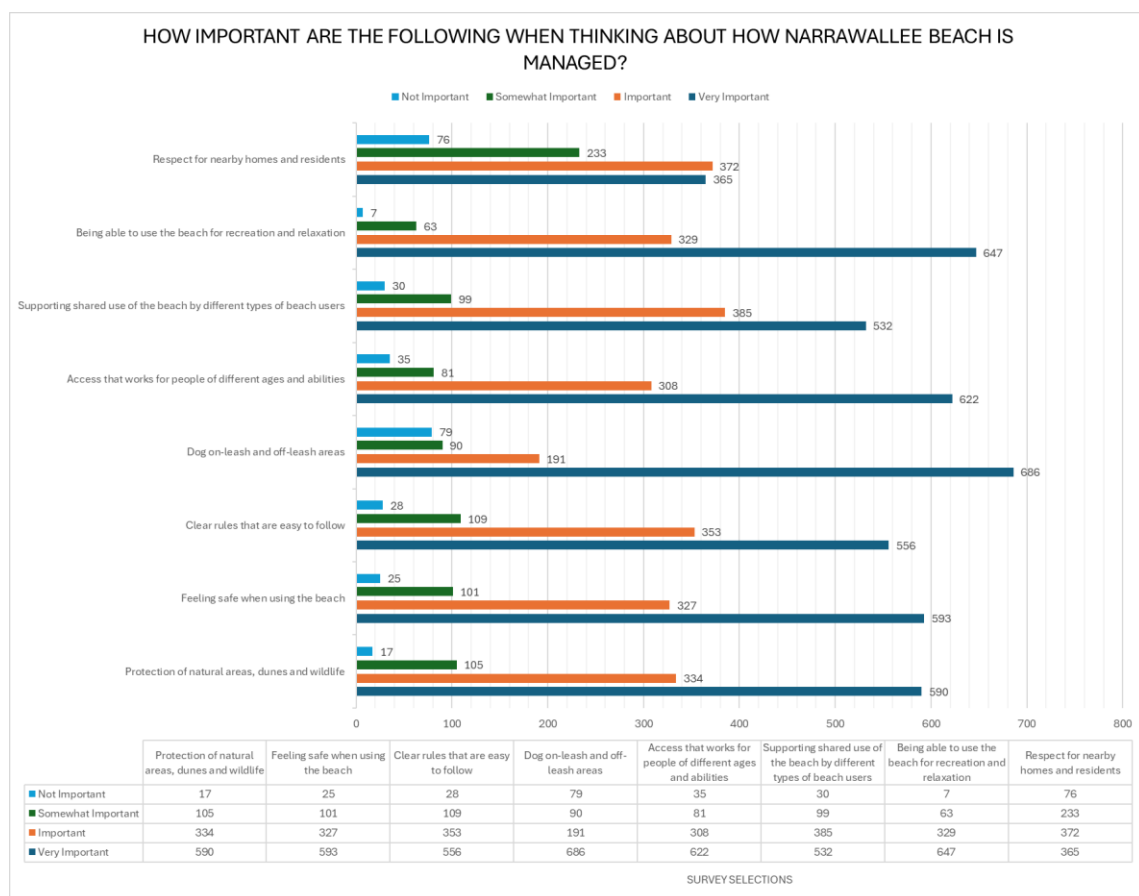
Question 10: Responses indicate that 19% of participants said that they, or someone who attends the beach with them, have mobility or accessibility needs that may influence how they access or use the beach. While most respondents (77%) indicated this was not the case, the results show that accessibility considerations are relevant for a notable proportion of beach users and their companions.



Section 3 Values and priorities

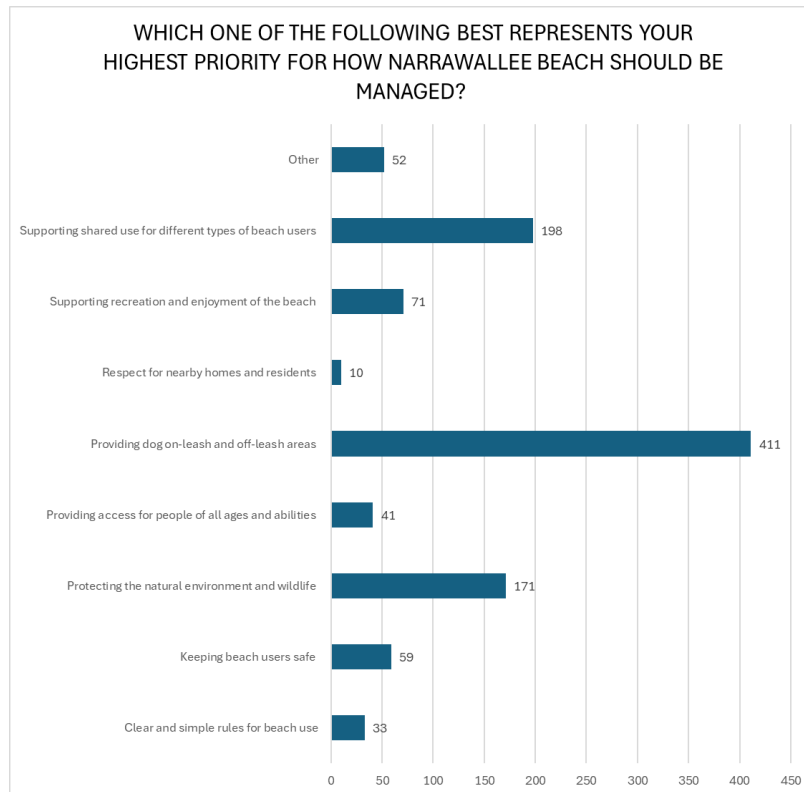
Question 11: Responses indicate that all factors were considered important by participants, with the majority rating each as 'important' or 'very important', particularly dog on- and off-leash areas, access for people of all ages and abilities, ability to use the beach for recreation, safety and environmental protection.

Overall, the results show that community priorities are broad and balanced, with strong emphasis on access, safety, environmental protection and clear management, rather than any single dominant factor.



Question 12: When asked to identify their highest priority for how Narrawallee Beach should be managed, responses were distributed across a range of options, indicating that community priorities are varied. The most frequently selected option was providing dog on-leash and off-leash areas. Other commonly selected priorities included supporting shared use for different types of beach users and protecting the natural environment and wildlife.

A smaller number of respondents identified priorities such as supporting recreation and enjoyment of the beach, keeping beach users safe, and providing access for people of all ages and abilities.



A selection of from open text responses:

"My husband's legs impacted by polio now has to drive and not walk as cannot use Victor steps with our dog reserve is double distance"

"Mum cannot access beach with dog at the moment and cannot walk up and down steep hill and path Via Matron Porter Reserve. Our home is two minute walk Victor Rd Steps"

"We now have to drive from Mollymook to Narrawallee, when on previous access rules allowing on-leash access from the south of Narrawallee, we could walk. Access through the tacks is rough"

"I have hip issues that make walking the distance difficult so I have to now drive to the beach to take the dog instead of using the Victor stairs"

"As far as possible, we avoid times when dogs are present. We have both been subject to the unwanted attentions of uncontrolled, off-leash dogs. We both have concerns when using stairs"

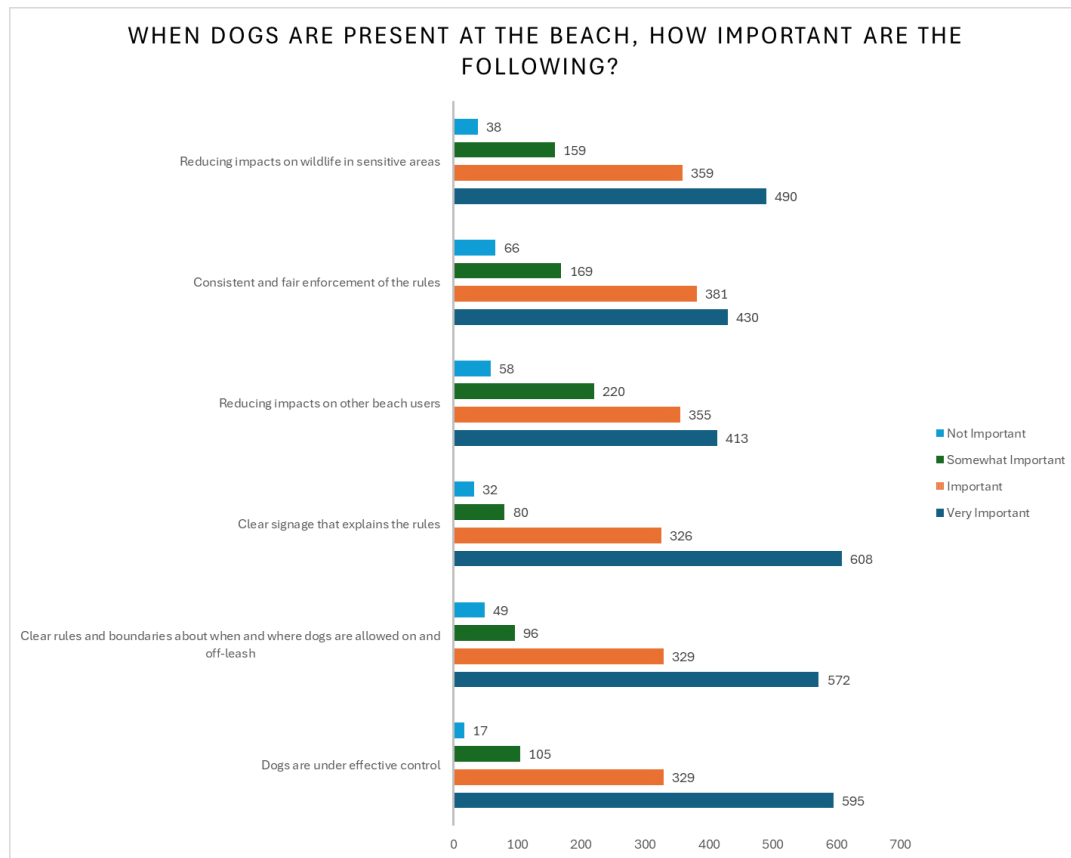
"I am extremely concerned of the possibility of using the stairs with dogs! I am 73 with osteoporosis and do not want to fall due to unrestrained dogs. Who would be responsible if I was knocked over??"

"I often have my elderly parents and young grand children with me. They are unsteady on their feet and so we stay away from the south end of the beach away from dog access"

"My friends with mobility issues previously accessed the beach via the Victor Ave stairs. Without this access point it is extremely difficult to easily get onto the beach. Now we can't enjoy the beach together."

Section 4 Dog management considerations

Question 13: Respondents consistently rated all dog management factors as ‘important’ or ‘very important’, indicating strong support for clear rules, effective control of dogs, appropriate signage and consistent enforcement. Environmental considerations, including impacts on wildlife, were also highly rated, reinforcing the importance of balanced management approaches.



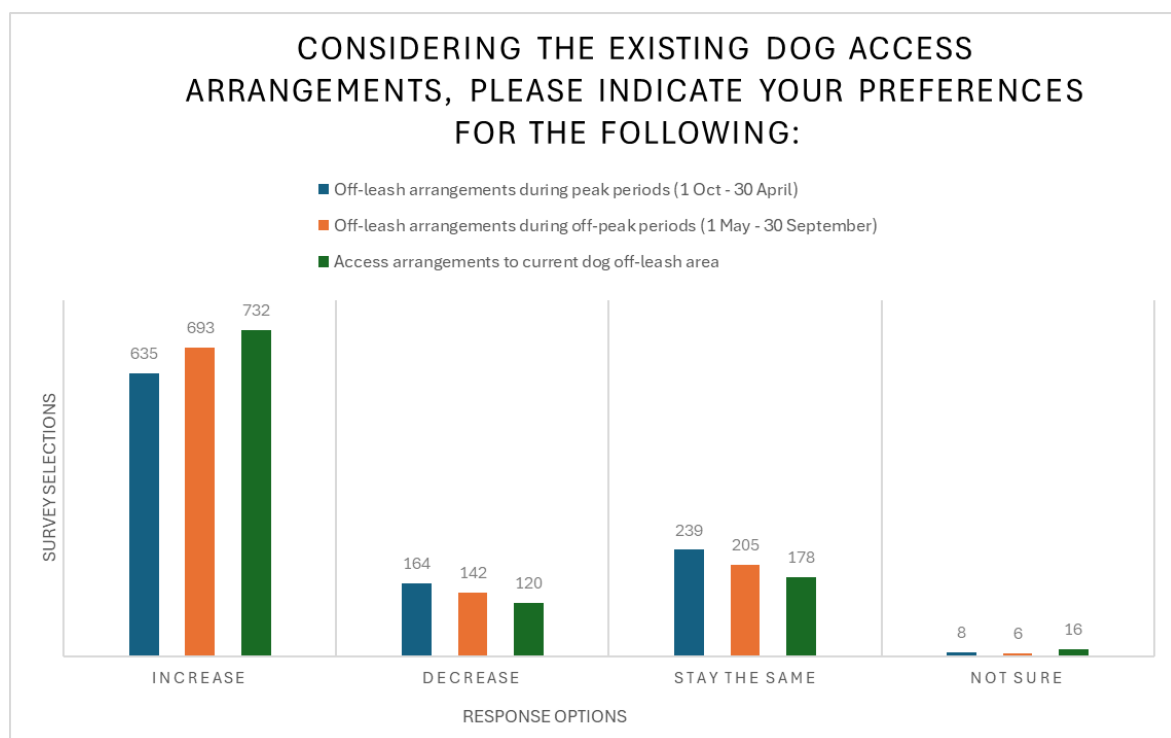
Question 14: Responses to this question indicate that a larger proportion of participants favoured increasing dog access arrangements across all three areas assessed (peak period off-leash, off-peak off-leash, and access to the off-leash area). The strongest support for increased access was observed for:

- Access arrangements to the current off-leash area (69%)
- Off-leash arrangements during off-peak periods (66%)
- Off-leash arrangements during peak periods (61%)

A moderate proportion of respondents preferred to keep arrangements the same, particularly for peak period access (23%), indicating some support for retaining existing controls during busier times.

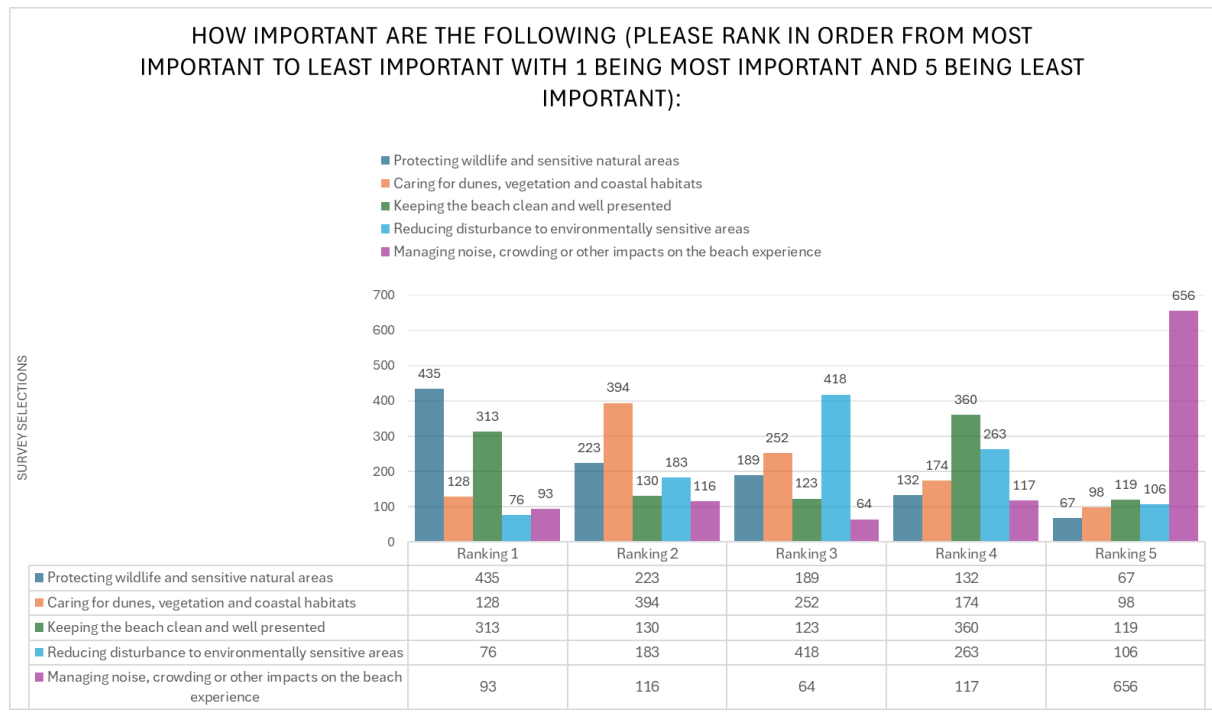
A smaller number of respondents indicated a preference to decrease access across all categories, with the lowest support for decreasing access to the off-leash area (11%).

Overall, the results indicate a tendency among respondents towards increasing dog access arrangements, particularly outside peak periods and in relation to access points. However, responses also demonstrate that a segment of the community prefers to maintain or reduce current access, reinforcing that community views are mixed and reflect differing priorities.



Section 5 Environmental and amenity

Question 15: Environmental considerations were consistently ranked as high priorities, particularly protecting wildlife and sensitive natural areas. Other factors, including beach cleanliness and habitat protection, were also important but more evenly distributed across rankings. Managing noise and crowding was most commonly ranked as a lower priority.



Section 6 Additional Council led questions

This section presents results from additional questions incorporated into the questionnaire during the consultation period at the request of Council. These questions were distinct from the original questionnaire developed by the engagement consultant.

Data has been provided by Council and is reported here for completeness and transparency. The questionnaire developed by the consultant was published on 6 February. On the 9 February, 5 additional questions were added.

Respondents who had already completed the original questionnaire were contacted by council and made aware of the change.

The additional questions from Council were five yes/no questions as outlined below.

Overall outcome of Council questions

Responses to the additional Council questions indicate that a majority of participants supported all proposed dog access arrangements. This suggests a general level of support among participants for both on-leash and off-leash access, including expanded arrangements. While this indicates a tendency towards increased flexibility, results should be considered alongside broader engagement findings, which reflect a range of views and competing priorities.

Do you support dogs on the beach off-leash?

A clear majority of respondents (81% said “yes”) indicated support for dogs being allowed off-leash on the beach. This suggests that many participants are comfortable with off-leash access, although a smaller but notable group expressed opposition.

Do you support dogs on the beach on-leash?

Responses showed strong support (81% said “yes”) for dogs being allowed on-leash on the beach. This indicates broad acceptance of on-leash access as a baseline arrangement, with fewer respondents opposing this option compared to off-leash access.

Do you support people using the stairs with dogs on-leash on Victor Avenue?

A majority of respondents supported on-leash dog access via the Victor Avenue stairs (82% said “yes”). This suggests that many participants see value in improving access to the beach via this location, although a smaller proportion did not support this access point.

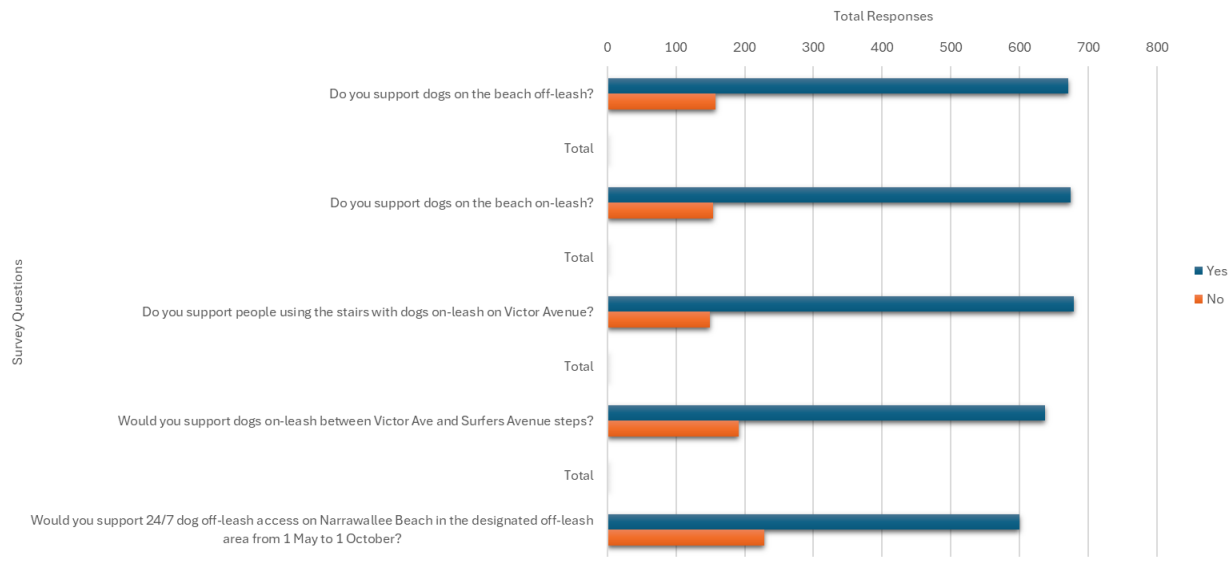
Would you support dogs on-leash between Victor Avenue and Surfers Avenue steps?

Most respondents supported on-leash access between Victor Avenue and Surfers Avenue steps (77% said “yes”), indicating general acceptance of extending on-leash access on this section of the beach. However, a portion of respondents did not support this change, reflecting some concerns about impacts in this area.

Would you support 24/7 dog off-leash access in the designated off-leash area (1 May to 1 October)?

Responses indicated majority support for extending off-leash access to 24 hours during the low season (72% said “yes”), although this question showed relatively higher levels of opposition compared to other questions. This suggests that while many participants support increased flexibility during quieter periods, some concerns remain regarding unrestricted off-leash access during this time.

COUNCIL QUESTION RESPONSES



APPENDIX B - QUESTIONNAIRE



Community questionnaire – dog access arrangements at *Narrawallee Beach.*

Introduction

Shoalhaven City Council is undertaking a new Review of Environmental Factors (REF) to assess potential adjustments to the current dog access arrangements at Narrawallee Beach.

This questionnaire focuses on how the community uses the beach, and what people value.

This questionnaire will take approximately 5-10 minutes to complete.

Privacy Collection Notice*

Shoalhaven City Council ("Council") is collecting personal information (including name, email and residential address) through this questionnaire as part of community consultation on dog access arrangements at Narrawallee Beach. This information will be used to analyse consultation results and inform Council decision-making.

Responses will be accessed by authorised Council staff and Council's external community engagement consultant. By participating, you consent to this information being shared for these purposes.

Your personal information is collected, stored, handled, and disclosed in accordance with Council's Privacy Management Plan and applicable NSW privacy laws (including the Privacy and Personal Information Protection Act 1998).

For more information about how your information is managed, your rights to access or correct information, or how to make privacy-related requests or complaints, please visit Council's Privacy and Personal Information page or contact Council on 1300 293 111.*

- ☐ **Yes**, I consent Shoalhaven City Council collecting my personal information to analyse consultation results and inform council decision making.
- ☐ **No**, I do not consent Shoalhaven City Council collecting my personal information to analyse consultation results and inform council decision making.

Section I - About you

1. Which best describes you?*

- ☐ Local resident
- ☐ Visitor
- ☐ Holiday homeowner
- ☐ Other (please explain)

2. What is your age group?*

- ☐ Under 18
- ☐ 18-24
- ☐ 25-54
- ☐ 55-74
- ☐ 75+
- ☐ Prefer not to say

3. How aware are you of current dog access arrangements at Narrawallee Beach?*

- ☐ Very aware
- ☐ Aware
- ☐ Slightly aware
- ☐ Not aware

4. Do you currently own a dog?*

- ☐ Yes
- ☐ No

5. How often do you walk your dog at Narrawallee Beach?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ A few times a year
- ☐ Rarely / never

Section 2 - How you use the beach

6. How often do you visit Narrawallee Beach? (Select one)*

- ☐ Daily ☐ A few times a year
☐ Weekly ☐ Rarely / never
☐ Monthly

7. When do you usually visit Narrawallee Beach? (Select all that apply)*

- ☐ Early morning ☐ Mostly on weekdays
☐ Daytime ☐ Mostly on weekends
☐ Evening

8. Does your visitation change during low season (1 May to 1 October)?*

- ☐ I visit less often
☐ I visit the same
☐ I visit more often

9. What activities do you usually undertake at the beach? (Select all that apply)*

- ☐ Walking or exercising ☐ Surfing
☐ Dog walking ☐ Relaxing
☐ Visiting with friends or family ☐ Nature appreciation / birdwatching
☐ Swimming or water activities ☐ Other (please specify)

10. Do you, or someone who attends the beach with you, have mobility or accessibility needs that may influence how you access or use the beach?*

- ☐ Yes ☐ No ☐ Prefer not to say

If you would like to, please describe how these needs influence access to or use of the beach (optional).

Section 3 - Values and priorities

11. How important are the following when thinking about how Narrawallee Beach is managed?*

Protection of natural areas, dunes and wildlife

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Feeling safe while using the beach

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Clear rules that are easy to follow

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Dog on leash and off leash areas

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Access that works for people of different ages and abilities

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Supporting shared use of the beach by different types of beach users

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Being able to use the beach for recreational and relaxation

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Respect for nearby homes and residents

- ☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

12. Which ONE of the following best represents your highest priority for how Narrawallee Beach should be managed?* (select one only)

- ☐ Protecting the natural environment and wildlife ☐ Supporting shared use by different types of beach users
☐ Keeping beach users safe ☐ Respect for nearby homes and residents
☐ Clear and simple rules for beach use ☐ Providing access for people of all ages and abilities
☐ Providing dog on leash and off leash areas ☐ Supporting recreation and enjoyment of the beach

Other (please specify)

Section 4 - Dog management considerations

13. When dogs are present at the beach, how important are the following?*

Dogs are under effective control

☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Clear rules and boundaries about when and where dogs are allowed on and off leash

☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Clear signage that explains the rules

☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Reducing impacts on wildlife in sensitive areas

☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Reducing impacts on other beach users

☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

Consistent and fair enforcement of the rules

☐ Very Important ☐ Important ☐ Somewhat Important ☐ Not Important

14. Considering the existing dog access arrangements, please indicate your preferences for the following:*

Off leash arrangements during peak periods (1 Oct – 30 April)

☐ Increase ☐ Stay the same ☐ Decrease ☐ Not sure

Off leash arrangements during off-peak periods (1 May – 30 September)

☐ Increase ☐ Stay the same ☐ Decrease ☐ Not sure

Access arrangement to current dog off leash area

☐ Increase ☐ Stay the same ☐ Decrease ☐ Not sure

Section 5 - Environment and amenity

15. How important are the following?*

Rank in order from most important to least important (1 being most important and 5 least)

- ☐ Protecting wildlife and sensitive natural areas
- ☐ Caring for dunes, vegetation and coastal habitats
- ☐ Reducing disturbance to environmentally sensitive areas
- ☐ Keeping the beach clean and well presented
- ☐ Managing noise, crowding or other impacts on the beach experience

Section 6 - Final Considerations: These are additional questions that are being asked by Council to inform future decision-making processes.

16. Do you support dogs on the beach off-leash? managed?

☐ Yes ☐ No

17. Do you support dogs on the beach on-leash?

☐ Yes ☐ No

18. Do you support people using the stairs with dogs on-leash on Victor Ave?

☐ Yes ☐ No

19. Would you support dogs on-leash between Victor Ave and Surfers Ave steps?

☐ Yes ☐ No

20. Would you support 24/7 dog off-leash access on Narrawallee Beach in the designated off-leash area from 1 May to 1 October?

☐ Yes ☐ No

Respondent *details*

21. Full name *

22. Email address *

23. Residential address (Optional)

APPENDIX C STAKEHOLDER MEETING SUMMARIES

As part of the engagement process, six targeted stakeholder meetings were undertaken between 20 February and 11 March 2026.

Participants included representatives from local businesses, community and advocacy groups and a surf lifesaving organisation. Meetings were held online and were designed to provide detailed, experience-based insights into how current and proposed dog access arrangements impact different user groups.

Key themes and findings

Stakeholder feedback reflected a broad range of perspectives, including strongly held and, at times, polarised views on dog access arrangements.

Access and accessibility

Some stakeholders supported increased access, including extended off-leash hours and introducing access via Victor Avenue and Surfers Avenue stairs, noting benefits for older residents, people with limited mobility, and those who rely on walking rather than driving. Others raised concerns about the suitability and safety of the stairs, including their condition, shared use, and potential for conflict.

Safety and user experience

Views on safety were mixed. Some stakeholders indicated that current arrangements are generally manageable when dogs are under control and that issues are infrequent. In contrast, others reported negative experiences with off-leash dogs, including feeling unsafe, avoiding the beach at certain times, and concerns about increased risks if access is expanded. Congestion at access points and interactions between dogs and other users were also identified as potential risks.

Environmental considerations

Environmental protection, particularly impacts on shorebirds and coastal habitats, was a key concern for some stakeholders. Concerns were raised about disturbance to feeding and roosting areas and increased dog presence in sensitive locations. Other stakeholders considered that impacts could be managed through responsible dog ownership and appropriate controls.

Compliance and management

There were differing views on current levels of compliance. Some stakeholders indicated that most dog owners behave responsibly, while others reported regular non-compliance, particularly in relation to off-leash behaviour and use of restricted areas. There was general agreement on the importance of clear rules, signage, and effective enforcement.

Community use and social value

Stakeholders highlighted the role of the beach in supporting recreation, wellbeing and community connection. Some emphasised the social benefits of dog walking and its contribution to community cohesion, while others noted that dog access can limit the ability of some users to enjoy the beach. Several stakeholders also noted that the issue has contributed to tension and division within the local community.

Local business and economic activity

Some stakeholders identified potential benefits of increased access, including supporting local businesses, tourism and enabling families to participate more easily in beach activities. Others did not identify significant economic benefits and focused instead on impacts to amenity and use.

Amenity (noise and parking)

Views on amenity impacts varied. Some stakeholders considered noise and parking impacts to be typical of a busy coastal environment and manageable, while others raised concerns about increased noise from dogs and localised parking pressures near access points.

APPENDIX D ON-SITE BEACH INTERVIEW SUMMARY

Face-to-face on-site interviews were conducted at Narrawallee Beach during the consultation period to capture feedback from people using the beach in real time.

This method enabled engagement with a range of beach users, including those who may not typically participate in online consultation processes.

Key outcomes

Face to face location interviews were undertaken at Narrawallee Beach and surrounding access points, including the Victor Avenue stairs and dog access area on:

- Friday 27 March
 - 7:00–8:30am
 - 9:45–11:30am
 - 3:30–4:00pm
- Saturday 28 March
 - 7:50–10:00am

Weather conditions on Friday 27 March limited engagement as no people were present on the beach in the afternoon.

A total of 37 individuals participated in discussions across the engagement period, including dog owners, non-dog owners, families and local residents.

Access via stairs

Many participants expressed support for on-leash dog access via the Victor Avenue and Surfers Avenue stairs, noting that this would provide more direct and practical access to the beach.

Participants highlighted that the stairs offer good visibility, allowing users to see approaching dogs and other beach users, which was considered to support safe shared use.

Some participants also raised potential improvements to access infrastructure, including the suggestion of separate new stairs for on leash dogs, effectively removing any issue from the stairs.

Accessibility was also raised as a consideration, with some participants noting that current access arrangements require longer walking distances, which may be challenging for older users.

Dog access arrangements

Views on broader dog access arrangements were mixed.

Some participants expressed support for increased access, including extended hours, noting the benefits for dog owners and the role of the beach in supporting recreation and wellbeing. This included both dog owners and some non-dog owners.

Other participants indicated a preference to retain existing arrangements, noting that the current system provides a balance between different beach users.

A small number of participants suggested broader, region-wide approaches to dog access to reduce pressure on individual beaches.

Safety, compliance and user experience

A number of participants raised concerns regarding compliance with existing rules, including instances of dogs being off leash in inappropriate areas or at restricted times.

Some participants reported negative interactions when raising compliance concerns with dog owners, including perceived aggression.

Concerns were also raised regarding potential congestion at access points, particularly during peak periods, and the implications this may have for safety and user experience.

Other participants indicated that shared use is generally manageable when dogs are appropriately controlled.

Many participants suggested a greater role for Council Rangers in ensuring compliance, especially in peak periods.

Community sentiment

Several participants commented on the broader community context of the issue, noting that dog access at Narrawallee Beach has been a divisive topic.

Participants referred to ongoing tension within the community and the challenges associated with differing views with some expressing concern about the impact of the issue on community relationships, while others highlighted the importance of reaching a balanced and respectful outcome.

Environmental and amenity considerations

Some participants emphasised the importance of environmental protection, including consideration of impacts on wildlife and sensitive areas. Others indicated that clear communication about the purpose of rules, and ranger enforcement, would support understanding and compliance.

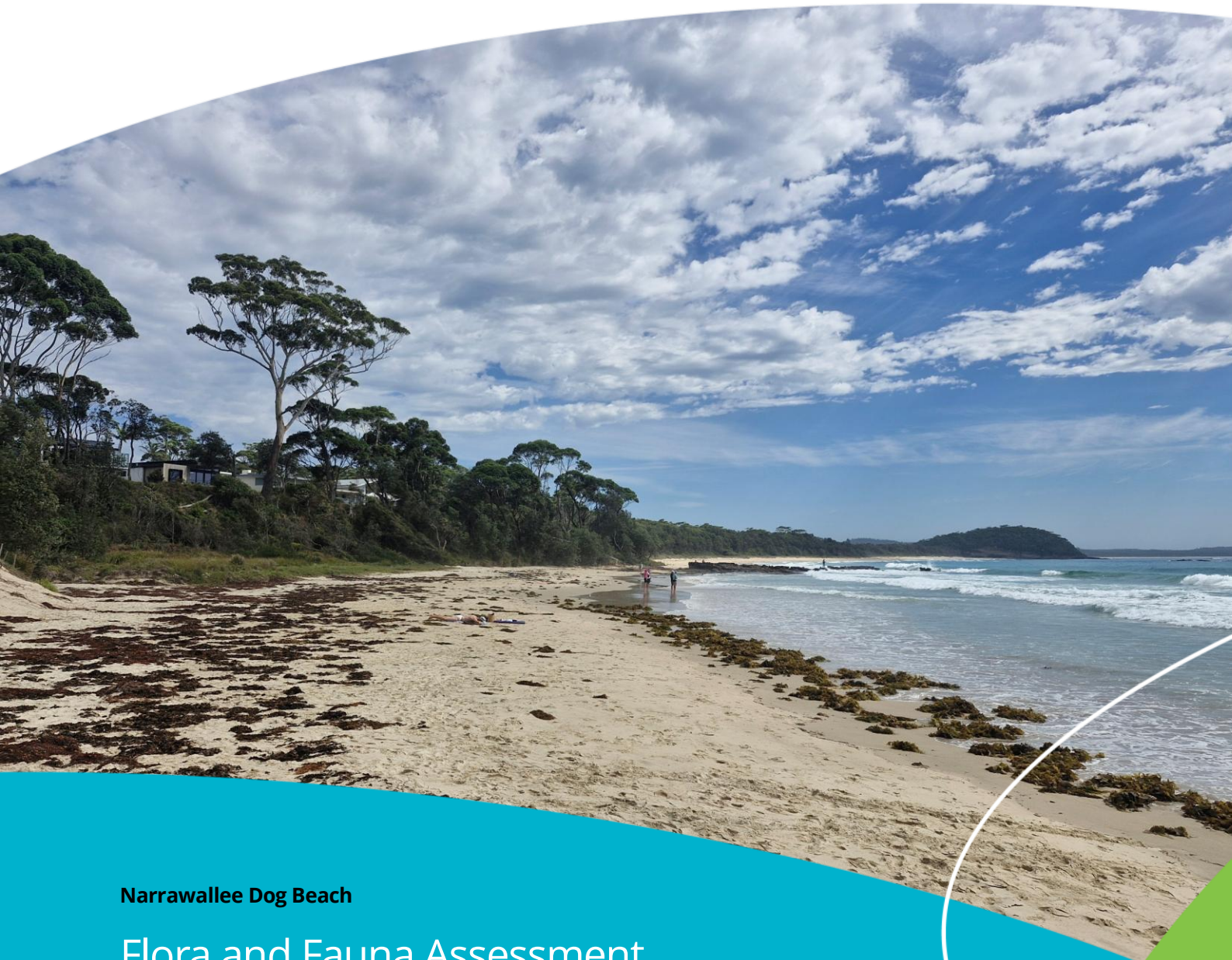
Summary

Feedback from on-site face to face interviews reflects a range of perspectives consistent with those from the questionnaire and stakeholder engagement. While there was general support among participants for improved access via the stairs, views on broader dog access arrangements were mixed.

Participants highlighted the importance of compliance, clear communication of rules and the need to balance access, safety, environmental protection and community expectations.

As with all consultation, findings are qualitative in nature and reflect the views of those who participated at the time.

Appendix 2 Flora and fauna assessment



Narrawallee Dog Beach

Flora and Fauna Assessment

Final Report

Prepared for Shoalhaven City Council

11 May 2026

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- NSW Department of Climate Change, Energy, the Environment and Water for access to the BioNet Atlas of NSW Wildlife.
- NSW Department of Primary Industries and Regional Development for access to the predicted distribution maps for threatened species and fish communities.

Biosis staff involved in this project were:

- Joel Nicholson (Field investigations and reporting)
- Jemma Guliano (reporting)
- Matthew Hyde (quality assurance)
- Jenny Beckius (GIS mapping)

Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

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Definitions

BC Act	<i>Biodiversity Conservation Act 2016</i>
Biosecurity Act	<i>Biosecurity Act 2015</i>
CBD	Central Business District
CM Act	<i>Coastal Management Act 2016</i>
Cth DCCEEW	Australian Commonwealth Department of Climate Change, Energy, the Environment and Water
DPIRD	Department of Primary Industries and Regional Development
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	<i>Fisheries Management Act 1994</i>
GIS	Geographic Information System
KTP	Key Threatening Process
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
MNES	Matters of National Environmental Significance
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PCT	Plant Community Type
SEPP	NSW State Environmental Planning Policy
SIC	Significant Impact Criteria
SIS	Species Impact Statement
study area	The study area is defined as the shoreline area from the foredune to the swash zone on Narrawallee Beach, heading south from Beach Access 8 to the southern section of the beach at Beach Access 1.
TEC	Threatened Ecological Community
ToS	Test of Significance
VMP	Vegetation Management Plan
VRZ	Vegetated Riparian Zone
WM Act	<i>NSW Water Management Act 2000</i>

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Shoalhaven City Council (Council) to complete a Flora and Fauna Assessment (FFA) to describe the ecological values and constraints associated with the proposed Dog Beach Extension Project located at Narrawallee Beach, Narrawallee in New South Wales (NSW).

Biosis understands a Review of Environmental Factors (REF) for a timed dog off-leash area was approved in May 2024 (Shoalhaven City Council 2024) for the middle section of Narrawallee Beach, where patronage among dog owners is high (Figure 1). This section of the beach is also used by other beach patrons walking the full length of the beach. Council proposes to extend the dog off-leash activity to 24 hours, 7 days per week from 1 May to 1 October each year, within the area marked as BA3 to BA8 shown in Figure 2. Council also proposes to provide dog on-leash access from the Victor Avenue steps (BA2) and the Surfers' Avenue steps (BA1) to the dog off leash area (Figure 2). This area is currently dog-prohibited, so this proposal represents an intensification of use, thereby requiring assessment.

Review of Environmental Factors (Shoalhaven City Council 2024)

Ecoplanning prepared an REF in 2024 on behalf of Council that provided environmental assessment for the off-leash dog area and ancillary works at Narrawallee Beach (Shoalhaven City Council 2024). The REF provided by Ecoplanning is a reviewed and updated version of the *Dog Off-leash Access Narrawallee Beach, Narrawallee report* completed by Council in 2022 (Shoalhaven City Council 2022). The REF assessed the potential environmental impacts of the proposed dog off-leash area and associated ancillary works (signage installation) along Narrawallee Beach.

The proposed activity of the REF involved the establishment of an off-leash dog area along the entirety of the subject site. The subject site was defined as the sand beach extending from the swash zone to the base of vegetated incipient dune as it represents the primary area of potential direct impact on the environment and shorebirds.

The REF ultimately determined that the area north of BA8 will be maintained as dog-prohibited, the area south of BA3 will be retained as dog-prohibited to ensure adequate buffering from the rock shelves in the south, and the current dog off-leash access area is extended from BA7 to BA8 (Figure 2). The determinations were provided with mitigation safeguards and concluded that it is unlikely that there will be any significant impacts to threatened species or Threatened Ecological Communities (TEC) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Biodiversity Conservation Act 2016* (BC Act).

1.2 Scope of assessment

The objectives of this investigation are to:

- Describe the vertebrate fauna (birds, mammals, reptiles, frogs, and fish) and decapod crustacea (e.g., crayfish).
- Map shorebird habitat features.
- Review the implications of relevant biodiversity legislation and policy.
- Identify potential implications of the proposed development and provide recommendations to assist with development design.
- Recommend any further assessments of the site that may be required (such as targeted searches for threatened entities).

1.3 Location of the study area

The study area is approximately 6.6 hectares and is defined as the shoreline area of the existing dog beach extending down to the beachfront areas on the southern section of Narrawallee Beach (Figure 1). The study area is within Shoalhaven Local Government Area (LGA). The study area is not located within the Biodiversity Values Map (BV Map) (NSW DCCEEW 2025a).

The study area is within the:

- Sydney Basin Bioregion.
- South East Local Land Services (LLS) Management Area.
- Shoalhaven Local Government Area (LGA).

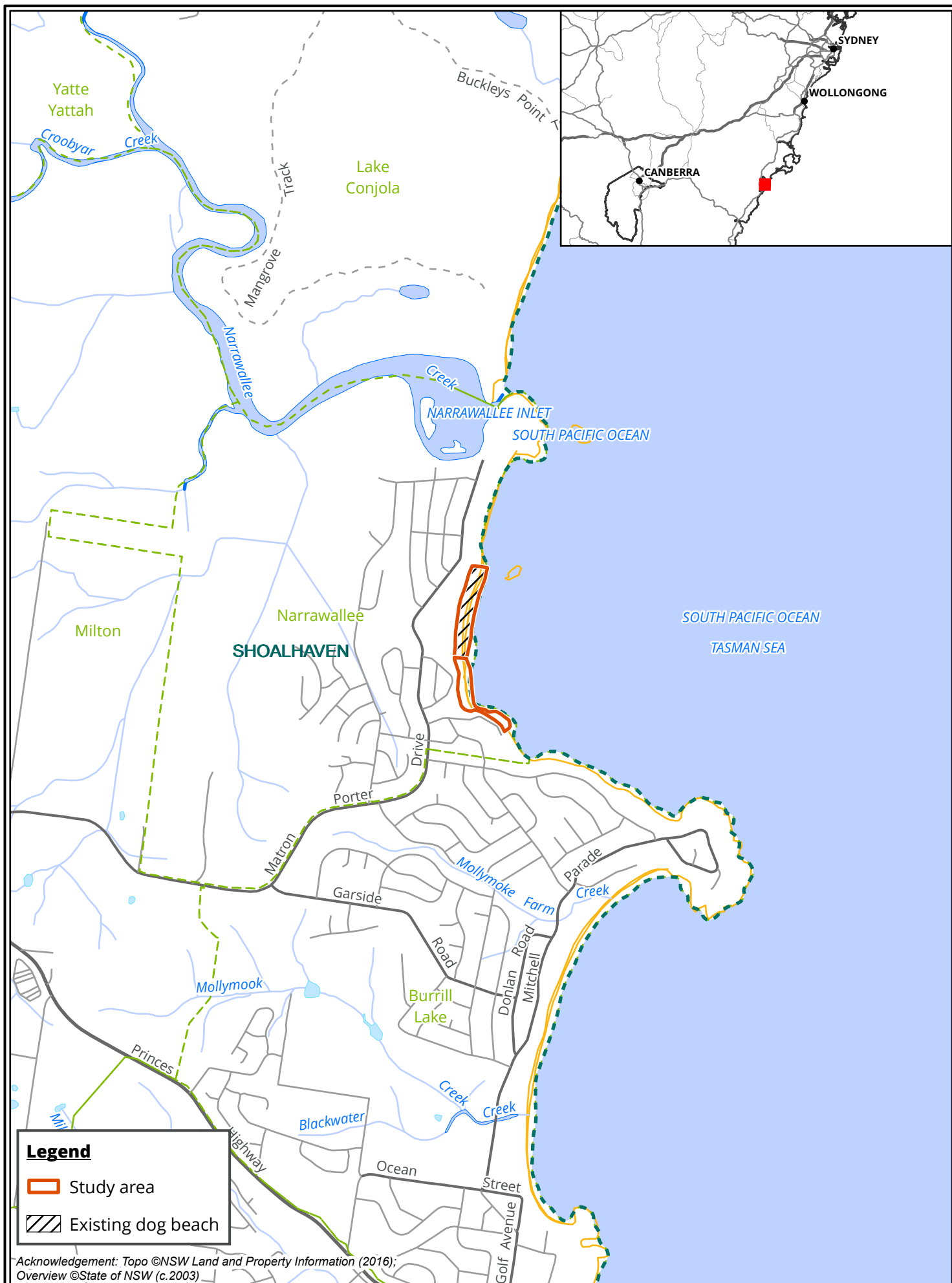


Figure 1 Location of the study area

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 Prepared for: JJN, Prepared by: OW, Last edited by: owilliams
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2 Methods

2.1 Database and literature review

Prior to completing the field investigation, key information was reviewed, including:

- Australian Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) Protected Matters Search Tool for matters protected by the EPBC Act.
- BirdLife Australia BirdData database, for records of bird species observations including threatened and migratory species (BirdLife Australia 2025).
- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) BioNet Atlas of NSW Wildlife, for items listed under the BC Act.
- The NSW Department of Primary Industries and Regional Development (DPIRD) Spatial Data Portal for *Fisheries Management Act 1994* (FM Act) listed threatened species, populations and communities (DPIRD 2025).
- NSW DPIRD *Biosecurity Act 2015* for listed priority weeds for the South East Local Land Services area.
- NSW DCCEEW Vegetation Information System (VIS) mapping including the NSW State Vegetation Type Map (SVTM C2.0M2.2) (NSW DCCEEW 2025b).

The implications for the project were assessed in relation to key biodiversity legislation and policy including:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Biodiversity Conservation Act 2016* (BC Act).
- *Coastal Management Act 2016* (CM Act).
- *National Parks and Wildlife Act 1974* (NPW Act).
- *Water Management Act 2000* (WM Act).
- *Fisheries Management Act 1994* (FM Act).
- *Biosecurity Act 2015* (Biosecurity Act).
- *Shoalhaven Local Environmental Plan 2014*

2.2 Field investigation

A field investigation of the study area was undertaken on 5 February 2026 by Joel Nicholson (Senior Zoologist). Vegetation and shoreline habitat within the study area was surveyed using the random meander technique (Cropper 1993) over six person hours.

A habitat-based assessment was completed to determine the presence of suitable habitat for threatened species previously recorded (DPE 2022a) or predicted to occur (Cth DCCEEW 2025) within five kilometres. This list was filtered according to species descriptions, life history, habitat preference and soil preference to determine those species most likely to be present within the study area.

2.2.1 Permits and licences

The biodiversity assessment was conducted under the terms of Biosis' Scientific Licence issued by NSW DCCEEW under the BC Act (SL100758, expiry date 30 June 2026). Wildlife surveys were conducted under the Secretary's Animal Care & Ethics Committee Approval (TRIM 17.892, expiry date 31 January 2028).

3 Results

The study area is located approximately three kilometres north of Ulladulla, in the township of Narrawallee. Narrawallee Beach is an open-coast beach, approximately 1.4 kilometres in length, with Narrawallee Creek Nature Reserve and Narrawallee Creek Inlet located north of the study area (Figure 1).

The existing off-leash dog area of Narrawallee Beach (Photo 1) provides low condition foraging and roosting habitat for threatened shorebirds due to the high use of the general public as well as dog-walkers (Figure 2). At high tide, the available beach width within this section is insufficient to provide effective refuge, resulting in low-quality habitat for shorebird species.



Photo 1 Narrawallee Beach Dog Off-leash area looking south to the restricted area.

The shoreline areas south of the existing off-leash dog area provide low to moderate quality foraging habitat for threatened shorebirds (Figure 2). The narrow beach profile, with the high tide line located close to the foredune, limits the extent of the intertidal zone and reduces available foraging habitat to the periods of low tide (Photo 2). The southern section of Narrawallee beach contains a small area that is protected from the high tide line, however at the time of survey the area had signs of storm and large swell damage, therefore not offering adequate protection or habitat for roosting/nesting shorebird species (Photo 3). While some feeding opportunities may occur along the swash zone and wrack line in this southern section, habitat suitability for roosting is constrained by the limited foreshore area. In addition, frequent human disturbance further reduces the likelihood of regular shorebird use. No threatened shorebird species were observed within this area during the time of survey. The use of this area for threatened shorebird use is likely to be infrequent and opportunistic for foraging.



Photo 2 Southern section of Narrawallee Beach outside the Off-leash zone.



Photo 3 Southern section of Narrawallee Beach with signs of storm damage.

Two areas of shorebird foraging habitat were identified during the field investigation; the southern intertidal reef platform located to the east of the beach access stairs from Surfers Avenue (Photo 4), and a nearshore tidal reef situated to the north-east of the existing off-leash dog area.



Photo 4 Reef foraging area located on the southern boundary of the study area near BA1

The intertidal rock platform at the southern extent of Narrawallee Beach (near BA1) provides suitable foraging habitat for threatened shorebirds, particularly species adapted to rocky coastal environments. The presence of exposed reef and rockpools supports a diversity of intertidal invertebrates, increasing prey availability during low tide. As such, there is a moderate likelihood of occurrence of species such as Sooty Oystercatcher and Pied Oystercatcher, which are known to utilise rocky shores, reefs, and adjacent coastal habitats for feeding. These species were recorded by Ecoplanning in this area in 2024. No threatened species were observed in this area during the field investigation, although it is very likely that they would use this area for foraging. The use of this habitat is likely to be intermittent and influenced by tidal conditions and disturbance, with higher activity expected during low tide periods when foraging opportunities are greatest.

A nearshore tidal reef situated north-east of the existing dog beach provides foraging habitat for threatened shorebirds, with habitat availability restricted to low tide periods when the reef surface is exposed. During these times, the reef and associated rockpools support would likely support a diversity of intertidal invertebrates, including molluscs, crustaceans, and worms. This type of habitat is most suitable for species adapted to rocky coastal environments, such as oystercatchers, and may contribute to local foraging opportunities within the broader coastal habitat network. However, because the reef is submerged at higher tides, its use is temporally limited, and overall habitat value is influenced by tidal cycles, accessibility, and levels of disturbance. No threatened species were identified within this area at the time of survey.

A shore bird reference site was included in the field investigation, located at the inlet of Narrawallee Creek (Photo 5) located north of Narrawallee Beach (Figure 2). The southern section of Buckleys Beach contains an

existing fenced threatened shorebird protection area. The site is recognised as a key local shorebird refuge, supporting seasonal use by migratory species and resident birds such as oystercatchers and plovers. The site has connectivity between the inlet, intertidal flats, and adjacent coastal dunes, which together form an integrated coastal habitat system critical for shorebird survival. Two threatened shorebird species were observed within the reference site, Sooty Oystercatcher and Pied Oystercatcher.



Photo 5 Narrawallee Creek Inlet located 600 metre north of the study area.

Community sightings

Council has provided correspondence from local residents that have observed a number of bird species, including Sooty Oystercatcher *Haematopus fuliginosus* (Vulnerable, BC Act) and Pied Oystercatcher *Haematopus longirostris* (Endangered, BC Act). Exact locations of sightings are not provided however it is noted that the sightings occurred on the rock platform to the east of the southern extent of Narrawallee Beach near BA1 (Figure 2). Local residents have provided Council with insight into potential occurrence of threatened species in the locality which was considered by Biosis in the habitat assessment and field investigation.

3.1 Vegetation communities

As it was previously assessed in the REF completed by Council (Shoalhaven City Council 2024) the study area was defined as the sand beach extending from the swash zone to the base of the vegetation incipient dune as it represents the primary area of potential direct/indirect impacts. Therefore, as the focus of this assessment is refined to the shoreline area, the vegetation behind the dune systems was not re-assessed.

The previous REF mapped two Plant Community Types (PCT) within the subject site; PCT 3805 Southern Sandplain Heath and PCT 3410 Spinifex Strandline Grassland (Shoalhaven City Council 2024). The Endangered Ecological Community (EEC) *Bangalay Sand Forest in the Sydney Basin and South East Corner bioregions* (EEC, BC

Act) was mapped for the Matron Porter Drive Reserve and along the Narrawallee Beach foreshore (Shoalhaven City Council 2024).

3.2 Threatened species

Background searches identified 13 threatened flora species and 135 threatened fauna species recorded (DPE 2022a) or predicted to occur (Cth DCCEEW 2025) within five kilometres of the study area. For the purpose of this flora and fauna assessment, the fauna has been limited to threatened shorebirds. Those species considered most likely to have habitat within the study area based on the background research are as follows.

Fauna

- Caspian Tern *Hydroprogne caspia* (Migratory, EPBC Act).
- Crested Tern *Thalasseus bergii* (Migratory, EPBC Act).
- Eastern Hooded Dotterel *Thinornis cucullatus cucullatus* (Vulnerable, EPBC Act and Critically Endangered, BC Act).
- Little Tern *Sternula albifrons* (Endangered, BC Act).
- Pied Oystercatcher *Haematopus longirostris* (Endangered, BC Act)
- Short-tailed Shearwater *Ardenna tenuirostris* (Migratory, EPBC Act).
- Sooty Oystercatcher *Haematopus fuliginosus* (Vulnerable, BC Act).

An assessment of the habitat values of the study area is provided in Table 1 for threatened fauna species.

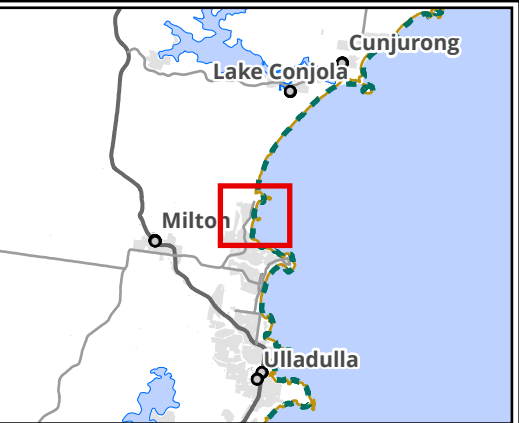
Table 1 Assessment of habitat for threatened shorebird species

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
Sandy beach areas	Threatened shorebirds use beach areas for foraging, nesting and/or roosting. Shorebirds commonly forage on small invertebrates in the swash zone or in the accumulated seaweed and debris along the shoreline. The foredunes are primarily used for nesting and roosting, providing short access to foraging resources and protection from high tides and disturbances.	The study area had low opportunities for roosting/nesting habitat due to the limited foreshore area and frequent impact from humans and storms. Based on the transient nature of threatened shorebird species and surrounding resources and connectivity to Narrawallee Creek Inlet within the landscape there is not likely to be an impact to significant impact to roosting shorebird species in this area. Foraging resources within the study area are limited, due to a narrow swash zone and increased disturbance from public use compared to the northern section of the beach and the Narrawallee Creek inlet area. As sandy beach habitats provide potential foraging resources, further assessment has been undertaken for the Little Tern, Eastern Hooded Plover, Pied Oystercatcher, and Sooty Oystercatcher. The Caspian Tern, Crested Tern and Short-tailed Shearwater do not utilise sandy beach foraging resources, therefore, further assessment of these

Habitat feature	Threatened fauna association	Likelihood of occurrence or impact
		species in relation to the study area is not required.
Intertidal reefs and Rockpools	The reefs and rockpools provide a variety of foraging resources such as mollusc's crustaceans and worms to threatened shorebirds. Rock platforms and headlands are also used for roosting to provide protection from high tide and disturbances.	The study area contains two significant intertidal reefs. The first is located in the southern boundary near BA1 and a nearshore intertidal reef near BA3 (Figure 2). The foraging resources in this area is of moderate to high quality with a variety of shorebird species likely to use these resources including the Pied Oystercatcher and Sooty Oystercatcher. Further assessment is required for these species. The Eastern Hooded Plover forages within sandy beach habitats, while the Little Tern, Caspian Tern, Crested Tern and Short-tailed Shearwater forage primarily within coastal and offshore marine waters. None of these species rely on intertidal rock reefs or rockpools for foraging; therefore, further assessment in relation to indirect impacts to these habitats is not required.
Estuaries	Estuaries and coastal inlets are key foraging and roosting habitat for threatened shorebirds. The intertidal mud and sandflats are the primary foraging areas, with areas above the high-tide line such as sand spits and banks providing high quality roosting habitat. Estuaries are key habitats for migratory species to provide protection and conserve energy between migratory periods.	The study area does not contain estuary habitat, however it is present 600 metres north of the study area at Narrawallee Creek Inlet. The Narrawallee Creek Inlet has an established protected shorebird habitat area on the northern bank, with signage and fencing to minimise disturbance.

Based on the size of the study area, the survey effort is considered comprehensive to assess habitat presence for the species outlined in Table 1. A number of the threatened entities considered to have a moderate or higher likelihood of occurring within the study area were identified throughout this assessment, triggering a requirement for further assessment, these threatened shorebird species are:

- Eastern Hooded Dotterel
- Little Tern
- Pied Oystercatcher
- Sooty Oystercatcher



- Legend**
- Study area
 - Lot
 - Beach access points
 - Existing dog beach
 - Shorebird reference site
 - Shorebird foraging habitat
- Biosis - Threatened fauna record**
- Pied Oystercatcher - *Haematopus longirostris*
 - Sooty Oystercatcher - *Haematopus fuliginosus*

Figure 2 Ecological features of the study area

0 75 150 225 300 Metres

Scale: 1:7,000@ A3
Coordinate System:
GDA2020 MGA Zone 56

biosis
APEM Group

Matter: 43836, Date: 28 April 2026,
Prepared for: JJN, Prepared by: OW, Last edited by: benjamin.mcfadden
Location: P:\43800s\43836\Mapping\
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Layout: 43836_F2_EcoFeatures

4 Ecological impacts and recommendations

The proposed activities involve the following indirect impacts to ecological features:

- Increased off-leash dog activity in the main section of the dog beach area (BA3 to BA8). Current off-leash hours extend from 16:00 to 8:00 from 1 October to 30 April and 15:00 to 10:00 1 May to 30 September. The proposed increase will be 24 hour off leash access from 1 May to 1 October.
- Increased dog activity in the southern section of the study area to access the off-leash section of the beach (specifically BA1 and BA2).

4.1 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of National Environmental Significance (MNES) protected under the Act. Under the EPBC Act, activities that have potential to result in significant impacts on MNES must be referred to the Commonwealth Minister for the Environment and Water for assessment.

The Eastern Hooded Dotterel listed as Vulnerable under the EPBC Act was assessed to have a medium or greater potential to occur within the study area. An assessment against the Significant Impact Criteria (SIC) (DoE 2013) has been prepared for this species which was deemed likely to be subject to negative impacts (Appendix 3). This assessment concluded that a significant impact was not likely to result from the project. The impacts to the habitat for this species are considered to be indirect and these areas are already experiencing disturbance from public use. Therefore, the mitigation measures of recommended in this report of appropriate buffers and increased signage will limit any further indirect impacts of the proposed activities on this habitat.

On the basis of criteria outlined in Commonwealth of Australia (2013) it is considered unlikely that a significant impact on a Matter of NES would result from the project. However, Council may choose to refer the proposed action to the Australian Government Minister for the Environment and Water to determine whether the action requires approval under the EPBC Act. Further detail is provided below.

Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species (DoEE 2017)

The purpose of this policy statement is to assist proponents in avoiding, assessing and mitigating significant impacts on migratory shorebirds listed under the EPBC Act. This policy statement is a key action under the Wildlife Conservation Plan for Migratory Shorebirds.

Areas used most by migratory shorebirds in Australia usually comprise networks of foraging and roosting habitats. Shorebirds move within these areas depending on the time of day, availability of resources, levels of disturbance and environmental conditions. Some habitats are important refuges during extreme high tides or when weather conditions prohibit occupancy of more commonly used habitats.

Important Shorebird habitats

A shorebird area is defined as the geographic area that had been used by the same group of shorebirds over the main non-breeding period. This is effectively the home range of the local population when present. Shorebird areas may include multiple roosting and feeding habitats. While most migratory shorebird areas

will represent contiguous habitat, non-contiguous habitats may be included as part of the same area where there is evidence of regular bird movement between them. Migratory shorebird areas may therefore extend beyond the boundaries of a property or project area, and may also extend beyond Ramsar boundaries for internationally important areas. Existing information and/or appropriate surveys can determine the extent of a migratory shorebird area (Clemens et al. 2010).

Figure 2 (DoEE 2017) in the guideline provides a process for identifying important habitat for migratory shorebirds. As the shorebird area is not already identified as internationally important and the shorebird area does not support:

- At least 0.1% of the fly way population of a single migratory shorebird species, or
- At least 2000 migratory shorebirds, or
- At least 15 migratory shorebird species

The shore areas of the Narrawallee Beach are not considered to be important habitat for migratory shorebirds.

Significant impacts on migratory shorebirds

The guideline states that habitat loss, habitat degradation, disturbance, and direct mortality are likely to result in significant impacts on migratory shorebirds in Australia. For the potential impacts outlined in this FFA disturbance is most likely factor that requires assessment.

Actions which involve disturbance at important habitat areas during vital life cycle stages are highly likely to be significant. Disturbance can result from residential and recreational activities such as four-wheel-driving, jet- and water-skiing, power boating, fishing, **walking**, wind-surfing, kite-surfing, **walking dogs**, noise and night-lighting.

The guideline states that measures to mitigate against the impacts of disturbance need to be determined on a case-by-case basis, as different species of shorebird respond differently to disturbance. Options for mitigating impacts from disturbance include:

- The use of buffer zones around important areas for migratory shorebirds. Appropriate buffers will depend on local circumstances, including the species present, type of habitat (ephemeral or permanent), habitat use (roosting or foraging) and scale of disturbance. As a guide, studies have recommended buffer zones with widths ranging from 165 metres to 255 metres.
- The construction of appropriate barriers, such as fences around important habitat to restrict access. Ideally, there should be no public access (by humans and/or domestic animals) to areas identified as important to migratory shorebirds. Where this is not feasible, particular recreational activities may need to be excluded or it may be necessary to limit the number of people using an area at one time and/or limit activities during the period between October and March (when the majority of shorebirds will be present)
- Landscape and urban design, including sympathetic lighting strategies, vegetation screening and sound attenuation
- Increased community education through mechanisms such as interpretive signs at access points to shorebird habitats.

As the shorebird habitat is not determined to be important for migratory shorebirds but does contain moderate foraging resources on the southern reef shelf it is our recommendation that a buffer of resources around 165-255 meters is adhered to. This would allow access from Victor Ave (BA2) which is approximately

190 metres from the reef edge (Figure 2). The access point from Surf Ave (BA1) is within 20 metres of the southern reef and will likely result in disturbance of foraging shorebirds in this area.

Access would be restricted to on-leash dog use between BA2 and BA3, with dog access prohibited south of BA2 and within BA1. This approach establishes a spatial buffer consistent with relevant shorebird management guidelines, reducing the risk of disturbance to identified foraging habitats. By limiting dog activity in areas where shorebird foraging is more likely to occur, the proposed arrangement helps maintain habitat function and minimises disturbance impacts associated with off-leash dogs.

4.2 Environmental Planning and Assessment Act 1979

An assessment of the project against the relevant sections of the EP&A Act is provided below.

Test of Significance

ToS were completed for four species considered to have a medium or greater likelihood of occurrence within the study area (Table 2).

The impact assessment determined that the existing presence of dogs within the designated off-leash area, together with the controlled on-leash movement through the southern section into this area, is unlikely to significantly impact or reduce the availability of shorebird habitat on Narrawallee Beach. This section of the beach is already subject to relatively high levels of recreational use by both people and dogs, which reduces its suitability for regular shorebird use. As a result, threatened shorebirds are more likely to utilise quieter, less disturbed habitats, such as those present within the reference site at the Narrawallee Creek inlet to the north.

No threatened shorebird species are expected to utilise the subject site to a degree that would result in their further endangerment from any proposed modification. Suitable habitat for threatened shorebirds does occur within the wider study area; however, the subject site itself offers limited habitat value due to its levels of existing disturbance. As such, the proposed spatial constraints and mitigation measures are expected to ensure that any impacts on these species are negligible.

A Biodiversity Development Assessment Report (BDAR) or Species Impact Statement (SIS) is therefore not required.

Table 2 Summary of Tests of Significance

Scientific name	Common name	1	2	3	4	5	6	7	Significant effect?
<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Dotterel	x	x	x	x	x	x	x	None
<i>Sternula albifrons</i>	Little Tern	x	x	x	x	x	x	x	None
<i>Haematopus longirostris</i>	Pied Oystercatcher	x	x	x	x	x	x	x	None
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	x	x	x	x	x	x	x	None

4.3 Biodiversity Conservation Act 2016

Four threatened species listed under the BC Act have a medium or greater likelihood of occurring within the study area. Tests of Significance (ToS) have been prepared for the following threatened entities that are deemed likely to be subject to negative impacts:

- Eastern Hooded Dotterel *Thinornis cucullatus cucullatus* (Critically Endangered, BC Act).
- Little Tern *Sternula albifrons* (Endangered, BC Act).
- Pied Oystercatcher *Haematopus longirostris* (Endangered, BC Act).
- Sooty Oystercatcher *Haematopus fuliginosus* (Vulnerable, BC Act).

The ToS assessments (Appendix 2) concluded that a significant impact was not likely to result from the project, due to reasons discussed above in section 4.2.

A BDAR or SIS is therefore not required.

4.4 Coastal Management Act 2016

The CM Act provides the statutory framework and key objectives for managing coastal areas in New South Wales, with an emphasis on ecologically sustainable use and development of the coastal environment. The Act defines specific coastal management areas within the NSW coastal zone, each with associated management objectives.

Narrawallee Beach is identified as both a Coastal Environment Area and a Coastal Use Area under the CM Act. The objectives for these areas focus on protecting and enhancing coastal environmental values, including ecosystem health, water quality, and natural coastal processes, as well as maintaining and improving social and cultural values such as public access to coastal areas for recreation.

The proposed activities have been assessed as consistent with the objectives of the CM Act and are not considered to conflict with its requirements.

4.5 Water Management Act 2000

The WM Act provides for the sustainable and integrated management of the state's water for the benefit of both present and future generations based on the concept of ecologically sustainable development. Under the WM Act an approval is required to undertake controlled activities on waterfront land, unless that activity is otherwise exempt under Section 91E. Waterfront land is defined within the Act as the bed of any river, lake or estuary and any land within 40 metres of the river banks, lake shore or estuary mean high water mark.

A public authority does not need to obtain a controlled activity approval for any controlled activities that it carries out in, on or under waterfront land.

The WM Act is supported by a series of interpretation guidelines including *Controlled activities on waterfront land - guidelines for riparian corridors on waterfront land* (DPE 2022b). This guideline defines a riparian management envelope referred to as the vegetated riparian zone (VRZ). The width of the VRZ within a riparian corridor has been pre-determined and standardised for first, second, third and fourth order and greater watercourses according to the Strahler System of ordering watercourses and is measured from the top of the highest bank on both sides of the watercourse. This guideline also presents the riparian corridor matrix that assists applicants for controlled activity approvals to identify certain works and activities that can occur on waterfront land and in riparian corridors. The guideline also includes overarching management measures for works on waterfront land.

As a public authority, under Part 2 of the *Water Management Regulation 2018*, Council does not need to obtain a controlled activity approval from the NSW DCCEW – Water Group for any controlled activities that it carries out in, on or under waterfront land.

4.6 Fisheries Management Act 1994

The FM Act provides for the protection and conservation of aquatic species and their habitat throughout NSW. Impacts to threatened species, populations and communities, and critical habitats listed under the FM Act must be assessed through an Assessment of Significance process.

The proposed activities do not involve dredging activities and are not expected to impact aquatic species or their habitats. As such, no further assessment of aquatic ecological impacts is required.

4.7 Shoalhaven Local Environmental Plan 2014

The *Shoalhaven Local Environmental Plan 2014* (LEP) is a planning instrument that guides land use, development controls, and environmental protection across the Shoalhaven LGA. The LEP sets out zoning provisions and development standards to manage growth while protecting environmental, cultural, and recreational values.

Where development consent is not required, the LEP does not apply. However, all relevant matters for consideration under Part 8 of the *Environmental Planning and Assessment Regulation 2021* must still be addressed.

5 Conclusion and recommendations

5.1 Conclusion

This report is an assessment of the potential impact of dog access changes on ecological values within the study area in accordance with the EP&A Act, FM Act, BC Act and the EPBC Act.

The proposed activities that will result in indirect impacts to ecological values include:

- Increased off-leash activity from dogs in the main section of the dog beach area (BA3 to BA8).
- Increased activity from dogs in the southern section of the study area to access the off-leash section of the beach (specifically BA1 and BA2).

This assessment has identified that suitable shorebird habitat within the study area is generally limited. Roosting habitat availability is low across the southern extent of Narrawallee Beach due to its narrow beach profile, high levels of recreational use, and the proximity of the high tide line to the foredune, which provides minimal refuge for shorebirds.

Foraging habitat is also limited in extent but is present in two key locations: the southern intertidal reef platform and the nearshore tidal reef near the existing off-leash dog area. These intertidal reef areas provide intermittent foraging opportunities for shorebirds at low tide. However, their use is likely to be opportunistic and influenced by tidal conditions and existing levels of human disturbance. Overall, while these habitats provide some ecological value, the narrow shoreline and exposure to disturbance limit their capacity to support regular threatened shorebird use.

5.2 Recommendations

To minimise potential disturbance to shorebirds and maintain the ecological function of identified foraging habitats, the following management measures are recommended:

- Exclusion Zone (BA1): Dog access should be prohibited from BA1 to establish a buffer between recreational use and the southern reef foraging habitat in accordance with the industry guidelines (DoEE 2017). This will reduce the potential for disturbance to shorebirds utilising the intertidal reef platform near Surfers Avenue.
- Controlled Access (BA2–BA3): Dog walking may be permitted on-leash between BA2 and BA3. This arrangement allows continued recreational use in less sensitive areas while minimising disturbance to key foraging habitats.
- Signage and Community Awareness: Install signage at BA1 and adjacent access points (BA2 and BA3) to inform the public of the presence of potential shorebird foraging habitat near the southern reef area. Educational messaging should encourage responsible dog management and awareness of shorebird sensitivity to disturbance.

These measures are intended to maintain a balance between recreational use and the protection of identified shorebird habitats, ensuring that disturbance impacts are minimised and ecological values are retained.

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Appendices

Appendix 1 Fauna

Fauna species recorded from the study area

Below is a list of fauna species recorded from the study area during the present assessment and a list of threatened fauna species recorded or predicted to occur within five kilometres of the study area.

Fauna species in these tables are listed in alphabetical order within their taxonomic group.

Notes to table:

Status – EPBC Act: CE – Critically Endangered EN – Endangered VU – Vulnerable	Status – BC Act: E1 – endangered species (Part 1, Schedule 1) E2 – endangered population (Part 2, Schedule 1) E4 – presumed extinct (Part 4, Schedule 1) E4A – critically endangered V – vulnerable (Part 1, Schedule 2)
Status – FM Act: C1 – critically endangered E1 – endangered E2 – endangered E4 – presumed extinct V1 – vulnerable	Status – Non-indigenous species * pest species not native to the area # established pest species as defined under the NSW Invasive Species Plan (INSERT REF).

Table 3 Fauna recorded from the study area (current assessment)

Scientific name	Common name	Commonwealth status	NSW status
Birds			
<i>Trichoglossus moluccanus</i>	Rainbow Lorikeet	-	-
<i>Anthochaera carunculata</i>	Red Wattlebird	-	-
<i>Vanellus miles</i>	Masked Lapwing	-	-
<i>Chroicocephalus novaehollandiae</i>	Silver Gull	-	-
<i>Phalacrocorax carbo</i>	Great Cormorant	-	-
<i>Haematopus longirostris</i>	Pied Oystercatcher	-	EN
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	-	VU
<i>Eopsaltria australis</i>	Eastern Yellow Robin	-	-
<i>Pelecanus conspicillatus</i>	Australian Pelican	-	-
Crustaceans			
<i>Ocypode cordimana</i>	Ghost Crab	-	-

Threatened fauna Likelihood of Occurrence

The following table includes a list of the significant fauna species that have potential to occur within the study area. The list of species is sourced from the NSW BioNet Wildlife Atlas, BirdLife Australia data search and the Protected Matters Search Tool (DCCEEW; accessed on 24/02/2026).

Notes to table:

#	species predicted to occur by the DEE database (not recorded on other databases)
##	species predicted to occur based on natural distributional range and suitable habitat despite lack of records in the databases searched
+	xxx
Year	recorded on databases listed above
2018	recorded during current survey

Likelihood of occurrence	Potential criteria
High	- Species recorded in study area during current or previous assessment/s. - Aquatic species recorded from connected waterbodies in close proximity to the study area during current or previous assessment/s. - Sufficient good quality habitat is present in study area or in connected waterbodies in close proximity to the study area (aquatic species). - Study area is within species natural distributional range (if known). - Species has been recorded within 5 km or from the relevant catchment/basin.
Medium	- Records of terrestrial species within 5 km of the study area or of aquatic species in the relevant basin/neighbouring basin. - Habitat limited in its capacity to support the species due to extent, quality, or isolation.
Low	- No records within 5 km of the study area or for aquatic species, the relevant basin/neighbouring basin. - Marginal habitat present (low quality & extent). - Substantial loss of habitat since any previous record(s).
Negligible	- Habitat not present in study area - Habitat for aquatic species not present in connected waterbodies in close proximity to the study area. - Habitat present but sufficient targeted survey has been conducted at an optimal time of year and species wasn't recorded.

Table 4 Threatened fauna Likelihood of occurrence

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	BC			
Birds						
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi		2024#	Low	Two records of Common Sandpiper occur within 5 km of the study area. While individuals may pass through coastal waters during migration, suitable breeding habitat is absent. Therefore, the likelihood of occurrence is considered Low.
<i>Ardenna grisea</i>	Sooty Shearwater	VU, Mi		2022#	Low	Two records of Sooty Shearwater occur within 5km of the study area. This species is a pelagic seabird that predominantly occurs offshore in open ocean waters and only comes ashore to breed on remote islands. While individuals may pass through coastal waters during migration, suitable breeding habitat is absent. Therefore, the likelihood of occurrence is considered Low.
<i>Ardenna pacifica</i>	Wedge-tailed Shearwater	Mi		2024	Low	A small number of records within 5km of the study area. The Wedge-tailed Shearwater is a pelagic seabird that forages offshore in open ocean waters and breeds in burrows on offshore islands. While individuals may occur in coastal waters during foraging or migration, no suitable breeding habitat is present within the study area. Therefore, the likelihood of occurrence is considered Low.
<i>Ardenna tenuirostris</i>	Short-tailed Shearwater	Mi		2024	Moderate	This species has been recorded within 5km of the study area. The Wedge-tailed Shearwater is a pelagic seabird that forages offshore in open ocean waters and breeds in burrows on offshore islands. While individuals may occur in coastal waters during foraging or migration, no suitable breeding habitat is present within the study area. Therefore, the likelihood of occurrence is considered Moderate.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	BC			
<i>Arenaria interpres</i>	Ruddy Turnstone	VU, Mi	VU	2010	Low	One record within 5km of the study area. The Ruddy Turnstone is a migratory shorebird that forages on rocky or sandy shorelines, often turning over stones and debris to find invertebrates. While Narrawallee Beach provides sandy shoreline, the site lacks the rocky or cobble areas typically preferred for foraging and no breeding habitat is present. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	EN	2019#	Low	One record within 5km of the study area. The Australian Bittern requires dense, tall reedbeds and freshwater marshes for foraging and breeding. The study area lacks suitable breeding and foraging habitats. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	VU, Mi	VU	2007#	Low	One record within 5km of the study area. This species has been recorded within 5km of the study area. The Sharp-tailed Sandpiper is a migratory shorebird that prefers shallow freshwater wetlands, floodplains, and mudflats for foraging during migration. No suitable foraging or breeding habitat is present within the study area. Therefore, the likelihood of occurrence is considered Low.
<i>Calidris melanotos</i>	Pectoral Sandpiper	Mi		1983#	Low	One record within 5km of the study area. The Pectoral Sandpiper is a migratory shorebird that typically occurs in shallow freshwater wetlands, marshes, and floodplains during migration. The study area lacks suitable foraging and breeding habitat. Therefore, the likelihood of occurrence is considered Low.
<i>Charadrius mongolus</i>	Lesser Sand-plover	EN, Mi	VU	2024	Low	One record within 5km of the study area. The Lesser Sand Plover is a migratory shorebird that forages along sandy beaches, tidal flats, and estuarine margins. While Narrawallee Beach provides sandy shoreline, the area lacks extensive tidal flats or sheltered foraging habitat or suitable breeding habitat. Therefore, the likelihood of occurrence is considered Low.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	BC			
<i>Esacus magnirostris</i>	Beach Stone-curlew		CE	2022	Low	One record within 5km of the study area. The Bush Stone-curlew is a nocturnal, ground-dwelling bird that prefers open woodlands, grasslands, and lightly vegetated areas with some ground cover for foraging and nesting. The study area at Narrawallee Beach consists primarily of coastal shoreline and lacks the open woodland or grassy habitats required. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Haematopus fuliginosus</i>	Sooty Oystercatcher		VU	2025	High	The Sooty Oystercatcher is a coastal shorebird that forages on rocky shorelines, reefs, and tidal platforms. Multiple records exist within 5km of the study area including the most recent record being approximately 80m from the study area in 2025. Therefore, the likelihood of occurrence within the study area is considered High.
<i>Haematopus longirostris</i>	Pied Oystercatcher		EN	2025	High	The Pied Oystercatcher is a coastal shorebird that forages on sandy beaches and tidal flats. There are 125 records within 5km of the study area, with the most recent record in 2025. Therefore, the likelihood of occurrence within the study area is considered High.
<i>Hydroprogne caspia</i>	Caspian Tern	Mi		2025	Moderate	There are 15 records within 5km of the study area with the most recent record from 2025. The Caspian Tern is a large coastal and estuarine seabird that forages over open water and nests on sandy or gravelly islands and shorelines. While Narrawallee Beach provides some foraging habitat, no suitable nesting sites were observed within the study area. Therefore, the likelihood of occurrence within the study area is considered moderate.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	BC			
<i>Ixobrychus flavicollis</i>	Black Bittern		VU	2008	Low	One records within 5km of the study area. The Black Bittern is a secretive wetland bird that requires dense reedbeds, freshwater marshes, or mangroves for foraging and breeding. The study area lacks suitable breeding and foraging habitat. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Lathamus discolor</i>	Swift Parrot	CE	EN	2020#	Low	There are three records within 5km of the study area. The Swift Parrot is a migratory species that prefers eucalyptus woodlands and forests where it can forage on flowering species. Whilst the adjacent vegetation provides suitable habitat, the study does not contain canopy species and therefore the likelihood of occurrence is considered Low.
<i>Limosa lapponica</i>	Bar-tailed Godwit	Mi		2024#	Low	There are 12 records within 5km of the study area. The Bar-tailed Godwit primarily forages on intertidal sandflats within estuaries and large coastal wetlands. While a few records have been observed within the surrounding area, the study area lacks extensive sheltered sandflat habitat. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Numenius madagascariensis</i>	Eastern Curlew	CE, Mi	CE	2022#	Low	There are 20 records within 5km of the study area. The Eastern Curlew primarily forages on intertidal mudflats within estuaries and large coastal wetlands. While a few records have been observed within the surrounding area, the study area lacks extensive sheltered mudflat habitat. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Pluvialis fulva</i>	Pacific Golden Plover	Mi		2011	Low	There is one record within 5km of the study area. The Pacific Golden Plover is a migratory shorebird that typically forages in open coastal flats, estuaries, and occasionally short grasslands. The study area lacks extensive tidal flats or suitable adjacent foraging areas. Therefore, the likelihood of occurrence within the study area is considered Low.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	BC			
<i>Pluvialis squatarola</i>	Grey Plover	VU, Mi	VU	2014	Low	There is one record within 5km of the study area. The Grey Plover is a migratory shorebird that typically forages on intertidal mudflats, sandflats, and estuarine environments. The study area lacks extensive tidal flats and sheltered intertidal foraging areas. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Sternula albifrons</i>	Little Tern	VU, Mi	EN	2022#	Moderate	There are 11 records within 5km of the study area, the closest being 1m from the study area. The Little Tern is a coastal species that forages over nearshore waters and nests on sandy beaches. While individuals may occur in coastal waters during foraging or migration, no suitable breeding habitat was observed within the study area. Therefore, the likelihood of occurrence is considered Moderate.
<i>Thalassarche carteri</i>	Indian yellow-nosed albatross	VU		2000#	Low	There are two records within 5km of the study area. The Indian Yellow-nosed Albatross is a pelagic seabird that forages predominantly in offshore oceanic waters and only comes ashore to breed on remote subantarctic islands. The study area does not provide breeding or core foraging habitat for this species. Therefore, the likelihood of occurrence within the study area is considered Low.
<i>Thalassarche cauta</i>	Shy Albatross	VU	EN	2008#	Low	There are two records within 5km of the study area. The Shy Albatross is a pelagic seabird that forages offshore in open ocean waters and breeds in burrows on offshore islands. While individuals may occur in coastal waters during foraging or migration, no suitable breeding habitat is present within the study area. Therefore, the likelihood of occurrence is considered Low.

Scientific Name	Common Name	Conservation status		Most recent record	Likely occurrence in study area	Rationale for likelihood ranking
		EPBC	BC			
<i>Thalassarche melanophris</i>	Black-browed Albatross	VU	VU	2000#	Low	There are two records within 5km of the study area. The Black-browed Albatross is a pelagic seabird that forages offshore in open ocean waters and breeds in burrows on offshore islands. While individuals may occur in coastal waters during foraging or migration, no suitable breeding habitat is present within the study area. Therefore, the likelihood of occurrence is considered Low.
<i>Thalasseus bergii</i>	Crested Tern	Mi		2024	Moderate	A number of records within 5km of the study area, the most recent being in 2024. The Crested Tern is a common coastal seabird that forages over nearshore waters and roosts on sandy beaches and headlands. This study area provides suitable foraging and roosting habitat, and the species is known to occur along the NSW coastline. Accordingly, the likelihood of occurrence is considered Moderate.
<i>Thinornis cucullatus cucullatus</i>	Eastern Hooded Dotterel	VU	CE	2025#	Moderate	A number of records within 5km of the study area, the most recent being in 2025. The Eastern Hooded Dotterel inhabits ocean beaches and nests on sandy shorelines. The study area provides suitable foraging and potential breeding habitat. Therefore, the likelihood of occurrence is moderate.
<i>Thinornis rubricollis</i>	Hooded Plover	VU	CE	2016#	Low	One record within 5km of the study area. The Hooded Plover is a resident shorebird that inhabits ocean beaches and nests directly on sandy shorelines. The study area provides low to moderate habitat for foraging and breeding. Therefore, the likelihood of occurrence is Low.

Appendix 2 Tests of Significance

The following section provides for Tests of Significance as outlined in Section 7.3 of the BC Act for all species listed as a medium likelihood or greater in Section 3.2.

Threatened Shorebirds

Four shorebird species listed as Vulnerable, Endangered, or Critically Endangered under the BC Act have been identified as having a medium or higher likelihood of occurring within the study area. Ecological descriptions for each identified species have been provided below.

The proposed activities will likely result in the indirect impacts to areas identified containing foraging habitat for threatened shorebirds.

Eastern Hooded Dotterel *Thinornis cucullatus cucullatus* (Critically Endangered, BC Act).

The Eastern Hooded Dotterel is a resident shorebird endemic to southern Australia, with its range extending along the southern coastline from western Victoria through to South Australia and into southern New South Wales, where it reaches its northern limit. In NSW, it is now largely confined to the south coast, with only small and fragmented populations remaining (NSW DCCEEW 2026a).

The species is non-migratory and remains within its coastal breeding range year-round. It is highly site-faithful and occupies exposed ocean beaches, particularly wide sandy shores with adjacent dune systems. Breeding occurs on open sandy beaches just above the high tide mark, where nests are formed as shallow scrapes in the sand, often placed near sparse vegetation, wrack lines, or driftwood for concealment. Breeding typically occurs in spring and summer, although timing may vary depending on local conditions.

The Eastern Hooded Dotterel is almost exclusively coastal and shows a strong preference for undisturbed beach environments, occasionally utilising adjacent estuaries and coastal lagoons for foraging or refuge. It relies on a connected mosaic of beach and dune habitats for feeding, nesting, and shelter.

Key threats to the Eastern Hooded Dotterel include disturbance from human recreational activities and domestic dogs, which can result in nest abandonment, trampling of eggs and chicks, and reduced breeding success. Additional threats include habitat loss and fragmentation associated with coastal development, predation, and the effects of climate change such as coastal erosion, increased storm intensity, and sea-level rise, all of which reduce the availability of suitable nesting habitat (NSW DCCEEW 2026a).

The Eastern Hooded Dotterel has 37 records within the five kilometre search radius, with the closest record approximately 540 metres from the study area and the most recent record in 2025 (Cth DCCEEW 2025).

Little Tern *Sternula albifrons* (Endangered, BC Act)

The Little Tern is a migratory shorebird and is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. Most records occur north of Sydney, with smaller numbers found south to Victoria (Cth DCCEEW 2026).

The Little Tern migrates from eastern Asia, arriving from September to November, and 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. It is almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers. It nests in small, scattered

colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands. The nest is a scrape in the sand, which may be lined with shell grit, seaweed or small pebbles. (Cth DCCEEW 2026).

Threats to the Little Tern include disturbance of nesting and direct mortality of eggs and chicks by trampling or predation (domestic dogs and avian predators), vegetation clearing for agricultural purposes, hydrological disturbance, habitat fragmentation, and habitat loss from erosion, climate change inundation, and sea-level rise (Cth DCCEEW 2026).

The Little Tern has 11 records within the five kilometre search radius, with the closest record approximately within the study area and the most recent record in 2022 (Cth DCCEEW 2025).

Pied Oystercatcher *Haematopus longirostris* (Endangered, BC Act)

The Pied Oystercatcher is a shorebird that is distributed around the entire Australian coastline, although it is most common in coastal Tasmania and parts of Victoria, such as Corner Inlet. In NSW the species is thinly scattered along the entire coast, with fewer than 200 breeding pairs estimated to occur in the State (NSW DCCEEW 2026b).

The Pied Oystercatcher inhabits intertidal flats of inlets and bays, open beaches and sandbanks, with foraging occurring on exposed sand, mud and rock at low tide. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones and occurs mostly on coastal or estuarine beaches although they occasionally use saltmarsh or grassy areas. Two to three eggs are laid between August and January (NSW DCCEEW 2026b).

Threats to the Pied Oystercatcher include disturbance of nesting and direct mortality of eggs and chicks by trampling or predation (foxes, domestic dogs and avian predators), vegetation clearing for agricultural purposes, hydrological disturbance, habitat fragmentation, entanglement in or ingestion of marine debris and habitat loss from erosion (NSW DCCEEW 2026b).

The Pied Oystercatcher has 125 records within the five kilometre search radius, with the closest record approximately 100 metres from the study area and the most recent record in 2025 (Cth DCCEEW 2025).

Sooty Oystercatcher *Haematopus fuliginosus* (Vulnerable, BC Act)

The Sooty Oystercatcher is a shorebird that is found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites limit populations (NSW DCCEEW 2026c).

The Sooty Oystercatcher favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries, with foraging occurring on exposed rock or coral at low tide. It breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks (NSW DCCEEW 2026c).

Threats to the Sooty Oystercatcher include disturbance of nesting and direct mortality of eggs and chicks by trampling or predation (foxes, domestic dogs and avian predators), vegetation clearing for agricultural purposes, hydrological disturbance, habitat fragmentation, entanglement in or ingestion of marine debris and habitat loss from erosion (NSW DCCEEW 2026c).

The Sooty Oystercatcher has 79 records within the five kilometre search radius, with the closest record approximately 80 metres from the study area and the most recent record in 2025 (Cth DCCEEW 2025).

Table 5 Test of Significance for Threatened Shorebirds

Test of Significance for Threatened Shorebirds
<i>In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</i> Suitable habitat for the Pied Oystercatcher and Sooty Oystercatcher occurs within and around Narrawallee Creek Inlet and at the southern end of Buckleys Beach. The species is also known to utilise the intertidal rocky platform at the southern extent of Narrawallee Beach, reflecting its preference for sandy beaches, intertidal flats, and exposed rock platforms. Foraging occurs primarily at low tide on sand, mudflats, and rock surfaces where invertebrate prey is available. The intertidal rocky platforms mapped in the southern section of Narrawallee Beach are observed as an important foraging resource for these species and impacts should be minimised to this area. The Little Tern and Eastern Hooded Dotterel have a higher preference for undisturbed beach environments with the selection of higher quality roosting and foraging habitat, typically returning to the same sites in recurring years. These species are likely occupying the area of the Narrawallee Creek Inlet, with observations outside this area occurring during transitions to other less disturbed habitat options. The proposed activities will not result in any direct impacts to shorebirds or their habitat (i.e., there will be no direct removal of habitat or vegetation). Indirect impacts from the proposed activities have potential to have an adverse effect on the life cycle of the four listed shorebirds through increased disturbance of potential low quality foraging habitat. The indirect and cumulative impacts of the proposed activities include the potential to cause disturbance to area identifies mapped as foraging habitat for threatened shorebirds. Narrawallee Beach currently experiences moderate levels of disturbances from public use, fishing and the existing dog access area. It is likely that if the listed species uses the study area for roosting and foraging then they would use the entire patch of estuaries and intertidal mudflats within the locality. The site is located 600 metres to the south of Narrawallee Creek Inlet, containing high quality intertidal mudflats and estuaries that would provide greater habitat potential than the area to be indirectly impacted by the proposed activities. The small scale of potential indirect impacts within an area containing larger continuous areas of suitable habitat, is considered unlikely to affect a viable local population of the species such that it is could be placed at risk of extinction. Additionally, the indirect impacts are to be mitigated through the recommendations of this report.
<i>In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:</i> <i>1. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</i> <i>2. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.</i>
Not applicable.
<i>In relation to the habitat of a threatened species or ecological community:</i> <i>1. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and</i> <i>2. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and</i> <i>3. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.</i>
The proposed activities will not result in any direct impacts to shorebirds or their habitat. The proposed activities have the potential to indirectly disturb the southern Narrawallee Beach area by increased presence of dogs between the 90 metre section of BA2 and BA3. The proposed activities may cause indirect impacts on the identified foraging Shorebird habitat on the southern section of Narrawallee Beach. Recommendations contained within this report aim to minimise indirect impacts from the activities and when implemented will ensure that indirect impacts of shorebird habitat is unlikely.

Test of Significance for Threatened Shorebirds

The indirect impact on the southern section of Narrawallee Beach will unlikely increase fragmentation impacts within the local area. The indirect impact of potential habitat will not isolate any habitat areas and will be mitigated through the measures recommended in this report.

The area of potential habitat proposed that may be indirectly impacted would represent a small proportion of available habitat for the Shorebirds in the local area. The site is located 600 metres to the south of Narrawallee Creek Inlet, containing high quality intertidal mudflats and estuaries that would provide greater habitat potential than the area to be indirectly impacted by the proposed activities. The importance of this area within the larger extent of habitat available would be considered quite low and the species would not rely on the resources within the locality.

Whilst the potential habitat within the study area would be potentially indirectly impacted, the overall continuity of the habitat patch will be maintained through the mitigation measures recommended in this report. Therefore the potential indirect impact of the proposed activities will not have a significant impact on the long-term survival of these four species within the locality.

Whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly).

There are no areas of outstanding biodiversity value within the study area or the broader locality.

Whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

The proposed activities have the potential to increase the operation of the following KTPs relevant to all four shorebirds:

- Habitat disturbance from human and animal presence (Indirect).

The indirect impacts of increased dog presences will be mitigated through the recommendations in this report including, the implementation of adequate buffers to ensure foraging resources are protected, and increased signage to raise community awareness.

Due to mitigation measures that will be implemented to prevent further habitat disturbance, it is unlikely the proposed activities will significantly increase the impact of any KTPs associated with these species.

Conclusion

In the consideration of the above five factors, it is unlikely that the proposed activities will impose a significant impact on the four listed shorebird or their habitats as any indirect impacts that may increase disturbance, will be mitigated through the recommendations in this report including, adhering to the industry guideline buffer distances and increased signage to minimise disturbance to habitat areas.

Appendix 3 Significant Impact Criteria assessments

Eastern Hooded Dotterel *Thinornis cucullatus cucullatus* (Vulnerable, EPBC Act)

An ecological description for this species has been provided above in Appendix 2.

The proposed activity will likely result in the indirect impact of land identified as foraging habitat for threatened shorebirds. The southern Narrawallee Beach area is currently subjected to disturbance through public use and the existing dog beach area

An assessment against the Significant Impact Criteria detailed in the *Matters of National Environmental Significance: Significant impact guidelines version 1.1* (DoE 2013) has been undertaken below.

Table 6 SIC assessment for Eastern Hooded Dotterel *Thinornis cucullatus cucullatus*

SIC assessment for Eastern Hooded Dotterel <i>Thinornis cucullatus cucullatus</i>
<i>Lead to a long-term decrease in the size of an important population of a species.</i> The records within this locality do not form an important population for the Eastern Hooded Dotterel. The estimated population for all of Australia is approximately 5000 birds, with at least 24 breeding pairs observed in the 2023/2024 season (NSW DCCEW 2026a). The northern distribution limit occurs at Jervis Bay, with a known important population at Cudmirrah Beach, supported by repeated records in the locality. While any individuals occurring within the subject site would be regionally significant due to the species' restricted distribution, more suitable habitat is present at the Narrawallee Creek Inlet and Narrawallee Inlet Reserve to the north of the study area. These areas provide higher quality foraging and potential breeding habitat and are not expected to be impacted by the proposed activity. The proposed activities will not result in any direct impacts to shorebirds or their habitat. The indirect and cumulative impacts of the proposed actions include the potential to cause further disturbance, and impacts to areas with potential foraging resources for threatened migratory shorebirds. The southern section of Narrawallee Beach and surrounding the study area are currently subjected to low levels disturbance from public use, with recent storms creating erosion and smaller foredune habitat. Any indirect impacts that may increase from the permitance of dogs at Narrawallee Beach can be mitigated through implementing the appropriate buffers outlined in the industry guidelines (DoEE 2017). Given the limited habitat value of the study area and the implementation of spatial restrictions (including exclusion of dogs from BA1 and controlled on-leash access), the proposal is unlikely to result in a long-term decrease in the size of any local population of the Eastern Hooded Dotterel.
<i>Reduce the area of occupancy of an important population.</i> The records near within this locality do not form an important population for the Eastern Hooded Dotterel. The proposed activities will not result in any direct impacts to the Eastern Hooded Dotterel or their habitat. The indirect impacts of the proposed development may cause further disturbance to land mapped as identified as potential foraging shorebirds. It is likely that if the Eastern Hooded Dotterel uses the study area for roosting and foraging then they would use the entire patch of estuaries and intertidal mudflats within the locality. The site is located 600 metres to the south of Narrawallee Beach Inlet, containing high quality intertidal mudflats and estuaries that would provide greater habitat potential than the area to be indirectly impacted by the proposed activities. The small scale of potential indirect impacts within an area containing larger continuous areas of suitable habitat, is considered unlikely to affect the area of occupancy of the Eastern Hooded Dotterel. Additionally, the indirect impacts are to be mitigated through the recommendations of this report
<i>Fragment an existing important population into two or more populations.</i> The records near within this locality do not form an important population for the Eastern Hooded Dotterel. There is a single record of the Eastern Hooded Dotterel within the study area, however given the current use of Narrawallee Beach and the available resources to the north at Narrawallee Creek Inlet, it is likely that the occurrence of

SIC assessment for Eastern Hooded Dotterel *Thinornis cucullatus cucullatus*

this species within the study area is transient. Fragmentation resulting from the indirect impact of this habitat area will be mitigated through the recommendations of this report.

Therefore, it is unlikely that the proposed activities will fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species.

The proposed activities will not result in any direct impacts to shorebirds or their habitat. The proposed activities will potentially indirectly impact habitat identified as having potential foraging resources. However, due to the existing level of disturbance, and the implementation of the mitigation measures for buffers and signage, this habitat will not be adversely affected. The Eastern Hooded Dotterel may utilise the study area for occasional foraging, with higher quality foraging habitat available outside the study area at Narrawallee Creek Inlet. This area also provides more suitable complementary breeding habitat and is subject to dog restrictions.

Disrupt the breeding cycle of an important population.

The records near within this locality do not form an important population for the Eastern Hooded Dotterel.

Suitable breeding habitat is more likely to occur in less disturbed locations, such as the Narrawallee Creek Inlet to the north, where wider beaches and reduced human activity provide more appropriate conditions.

The proposed activity will not result in habitat removal and includes spatial restrictions and mitigation measures to minimise disturbance, particularly in more sensitive areas. Given the low likelihood of breeding occurring within the subject site, the proposal is unlikely to disrupt the breeding cycle of an important population of the species.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The proposed activity will not directly modify or destroy habitat for the Eastern Hooded Dotterel, but may result in minor indirect impacts to areas identified as threatened shorebird foraging habitat. However, given the existing levels of disturbance within the study area and the implementation of mitigation measures, including spatial controls, managed access, and increased signage, these habitats are not expected to be adversely affected.

Accordingly, the proposed activity is unlikely to modify, destroy, remove, isolate, or decrease the availability or quality of habitat to the extent that the Eastern Hooded Dotterel is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The proposed actions will not increase invasive fauna species. Invasive weeds species are not known to directly harm populations of the Eastern Hooded Dotterel.

Introduce disease that may cause the species to decline.

The project will not result in the introduction of a disease that is harmful to the Eastern Hooded Dotterel.

Interfere substantially with the recovery of the species.

There is no National Recovery Plan for the Eastern Hooded Dotterel, however the mitigation measures will minimise indirect impacts to the habitat within the study area.

Conclusion

Considering the above factors, it is unlikely that the proposed activities will impose a significant impact on the Eastern Hooded Dotterel or its habitats as any indirect impacts that may increase the level of disturbance, will be mitigated through the recommendations in this report including, the application of appropriate buffers and signage. The important habitat to the south and north of the study area will be protected from the proposed activity and therefore will not result in a significant impact to the Eastern Hooded Dotterel or its habitat.

Appendix 3 Aboriginal due diligence assessment



Narrawallee Beach Dog Access Area

Aboriginal Due Diligence Assessment

Final report

Prepared for Shoalhaven City Council

7 May 2026

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- Jenny Beckius (mapping).

Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

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Summary

Biosis Pty Ltd (Biosis) has been commissioned by Shoalhaven City Council (Council) to undertake an Aboriginal Due Diligence Assessment (ADDA) for the proposed Narrawallee Beach Dog Access Area at Narrawallee Beach, Narrawallee New South Wales (NSW) (the study area). The ADDA will inform proposed changes to dog access arrangements at Narrawallee Beach and will be assessed in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

An assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) (Due Diligence Code) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) (the Code) was conducted, to adequately map areas of high, moderate and low archaeological potential.

Background research indicated that the study area is located within three soil landscapes described by Mitchell (2002) including Milton Basalts and Sands, Wandandian Coastal Plains and Bherwerre Barrier. The study area comprises numerous geological units that include Alluvium to the north and Snapper Point Formation to the south. The formations that comprise the centre of the study area are Beach Ridge, Dune Facies, and Beach Facies Coastal Deposits. Topographically, the majority of the study area contains the upper shoreface to the foredunes, increasing from sea-level to approximately 6 metres. The eastern portion of the study area is adjacent to the Tasman Sea which is an inlet of the South Pacific Ocean. The mouth of Narrawallee creek, a 6 in the Strahler order, is approximately 550 metres north of the study area. Approximately 800 metres from the southern end of the study area is first order watercourse, named Mollymoke Farm, becomes a second order as it reaches the coast.

Background research also included a search of the Aboriginal Heritage Information Management System (AHIMS) database and a review of relevant reports. The AHIMS search conducted on 29 January 2026 identified 79 Aboriginal archaeological sites within a 4x4 kilometre search area centred on the study area (Client service ID: 1086831). None of these sites were located within the study area; however, four sites were located within 200 metres of the study area. Previous assessments within the local and regional areas and their findings were also reviewed as part of this assessment. The results of the previous assessments along with a review of the historical aerial imagery, geology, hydrology and soil landscape characteristics of the study area have been examined to provide a series of predictive statements of the study area's archaeological potential. The predictive statements indicated that there was high potential for stone artefacts and shell middens to be present within the study area.

An archaeological survey of the study area was undertaken by Samantha Keats, Biosis heritage Manager on 5 February 2026. During the survey, one new Aboriginal site (AHIMS 58-1-1158/Narrawallee Beach Dog Access AS1) and an area of potential archaeological deposit (PAD) were identified. The proposed works seek only to extend the hours of dog off-leash activity at the beach and allow dog on-leash access at two access points. These works have a low likelihood of causing impacts to Aboriginal sites.

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.

- Current best conservation practise, widely considered to include:
 - The Ethos of *The Burra Charter: the Australia International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance, 2013* (the Burra Charter).
 - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

Council proposes to extend the dog off-leash activity to 24 hours, 7 days per week from 1 May to 1 October each year, and provide dog on-leash access from the Victor Avenue steps and the Surfers' Avenue steps to the dog off leash area. These works have a low likelihood of causing impacts to Aboriginal sites and no further archaeological assessment is required subject to recommendations 2 and 3 below.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the *National Parks and Wildlife Act 1974* (NPW Act). It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW, NSW Department of Climate Change, Energy, the Environment and Water (Heritage NSW). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying the Heritage NSW and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

Definitions

ACHA	Aboriginal Cultural Heritage Assessment
AD	Anno Domini
ADDA	Aboriginal Due Diligence Assessment
AHIMS	Aboriginal Heritage Information Management System
Biosis	Biosis Pty Ltd
BP	Before present
Burra Charter	<i>Ethos of The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance, 2013</i>
Due Diligence Code	<i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
GSV	Ground Surface Visibility
Heritage NSW	Heritage NSW, NSW Department of Climate Change, Energy, the Environment and Water
ICOMOS	International Council on Monuments and Sites
LEP	Local Environment Plan
LGA	Local Government Area
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
PAD	Potential Archaeological Deposit
REF	Review of Environmental Factors
Study area	Defined as Narrawallee Beach, Narrawallee NSW
The Code	<i>The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i>

1 Introduction

1.1 Background

Biosis has been commissioned by Council to undertake an ADDA for the proposed Narrawallee Beach Dog Access Area at Narrawallee Beach, Narrawallee NSW (the study area). The ADDA will inform proposed changes to dog access arrangements at Narrawallee Beach and will be assessed in accordance with Part 5 of the EP&A Act.

An assessment in accordance with the Due Diligence Code (DECCW 2010a) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) (the Code) was conducted, in order to adequately map areas of high, moderate and low archaeological sensitivity.

1.2 Location of the study area

The study area is located within the Shoalhaven Local Government Area (LGA), Parish of Ulladulla, County of St Vincent as shown in Figure 1. The study area incorporates part of Lot 7009 DP 1116370. The study area is bounded by Narrawallee Creek Mouth to the north, Surfers Avenue to the south, the Tasman Sea to the east and Matron Porter Drive and Victor Avenue to the west (refer to Figure 2).

1.3 Planning approvals

The proposed development will be assessed against Part 5 of the EP&A Act. Other relevant legislation and planning instruments that will inform the assessment include:

- NPW Act.
- *National Parks and Wildlife Amendment Act 2010 (NSW)*.
- *Shoalhaven Local Environmental Plan 2014 (LEP)*.
- *Shoalhaven Development Control Plan YEAR (DCP)*.

1.4 Scope of the assessment

The following is a summary of the major objectives of the assessment:

- Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the Aboriginal Heritage Information Management System (AHIMS).
- Undertake archaeological survey as per Requirement 5 of the Code, with particular focus on landforms with high potential for Aboriginal heritage within the study area, as identified through background research.
- Record and assess sites identified during the survey in compliance with the guidelines endorsed by Heritage NSW, NSW Department of Climate Change, Energy, the Environment and Water (Heritage NSW).

- Determine levels of archaeological significance of the study area.
- Make recommendations to mitigate and manage any cultural heritage values identified within the study area.

1.5 Proposed activity

Biosis understands a Review of Environmental Factors (REF) for a timed dog off-leash area was approved in May 2024 for the middle section of Narrawallee Beach, where patronage among dog-lovers is high. This section of the beach is also used by other beach patrons walking the full length of the beach.

Council proposes to extend the dog off-leash activity to 24 hours, 7 days per week from 1 May to 1 October each year, within the area BA3 to BA8 shown on the map in the request for quotation (Photo 1). Council also proposes to provide dog on-leash access from the Victor Avenue steps and the Surfers' Avenue steps to the dog off leash area. This area is currently dog-prohibited.



Photo 1 Proposed Narrawallee Beach off-leash and prohibited areas, the study area encompassing the yellow and lower red highlighted portions (Narrawallee REF 2024 Figure 7, Shoalhaven City Council)

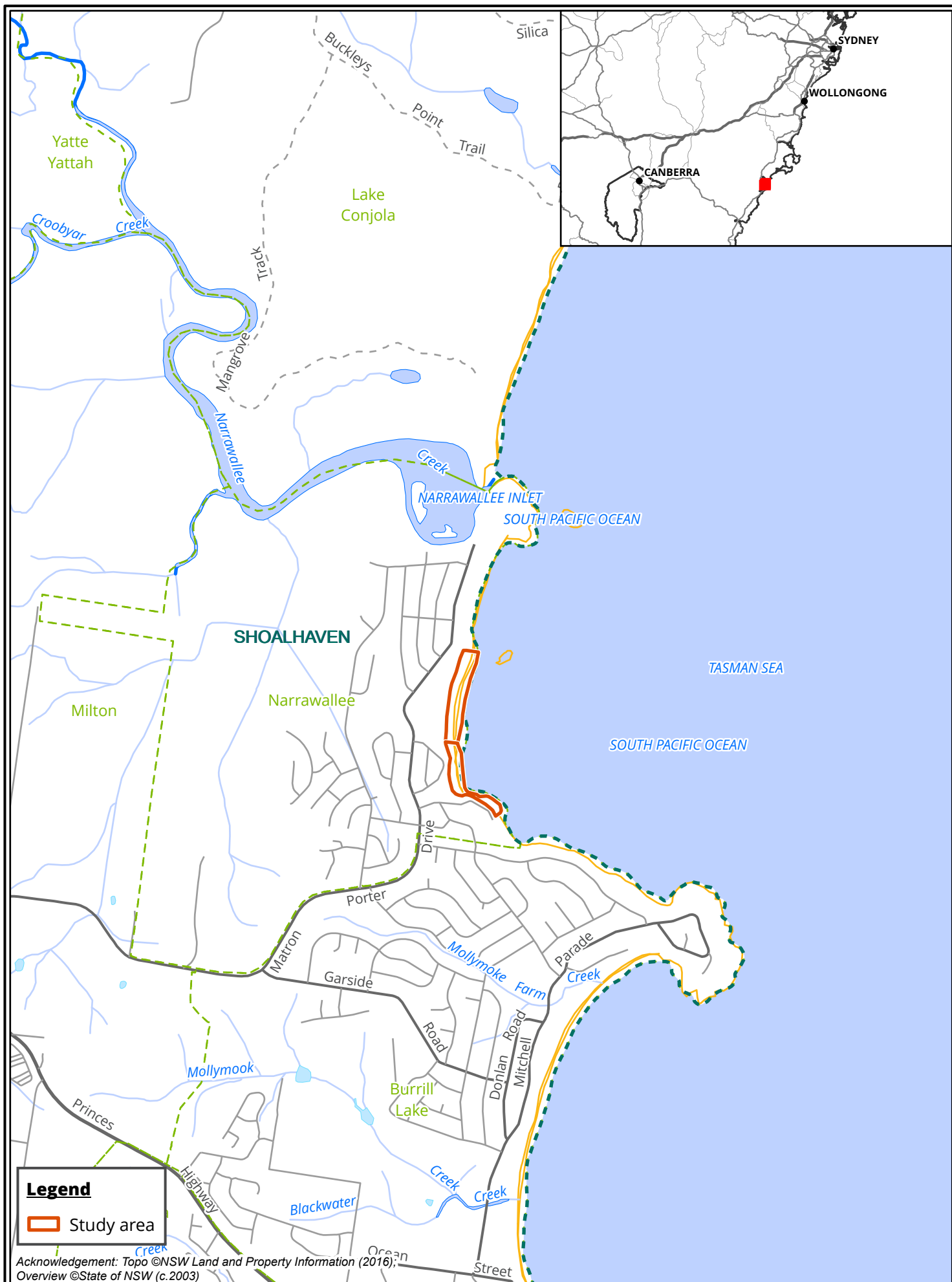


Figure 1 Location of the study area

Matter: 43836, Date: 10 March 2026,
 Prepared for: SJK, Prepared by: LH, Last edited by: owilliams
 Location: P:\43800s\43836\Mapping\43836_NarrawalleeBeachDogAccessArea_ADDA
 Layout: 43836_ADDA_F1_Locality



Legend

- Study area
- Lot

Figure 2 Study area detail

0 50 100 150 200 N

Metres

Scale: 1:4,000@ A3

Coordinate System:
GDA2020 MGA Zone 56

biosis
APEMGroup

Matter: 43836, Date: 10 March 2026,
Prepared for: SJK, Prepared by: LH, Last edited by: owilliams
Location: P:\43800s\43836\Mapping\
43836_NarrawalleeBeachDogAccessArea_ADDA,
Layout: 43836_ADDA_F2_StudyArea

2 Desktop assessment

A brief desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and identify known Aboriginal sites and/or Places recorded in the study area. This desktop assessment has been prepared in accordance with Requirements 1 to 4 of the Code.

2.1 Landscape context

It is important to consider the local environment of the study area any heritage assessment. The local environmental characteristics can influence human occupation and associated land use and consequently the distribution and character of cultural material. Environmental characteristics and geomorphological processes can affect the preservation of cultural heritage materials to varying degrees or even destroy them completely. Lastly, landscape features can contribute to the cultural significance that places can have for people.

The study area is located in a peri urban environment on Narrawallee Beach.

2.2 Geology, landforms, hydrology and soils

Geology, landforms, hydrology and soils provide useful information for determining the potential for Aboriginal sites and objects. Geology can aid in determining if there were useful raw material resources that could be exploited; soils can be used to determine the likelihood of preservation of archaeological materials; and hydrology is often an indicator of the potential for sites to be present depending on the perennality and size of the water sources.

The study area is located in the Jervis subregion of the Sydney Basin Bioregion. The coastal lowland landscape it sits within is characterised by gentle undulations and low order drainage lines, formed from the underlying Permian sediments and associated intrusive geological materials of the southern Sydney Basin. Generally, the area consists primarily of Permian sandstone, siltstone and shale, with Quaternary dunes along the coastline and alluvial deposits adjacent to the estuary. The study area contains numerous geological units that include Alluvium and Estuarine Tidal Delta Flat to the north and Snapper Point Formation to the south (Figure 3). This geology is characterized by fine to medium grained quartz, polymictic gravel, silt, clay, and shell material. The formations that comprise the centre of the study area are Beach Ridge, Dune Facies, and Beach Facies Coastal Deposits. These deposits are marine deposited and aeolian reworked sand that can range from fine to coarse grained.

Topographically, the study area is generally flat along Narrawallee Beach with a ridge peak on the northern point and footslopes and slopes that depress into a small valley on the south end of the beach. The majority of the study area contains the upper shoreface to the foredunes, increasing from sea-level to approximately 6 metres (Figure 4). Narrawallee headland located north of the study area has a 26 metre elevation from sea-level.

Stream order is recognised as a factor which helps the development of predictive modelling in Aboriginal archaeology in NSW. Predictive models which have been developed for the region have a tendency to favour permanent water courses as the locations of campsites as they would have been more likely to provide a stable source of water and by extension other resources which would have been used by Aboriginal groups,

and are more likely to be found upon well drained topographies associated with permanent watercourses (creek banks, flats, terraces) (Dyall 1979, Dean-Jones 1990, Biosis 2017).

The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Photo 2. As stream order increases, so does the likelihood that the stream would be a perennial source of water. Hydrological features identified within the study area would have most likely been associated with temporary land use due to their non-perennial nature, and Aboriginal sites within the study area are more likely to be identified within well-drained topographies such as foot slopes and gentle slopes within proximity to these water sources.

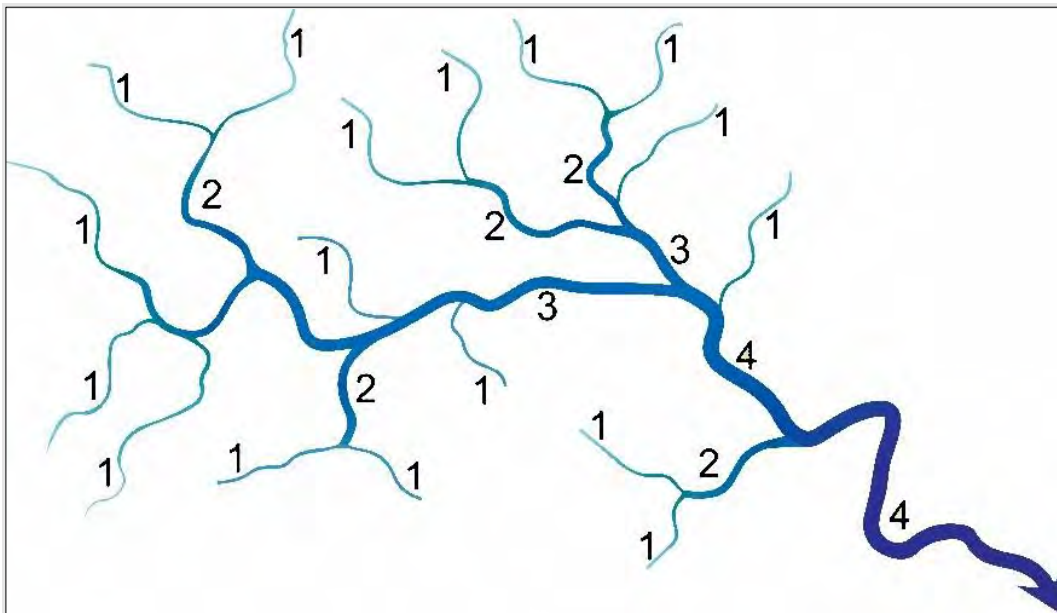


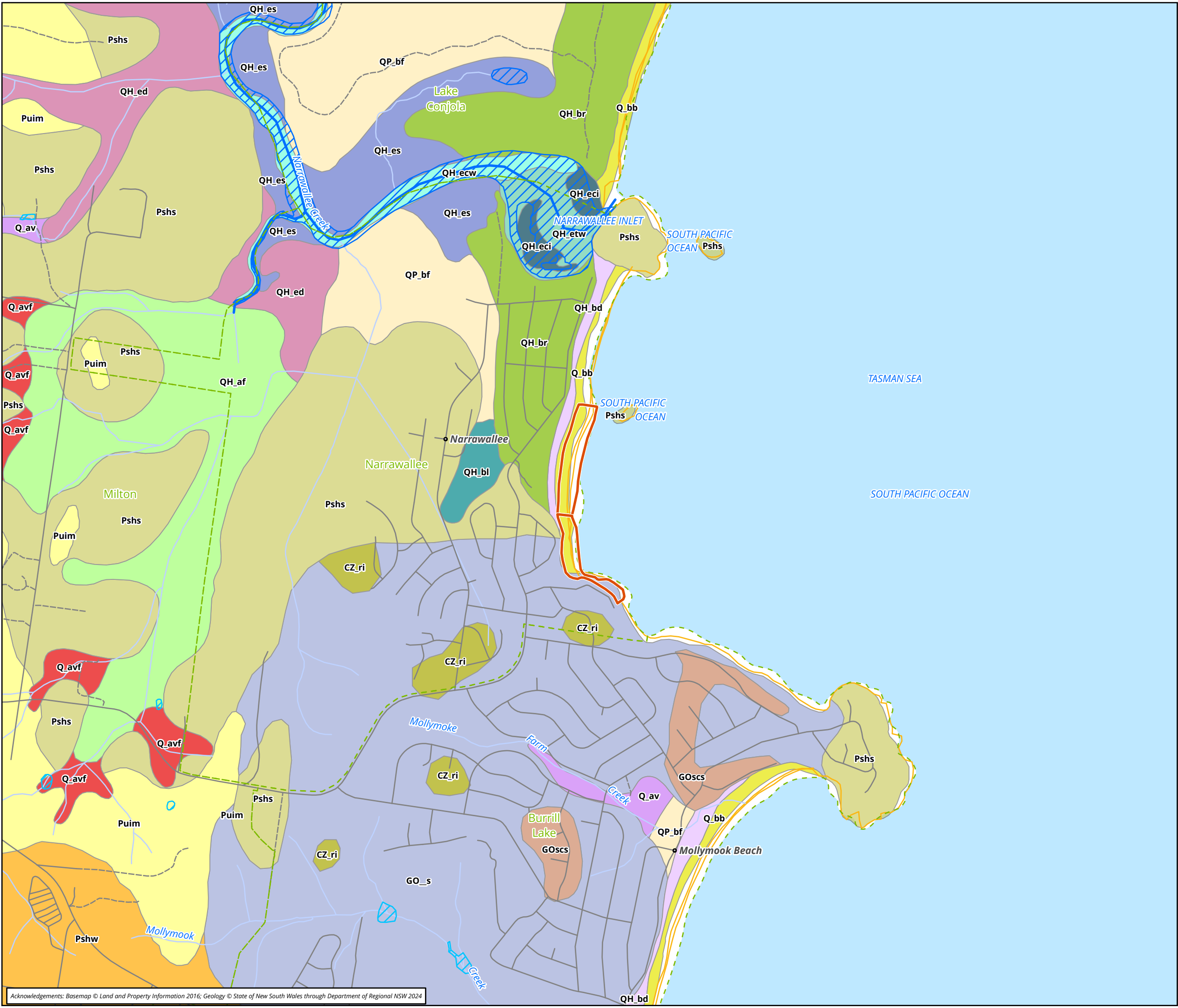
Photo 2 Diagram showing Strahler stream order (Kelly-Quinn et al. 2019)

The eastern portion of the study area is adjacent to the Tasman Sea which forms part of the South Pacific Ocean (Figure 4). The mouth of Narrawallee creek, a six in the Strahler order, is approximately 550 metres north of the study area. Approximately 800 metres from the southern end of the study area is a first order watercourse, named Mollymoke Farm Creek, becomes a second order as it reaches the coast. These areas and higher order perennial water bodies would have provided an abundance of resources to Aboriginal people within the region. At least four other unnamed watercourses ranging from first to third order are within 1 kilometre of the study area; however, it is unknown if they were perennial prior to Narrawallee being developed.

Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure. The study area contains three soil landscapes described by Mitchell (2002) and are shown in Figure 5 and Table 1. The majority of the study area is within a dune landform and, although these types of landscapes contain a high erosional hazard, their deep soils provide potential for archaeological deposits to remain. Common sites within this landscape can include artefacts, middens and burials. Milton Basalts and Sands soil landscape is most likely to contain shell, artefacts, PAD and modified trees. Similarly, the Bherwerre Barrier soil landscapes may contain artefacts, PAD and shell sites, while the Wandandian Coastal Plains soil landscape can include stone quarries.

Table 1 Soil landscape characteristics within the study area

Soil material	Description
Bherwerre Barrier	Beach, dune and intermittently closed and open lagoon complexes of the South Coast. Quaternary quartz sand in dunes with muddy sands in the lagoons, general elevation 0 to 15 m, local relief 5 to 10 m. Coastal barriers extend from clean dune sands to deep podsols in Pleistocene dunes.
Wandandian Coastal Plains	Undulating slopes and wide flat valleys with dendritic drainage on horizontal Permian lithic sandstone and pebbly siltstone. The general elevation is 20 to 80 m, with a local relief of less than 30 m. Yellow and yellow-red deep texture-contrast soils with bleached topsoils occur along with harsh clay subsoil.
Milton Basalts and Sands	Low flat hills near the coast on Tertiary basalts and underlying quartz gravel and sand, with an elevation of 40 to 60 m. Well-structured, fertile, brown to red-brown loams and clay loams occur on basalt, with bleached sandy podsols with thin iron pan development occur on the sands.



Legend

Study area

Geological units

- CZ_ri - Residual deposits - silcrete
- GO_s - Alluvial gravel, sand and clay deposits
- GOscs - South Coast Volcanics
- Pshs - Snapper Point Formation
- Pshw - Wandrawandian Formation
- Puim - Milton Monzonite
- QH_af - Alluvial floodplain deposits
- QH_bd - Coastal deposits - dune facies
- QH_bl - Coastal deposits - lagoon facies
- QH_br - Coastal deposits - beach ridge
- QH_eci - Estuarine in-channel bar and beach deposits
- QH_ecw - Estuarine channel deposits (subaqueous)
- QH_ed - Estuarine fluvial delta front
- QH_es - Estuarine swamp
- QH_etw - Estuarine tidal delta flat (subaqueous)
- QP_bf - Coastal deposits - backbarrier flat facies
- Q_av - Alluvial valley deposits
- Q_avf - Alluvial fan deposits
- Q_bb - Coastal deposits - beach facies

Figure 3 Geological units in the vicinity of the study area

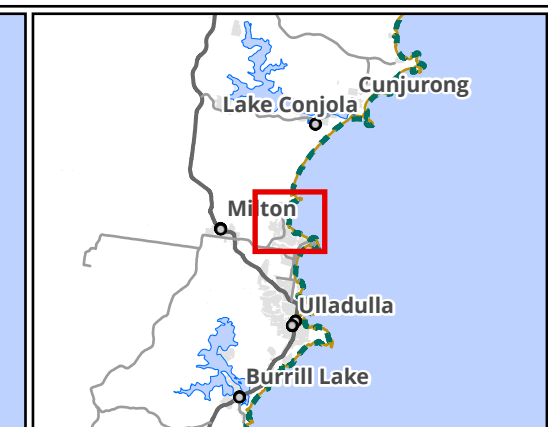
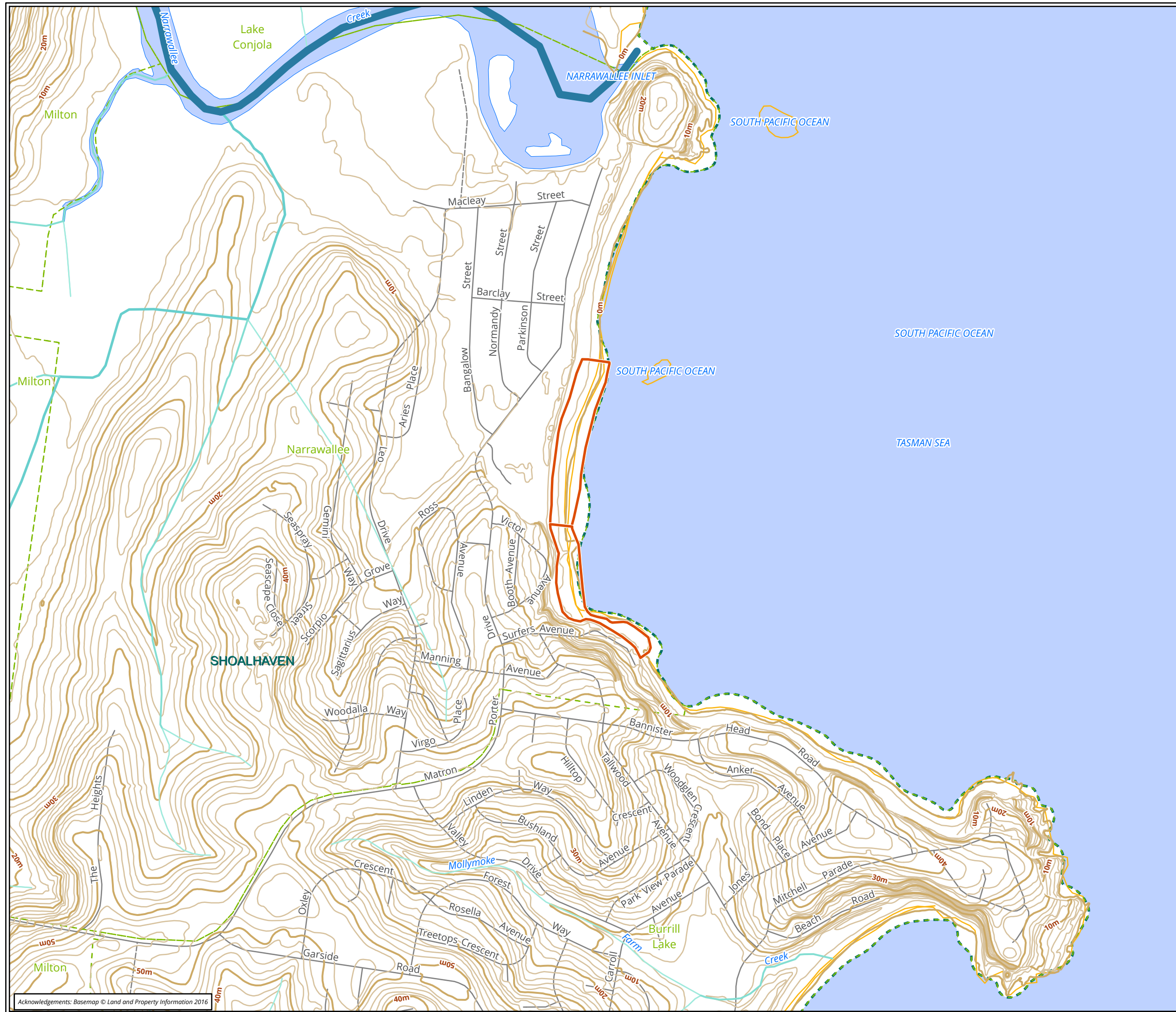
0 200 400 600

Metres

Scale: 1:15,000@ A3
Coordinate System:
GDA2020 MGA Zone 56



Matter: 43836, Date: 10 March 2026,
Prepared for: SJK, Prepared by: LH, Last edited by: owilliams
Location: P:\43800s\43836\Mapping\
43836_NarrawalleeBeachDogAccessArea_ADDA,
Layout: 43836_ADDA_F3_Geology



Legend

- Study area
- Contour (2m)

Strahler Order

- 1
- 2
- 3
- 6

Figure 4 Hydrology and topography in the vicinity of the study area

0 100 200 300 400

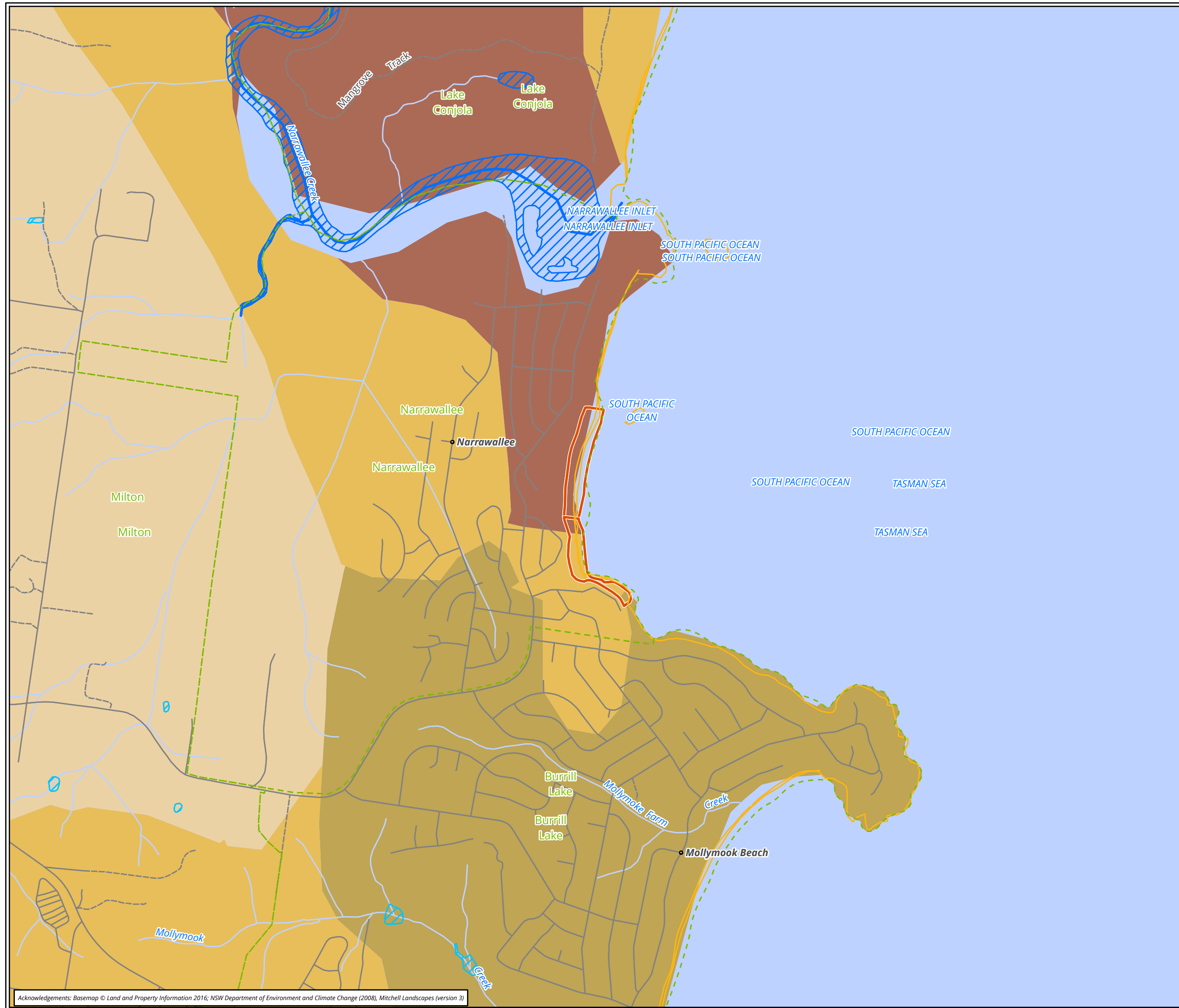
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Coordinate System: GDA2020 MGA Zone 56

biosis
APEM Group

Matter: 43836, Date: 10 March 2026,
Prepared for: SJK, Prepared by: LH, Last edited by: owilliams
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Layout: 43836_ADDA_F4_Hydrology



Legend

 Study area

Mitchell landscapes (1:250,000)

-  Bherwerre Barrier
-  Milton Basalts and Sands
-  Milton Hills
-  Wandanadian Coastal Plains

Figure 5 Soil landscapes in the vicinity of the study area

0 200 400 600

Metres

Scale: 1:15,000@ A3
Coordinate System:
GDA2020 MGA Zone 56



Matter: 43836, Date: 10 March 2026,
Prepared for: SJK, Prepared by: LH, Last edited by: owilliams
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43836_NarrawalleeBeachDogAccessArea_ADDA,
Layout: 43836_ADDA_F5_Soils

2.3 Flora and fauna

The Ulladulla region would have generally provided a number of resources used by Aboriginal inhabitants. The wider region includes distinct ecological zones, including open forest and open woodland, with riparian vegetation extending along many of the watercourses. Each ecological zone hosts a different array of floral and faunal species, many of which would have been utilised according to seasonal availability.

The Milton Basalts and Sands soil landscape supports Red Bloodwood *Corymbia gummifera*, Old Man Banksia *Banksia serrata*. On the coastal headlands heaths of Hakea *Hakea sericea*, Melaleuca *Melaleuca armillaris*, Coast Rosemary *Westringia fruticosa* and Dwarfed Red Bloodwood *Corymbia gummifera* occur in shallow soils subject to high salt spray input and frequent fire (Mitchell 2002).

Wandandian Coastal Plains soil landscape support open forest of Spotted Gum *Corymbia maculata*, Forest Oak *Allocasuarina torulosa* with extensive Macrozamia *Macrozamia sp.* and Blady Grass *Imperata cylindrica* understorey. Freshwater Reed *Phragmites australis* swamps on wider valley floors, merging down valley with Swamp Oak *Casuarina glauca* communities especially in brackish water of estuaries where organic sands and mud support Grey Mangrove *Avicennia marina* and limited saltmarsh (Mitchell 2002).

Bherwerre Barrier Sand Dunes soil landscape supports barrier sequence of Coast Tea-tree *Leptospermum laevigatum*, Coast Banksias *Banksia integrifolia*, and Coast Wattles *Acacia longifolia ssp. sophorae*. These merge to protected forests and scrubs with Smooth-barked Apple *Angophora costata*, Red Bloodwood *Corymbia gummifera*, Forest Oak *Allocasuarina torulosa*, Southern Mahogany *Eucalyptus botryoides* and Blackbutt *Eucalyptus pilularis*. Swamp Oak *Casuarina glauca*, salt marsh and mangrove sequence in estuaries, Common Reed *Phragmites australis* and *Juncus sp.*, in fresher waters (Mitchell 2002).

Plant resources were used in a variety of ways. Fibres were twisted into string, which were used for many purposes, including the weaving of nets, baskets and fishing lines. String was also used for personal adornment. Bark was used in the provision of shelter; a large sheet of bark being propped against a stick to form a gunyah (Attenbrow 2002). Townsend (1849) described the use of canoes made of 'a sheet of bark, tied at each end and stretched cross-sticks and on a lump of clay at the bottom is carried a small fire'.

Ethnographic sources suggest that species available to Aboriginal people in the study area included Brush Tail Possum *Trichosurus vulpecula*, Long-nosed Bandicoot *Perameles nasuta*, Eastern Grey Kangaroo *Macropus Giganteus*, fish and wild fowl, as well as prawns, eel and shellfish species (Townsend 1849). A recounted oral history story also suggested that local Aboriginal people ate a stranded whale on at least one occasion (McAndrew 1993). Aboriginal middens that occurred next to lakes and water ways in the region were recorded by early European visitors, with Townsend (1848) noting that on the banks of the lake were 'immense heaps of cockle-shells, the accumulation of which is difficult to account for'. The *Sydney Mail* printed a description of Burrill Lake in 1881 stating that:

'the lake abounded with fish of every description, white oysters, crustacean and cockles are plentifully found'. So great was the quantity of shellfish procured from time to time that the blacks are said to have visited the lake in great numbers, and as evidence of their feeding-places are remains of fires and bones of different animals together with immense beds of shell'.

As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', would have functioned as awls or piercers. Kangaroo teeth were incorporated into decorative items, such as head bands (Attenbrow 2002).

2.4 Land use history

The land surrounding the study area was first surveyed in 1827 by Thomas Florance from Burrill Lake to Narrawallee (Milton-Ulladulla Historical Society N/A). Settlement in the region expanded quickly in the early 1800s with timber and cattle grazing becoming the two primary industries. Prior to the Princes Highway, a road was formed along a similar route in 1857 and was later named the Princes Highway in 1920. Mining became popular throughout Conjola and Ulladulla during the twentieth century, while the development of the Princes Highway saw an influx of tourism, particularly at Burrill Lake approximately 5 kilometres south of the study area (Milton-Ulladulla Historical Society N/A).

The study area is located within a beach landscape, and a review of historical aerial photographs provide insight to development that occurred surrounding the study area during the twentieth century and early twenty first century. This review shows the development of the surrounding area through several residential development phases. Current aerial imagery of Narrawallee Dog Beach indicates that the beach has continued to be used for recreational purposes and surrounding areas have undergone continuous stages of residential development.

Aerial imagery dated to 1959 exhibits the study area in a fairly undisturbed condition, with only informal access tracks present across the southern and western portions of the study area (Photo 3). Within the back dune, vegetation is still extensive and archaeological material may still be in good condition. Aerial imagery from 1971 shows various residential ruts and trackways in the surrounding back dune, indicating residential development between 1959 and 1971 (Photo 4).

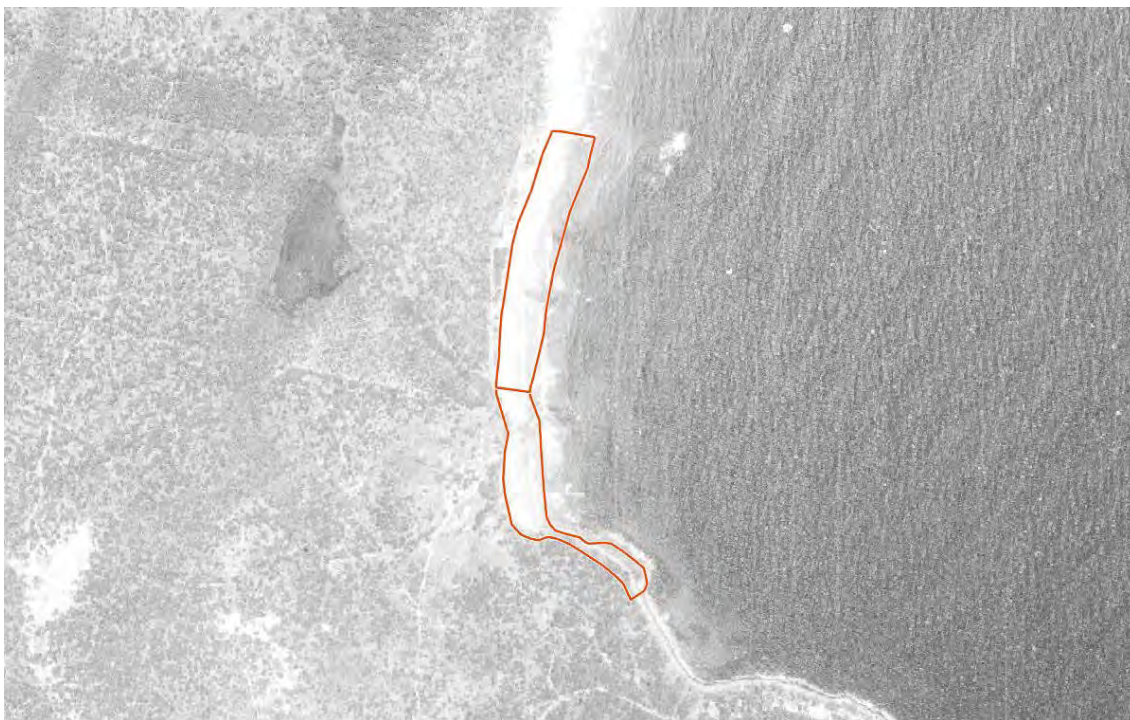


Photo 3 Aerial dated to 1959, study area outlined in orange (Source: NSW Spatial Services 2021)



Photo 4 Aerial dated to 1971, study area outlined in orange (Source: NSW Spatial Services 2021)

Aerial imagery dated to 1979 shows the addition of buildings and cul-de-sacs associated with increasing residential development of surrounding areas between 1971 and 1979 (Photo 5). Aerial imagery dated to 1991 shows the ongoing development of residential infrastructure with vegetation clearance and additional dwellings being constructed (Photo 6). Visible in this imagery are also pathways within the adjacent vegetation, formally connecting the development with the beach which suggests further impacts by human interaction with the landscape.



Photo 5 Aerial dated to 1979, study area outlined in orange (Source: NSW Spatial Services 2021)



Photo 6 Aerial dated to 1991, study area outlined in orange (Source: NSW Spatial Services 2021)

Between 1991 and 2025 little changes have occurred within the study area (evident through aerial imagery dated to 2006 (Photo 7)), with the only development being nearby vegetation being in a state of regrowth (Photo 8). The continuous recreational use of the study area is evident through the upkeep of the paths connecting the beach to nearby development, however this alone will not have impacted archaeological material to a considerable extent. The relatively limited disturbances visible on the foredunes across time suggest there is a potential for archaeology to be present, though these are likely to have been impacted by weather events along the beach.



Photo 7 Aerial dated to 2006, study area outlined in orange (Source: NSW Spatial Services 2021)



Photo 8 Current aerial imagery, study area outlined in orange (Source: NSW Spatial Services 2021)

3 Aboriginal context

3.1 Ethnohistory and contact history

The study area is situated within the Traditional Country of the Walbunja (alternative spellings include Walbunga and Walbanga) people, a Dhurga-speaking group of the larger Yuin nation. Tindale (1974, p. 199) describes the location of the Walbunja people as being from 'Cape Dromedary north to near Ulladulla; at Braidwood, Araluen, and Moruya inland on the Shoalhaven River'. There may have been some overlap with other language groups in the area, as Tindale (1974, p. 199) also describes the Wandandian people as living on Country from 'Ulladulla to Shoalhaven River and Nowra'.

Evidence of Aboriginal people occupying the South Coast of NSW dates back to the last 20,000 years (Navin Officer Heritage Consultants 2021). Lampert (1971) identified the Burrill Lake rock shelter to be one of the oldest known coastal sites. Occupation of the rock shelter occurred when sea levels were up to 100 metres lower. People within the area are known to have travelled along the coast and west to the Monaro tablelands for trade and ceremony (Navin Officer Heritage Consultants 2021).

Through the 1830s and 1840s, European settlement increased in the Shoalhaven region. Many of the roads that were established were generally based on Aboriginal tracks as in other parts of NSW (Goulding Heritage Consulting & Waters 2005, p. 28, Navin Officer Heritage Consultants 2021, p. 33). Aboriginal people were known to help newly arrived Europeans in the early decades of colonial intrusion, feeding early settlers and explorers and providing information on the environment and landscape, and also guided them to good areas for timber cutting and stock grazing (Goulding Heritage Consulting & Waters 2005, pp. 30–31).

Goulding Heritage Consulting & Waters (2005, p. 29) note that while there are few records of violence and conflict between Europeans and Aboriginal people of the Shoalhaven region, this does not necessarily indicate that they did not occur. It is suggested, however, that the worst conflict may have been restricted to the first decade of European invasion of the area. South of the study area at Kioloa, there was a massacre of Aboriginal people led by Joseph Berryman as revenge for spearing of four cattle. The number of Aboriginal people murdered as part of this massacre is not known (Navin Officer Heritage Consultants 2021, p. 31).

In the 1850s, a German migrant called Hermann Lau wrote of his travels in the Shoalhaven region and Ulladulla area. The English translation of his writings notes that there was a large community of Aboriginal people in the Ulladulla area, the largest number he had encountered, but that they were being considerably affected by internal conflict within the Aboriginal community, as well as the introduction of alcohol and disease by the European colonists (Fletcher 1991, p. 29 cited by Goulding Heritage Consulting & Waters 2005, p. 30). Introduced diseases would have had a devastating effect on the Aboriginal community in the Milton and Ulladulla region as they did elsewhere. In Broulee, south of the study area, Captain William Oldrey recorded 194 Aboriginal people and their names at the Broulee Post office in 1842 as part of the annual blanket distribution to Aboriginal people; this was a common way for the colonial government to monitor the Aboriginal population. However, by 1845, Oldrey wrote that the Aboriginal population at this time had been halved over the previous five to 10 years due to disease and sickness (Navin Officer Heritage Consultants 2021, p. 25). An outbreak of influenza in 1860 in the Milton and Ulladulla area caused the deaths of at least four elderly Aboriginal men and women in the area, and likely would have had widespread effects throughout the Aboriginal and non-Aboriginal community. "Old Charlie Pickering, King of the Pidgeon House", suspected to be 100 years old, and his "queen", also described as elderly, were two of those that perished. Charlie Pickering is described as "being remarkable for his sobriety and gentleness of disposition" and the best bark stripper within the area. Another man who succumbed to the virus was known as "old Burriel Paddy", aged

around 80, and also “old Burriel Tommy”, of a similar age. Burriel Paddy was noted for his sobriety and his resistance to smoking tobacco (Illawarra Mercury 1860).

Aboriginal people were forced to adapt due to the loss of land access and the dominating and changing culture surrounding them in order to survive, developing new lifeways and existence patterns. Alston Fowler, a resident of Ulladulla born in 1910, recalls the skills local Aboriginal people taught his grandfather for stripping and treating bark to make roofing materials. Long lengths of bark were taken from turpentine and Stringybark trees without splitting them and laid vertically over a fire for a short period. This treatment allowed for insulation from heat and cold and was also waterproof. Fowler mentions an Aboriginal woman called Moriah who he was told was an expert at catching wallabies, having trained her kelpie dogs to chase the wallabies towards her hiding place, using her nulla nulla or hunting stick on the wallabies. Moriah is said to have sometimes dressed in chaff bags (Alston Fowler, born Ulladulla 1910, quoted in McAndrews, p.32, cited by Goulding Heritage Consulting & Waters 2005, p. 47). Moriah was a notable member of the Aboriginal community of Ulladulla, sometimes referred to as Queen Maria (or Moriah) and her husband King Billy Boy; Moriah’s Aboriginal name was Coomee Nilunga (Goulding Heritage Consulting & Waters 2005, p. 68). Others took up employment in European industry, such as those Aboriginal people working in the timber industry in brush cutting or sawmills, as remembered by Mottram Thistleton of Ulladulla (Family account of Mottram Thistleton (1869-1950) recollections, McAndrew, p.32, cited by Goulding Heritage Consulting & Waters 2005, p. 47). Alternatively, some Aboriginal people took up agricultural work on farms in the region. An 1871 newspaper article briefly notes that a family of Aboriginal people were husking maize at the Terrara estate near Nowra (Australian Town and Country Journal 1871).

Mickey of Ulladulla (c.1820-1891) was an Aboriginal artist who depicted scenes of traditional Aboriginal and late 19th century activities. His artworks depict a range of images from ceremonial and social events such as Corroborees, to more everyday tasks such as fishing, selling goods and working and managing the land. It is believed that Mickey, described as a ‘cripple’, would include a self-portrait within some of his artworks, identified as the man holding two crutches (Sayers 2005). These images provide insight into the various elements of dress and personal adornment, tools, equipment and weapons likely used by Aboriginal people of the Ulladulla region, possibly wider, as well as the different components and elements involved in ceremonies and corroborees, native and non-native species, and also some indication of how traditional Aboriginal life had been adapted to survive in an increasingly European colonial landscape.

In 1882 the newly established Aborigines Protection Board (APB) undertook a census of Aboriginal people in NSW, which also included details on education, welfare and aid provisions. For the Milton and Ulladulla area, it is reported that Aboriginal people were employed in fishing, oystering, farm work and stripping bark (‘Annual report of the Aborigines Protection Board for the year 1882’, Votes & Proceedings of the Legislative Assembly of New South Wales, 1883, cited by Goulding Heritage Consulting & Waters 2005, p. 48). The 1890 APB report notes that in the Milton and Ulladulla area, Aboriginal people continued to be employed in fishing, farming, in the timber industry, stripping bark, loading and unloading steam boats and also as domestic servants (APB Report 1891-2, cited by Goulding Heritage Consulting & Waters 2005, p. 49). The APB established Roseby Park Station east of Nowra in 1904, and in the following years evicted many Aboriginal people in the region, forcing them to Roseby Park Station. Subsequent APB reports on Aboriginal people in the region in the early 20th century noted that most of the able-bodied men were employed in work off the station throughout the year, while women undertook washing work (Goulding Heritage Consulting & Waters 2005, pp. 49, 75). During the 20th century, seasonal crop picking in Bega and Bodalla for example, was a common form of employment, and also allowed for maintaining relationships with family and contacts outside of the local communities of the Shoalhaven (Louisa Andrews, p.23 Goulding Heritage Consulting & Waters 2005, p. 50).

Relatively few official Aboriginal reserves were established in the Shoalhaven region, and it is suggested that Aboriginal people may have lived in other types of reserve land. APB records document at least two of these places in the Milton and Ulladulla area, including Tom Cooley's Reserve, gazetted 1889, and Ulladulla Reserve, gazetted 1892 (Goulding Heritage Consulting & Waters 2005, pp. 62–63). APB reports from 1889 and 1890 suggest that Tom Cooley's Reserve may have been an area of land specifically set aside for Tom Cooley and his family, rather than a wider community reserve. In 1892, 21 acres was reserved at Ulladulla Harbour for the Aboriginal community, which was already occupying this land. It was reported in that year that there were 10 houses and 43 Aboriginal people living on the site (Goulding Heritage Consulting & Waters 2005, p. 65). It appears that the Milton and Ulladulla Benevolent Society lobbied the APB for better treatment and care, particularly for the elderly or disabled members of the community living on the reserve (Goulding Heritage Consulting & Waters 2005, p. 67). In 1930, an attempt was made by the local Council to get the APB to relocate the Ulladulla Harbour reserve to another site at Racecourse Creek (Goulding Heritage Consulting & Waters 2005, p. 70).

Despite the many restrictions placed on Aboriginal people during this period, they continued to live, work and maintain connections to country and culture in the surrounds of the study area. Walbunga people's involvement in the farming, fishing and timber industries in particular has been noted in local histories such as *They Came to Murrumarang: A History of Murrumarang, Kioloa and Bawley Point* (Harmon 2015).

Following several decades of Aboriginal land rights activism, the 1970s and 1980s saw increasing recognition of Aboriginal people's rights in country by governments and law makers at both state and national levels. Enactment of legislation such as the *New South Wales Aboriginal Land Rights Act 1983* and in the 1990s, the *Commonwealth Native Title Act 1993*, resulted in Aboriginal ownership of many previous Aboriginal Reserves and housing settlements within the region, or recognition of native title rights. Aboriginal Land Councils were established to administer and assist with land claims, native title claims and land management. This has resulted in the numerous parcels of land transferred to Local Aboriginal Land Councils (NSW Land Rights) including Yuin and Walbunga people (Feary, xxxii in Harmon 2015).

Today, over 5% of the City of Shoalhaven LGA identifies as Aboriginal Australian and Torres Strait Islanders (Australia Bureau of Statistics 2016). Aboriginal people and organisations in the Milton Ulladulla area continue caring for country and strengthening community through, for example, work, family practices, health care, land care and management organisation groups, native title groups, legal and political advocacy, and cultural heritage consultancies.

3.2 Regional context

Several Aboriginal cultural heritage investigations have been conducted for the Cumberland region. Models for predicting the location and type of Aboriginal sites with a general applicability to the Cumberland lowlands region and thus relevant to the study area have also been formulated, some as a part of these investigations and others from cultural heritage investigations for relatively large developments.

A number of Aboriginal cultural heritage investigations have been conducted in the Ulladulla and Milton region. Models for predicting the location and type of Aboriginal sites with a general applicability to the Ulladulla and Milton region and thus relevant to the study area have also been formulated, some as a part of these investigations and others from cultural heritage investigations for relatively large developments. These investigations are summarised below.

The Batemans Bay Archaeological Project: Site Distribution Analysis (Knight 1996) was undertaken by students from the Australian National University between 1981 and 1983. The synthesis of studies focused on the Murrumurang Aboriginal Area and the forested hinterland of the Batemans Bay and Ulladulla region

more generally, located approximately 23 kilometres south of the study area. The research aimed to locate, record and analyse evidence of Aboriginal occupation, which identified 2,207 Aboriginal sites during the surveys. The sites consisted of 1,142 artefact scatters, 678 isolated artefacts, 349 shell middens, 24 rock shelters (10 of which had associated art), 11 grinding groove sites and 3 scarred trees.

A total of 18,783 stone artefacts were recorded, and 59% of sites were recorded on high points such as ridges, hills and peaks. However, sampling bias should be acknowledged as the surveys were focused on exposures such as roads which also tend to be located on ridgelines. Debitage made up 80% of the stone artefact assemblage, and the remainder consisted of cores, hammerstones, anvils, backed blades, scrapers, eloueras and blades. Raw materials for these artefacts consisted of silcrete and volcanics.

The site data was compiled and analysed identifying several trends in site type and distribution:

- More than half the sites were located on high points such as ridgelines, peaks, spurs and saddles.
- 12% of sites occurred on slopes of which foot and upper slopes were the most common.
- Valley locations accounted for just over 6% and 13.5% were located within the ocean shoreline such as dunes, cliff tops and headlands.
- Approximately 7.4% of sites were located near estuarine features such as lake shores, lagoons and river banks.
- The majority of artefact scatters (95%) contained less than 50 artefacts, while the average number of artefacts at each site was only seven.
- Large, complex sites tended to be located at high linear feature junctions in close proximity to permanent fresh water.
- Flakes and flake pieces dominate the stone artefact assemblage at 80%, while hammerstones, anvils represent 14% and formal tools such as backed blades and scrapers represented 5%.
- Raw material was dominated by silcrete and volcanics, followed by quartz, chert and quartzite.
- There was a clear emphasis upon the use of locally available material for stone artefact manufacture.

Based on the morphology of the artefacts, Knight (1996) suggests that many of the sites relate to Aboriginal occupation within the last 5,000 years. Middens contained the remains of both marine and land animals, and stone and bone artefacts, in addition to a variety of shellfish species.

Dibden (2004) conducted a pedestrian survey of the Murramarang Eco Resort, located approximately 23 kilometres south of the study area, and recorded three significant Aboriginal sites. Locale 1 was situated on an open exposure of sandy loam that had been heavily disturbed and included two stone artefacts made from porphyry and quartz. Locale 2 was situated on a large mound of imported soil of unknown origin and consisted of 13 stone artefacts of quartz, silcrete, quartzite and volcanic material. Locale 3 was located on an exposure of bare earth, which has also been subjected to heavy disturbance from construction works, and included 16 stone artefacts of quartz, volcanic material and silcrete. The entire study area was considered to be highly modified by the original clearance of the site and by the construction of the resort, and was therefore assessed as containing nil to low potential for archaeological deposits.

Navin Officer Heritage Consultants Pty Ltd (NOHC) (2005a) conducted an Aboriginal heritage assessment for Lots 682 DP 569678, Lot 705 DP 613881 and Lot 810 DP 247285 at Manyana, located approximately 9 kilometres north of the study area. Background research identified two previously recorded artefact scatter sites to be located on low gradient mid slopes on a spurline landform within the study area. Two PAD sites were also present, located within an alluvial flat landform adjacent to a creek line. A field investigation

recorded five new sites, which included four artefact scatters of grey quartz and silcrete flakes and cores, and an isolated artefact of grey silcrete located within an exposed access track. These sites were located within spurline slopes and elevated ground nearby a drainage line. Further investigation was recommended.

South East Archaeology (2005) conducted subsurface testing of “The Dairy” Stages 2-4 at Dolphin Point, located approximately 12 kilometres south of the study area on the southern banks of Burrill Lake. The study area was identified to contain gentle slopes, spur crests and ephemeral drainage lines. A total of 16 areas were tested, obtaining 2,142 artefacts in addition to shell midden deposits. The majority of artefacts (86.32%) were silcrete material with low frequencies of quartz, rhyolite, quartzite, chert and volcanic material in the form of flakes, flake fragments, retouched flakes, Bondi points, core fragments, cores, microblade cores, backed flakes, bipolar flakes, thumbnail scrapers, geometric microliths and hammerstones. Two midden sites were also radiocarbon dated. The results of the dating identified a potential single meal event between 1080 and 1410 *Anno Domini* (AD) and the other a major meal event or repeated events between 610 and 1090 AD.

The results of the excavations concluded that there is a higher frequency of artefacts and activity areas on gentle spur crest units within 200 metres of the waterline. The landscape was likely used for transitory movement with multiple episodes over a short duration. Salvage excavations were recommended prior to development.

South East Archaeology (2006) conducted a heritage impact assessment for a residential subdivision at Manyana, located approximately 9.5 kilometres north-east of the study area. Artefact scatters, PAD, scarred trees and a burial site were identified within close proximity to the study area. A predictive model was developed based on previous research conducted within the region:

- Artefact scatters can occur across spur crests, simple slope and drainage depression landscapes and are likely to be of higher density when in close proximity to higher order water courses, particularly when not impacted by recent land use.
- Burials are likely to occur within deep sand deposits and creek banks and can be marked by scarred trees.
- Scarred trees are considered to be rare due to extensive tree clearance within the area.
- Middens are common within the region and increase in occurrence when located within one kilometre of shellfish sources.
- Rock shelters have the potential to occur within rock overhangs or caves.

A survey of the study area identified an artefact scatter on a spur crest, extending down the hill slope, which supported the predictive model. Thirteen artefacts were identified as part of the scatter and consisted of silcrete, chert and rhyolite flakes and cores. An historical site was also identified during the survey and further investigation was recommended.

Following the survey, South East Archaeology conducted test excavations for the residential subdivision. Thirty one test pits were excavated at 5 metre intervals along transects in the south-east corner of the study area and a total of 173 artefacts were recovered. Two test pits had 66 and 52 artefacts respectively, while 17 test pits had one artefact each, the remainder of the test pits had no artefacts. The artefact assemblage contained elements typical of Holocene backed artefact technology. It was concluded that ‘occupation of each of the simple slopes and spur crests appears to have primarily involved transitory movement and/or hunting and/or gathering without camping. The episodes may have involved small groups of people and been for short durations of time. The absence of permanent potable water is likely to have prevented stays of an extended duration or by large groups of people.’

Dibden (2008) conducted salvage excavation at Murramarang Eco Resort, located approximately 36 kilometres south-east of the study area, ahead of the proposed upgrades to wastewater treatment facilities. Nine 1 metre by 1 metre test pits were excavated which resulted in 1,610 stone artefacts being recovered, with density varying from 20 artefacts per square metre to 1,200 per square metre. The majority of the assemblage was considered small (10 millimetres in length or less), with 388 artefacts less than 5 millimetres in length. This suggested that stone tool manufacturing occurred at this site. Other stone material recovered included sandstone fragments and rounded pebbles of volcanic stone and quartz, and shell material was found in most test pits between 100 and 500 millimetres below the ground surface. Dibden concluded that there were likely two midden forming events within the site, and that the artefact distribution and assemblage composition indicated that the site was utilised on repeated occasions for short-term activities including the processing and consumption of marine resources and manufacture of stone tools.

Dibden (2008b) undertook an archaeological salvage program of the eastern portion of the Murramarang Eco Resort, which included sixteen 1 metre by 1 metre test pits. A total of 1,075 artefacts, 106 kilograms of shell, and 468.18 grams of bone and fish scales were recovered during the excavations. Artefact density was 108.9 artefacts per cubic metre and the assemblage contained flake fragments, flakes, cores, flaked pieces, unmodified artefacts with use wear, and special use items such as a hammer stone, file, whetstone, pestle and a hatchet. Although all of the areas of proposed impact of this stage of the development were considered to have been subject to prior disturbance, activities evidenced at the site included processing and consumption of marine resources and the manufacture of stone tools. Dibden concluded that any archaeological sites present are not in their original context and contain little integrity, and the introduction of soil as fill suggests that any Aboriginal objects located here may have been introduced from elsewhere.

3.3 Local context

Several Aboriginal cultural heritage investigations have been conducted within the local area (within approximately five kilometres of the study area). Most of these investigations were undertaken as part of Development Applications and included surface and sub-surface investigations. These investigations are summarised below.

Lampert (1971b) investigated coastal sites along the South Coast area and excavated a rock shelter at Burrill Lake approximately 6 kilometres south-west of the study area. Previous excavations had been conducted at the site in 1931, identifying a large midden site. However, excavations were confined to the upper deposit that was described as a midden that ranged from 500 millimetres to 1 metre in depth. Below the midden was up to 1 metre of sand and, due to lack of archaeological experience, the excavators assumed this layer was culturally sterile (or devoid of Aboriginal artefacts). The results of the 1931 excavation were considered unreliable.

Between 1967 and 1968, Lampert excavated 35 square metres within the rock shelter and obtained 6509 artefacts, including scrapers, backed artefacts, eloueras, and utilised flakes of quartz, rhyolite, and quartzite. The Burrill Lake site shows a three-phase industrial sequence that parallels McCarthy's (1967) Eastern Regional Sequence; however, it only contained the first and middle phases (Capertian and Bondaian). Beginning 20,000 years ago, the first phase is characterised by crude and amorphous scrapers although some were finely made and the dentated saws showed that careful retouching was not confined to the overlying Bondaian horizon. Scrapers were joined by a range of stone implement types around 5000 years ago that appeared to have specific functions and included blades (Bondi points and geometric microliths), thumbnail scrapers, eloueras and scalar cores.

Faunal remains were only found in the top 250 millimetres of the deposit and indicated a mixed economy with woodland, lake shore and sea shore being exploited. This included mammal bones of Yellow Bellied

Glider (*Petaurus australis*), Sugar Glider (*Petaurus brevicaeps*, *Potorous tridactylus*) Long-nosed Potoroo, Eastern Swamp Rat (*Rattus lutreolus*) and Bush Rat (*R. fusaipes assimilis*). Very few avian bones were present, while marine bones consisted mainly of snapper and bream. Among the midden material, Sydney Cockle (*Anadara trapezia*) and Hercules Club Whelk (*Pyrarzus ebininus*) dominated the shellfish assemblage.

Excavations at the Burrill Lake rock shelter provided one of the oldest dated sites on the NSW coast, dating to 20,830±810 before present (ANU-138). The site would have been next to a river flowing out onto the plain, and the archaeological evidence in the lowest levels of the cultural deposits reflect a diet based on terrestrial resources. In contrast, the higher and younger deposit levels contain marine species amongst the food remains, which correlates with palaeoenvironmental data showing that the sea reached its current level around 5,000 to 6,000 years ago (Feary 2015).

Hotchin (1988) conducted an archaeological report on the Burrill Lake area located approximately 5 kilometres south of the study area. The geology of the area includes complex sedimentary elements composed in the Pleistocene, with back barrier sediments of Burrill Lake formed during Holocene processes. Recent erosional processes have provided a number of rock platforms and estuary development providing valuable resources during the Holocene period.

The dominant work at Burrill Lake was centred on the Burrill Lake Rock Shelter, including Lamperts dating of the shelter deposits to 20,000 BP. During this time, Hotchin (1988) notes that the topography of the area would have been much steeper with deeper valleys, rather than the current alluvial and lacustrine seen today. The Bondaian Phase appeared around 5,200 BP, including the appearance of backed blades and thumbnail scrapers within assemblages. Large volumes of midden material was then noted to appear around 2,000 BP. A comprehensive site survey conducted by White in 1987 identifying areas of extensive deposits surrounding the lake, sparking the need for management and planning within the area.

Hotchin (1988) conducted a survey of Burrill Lake, identifying that middens appear in two locations, immediately adjacent to and well above the lake shore. Estuary shoreline middens are dominated by *Bimbula Andara trapezia* species, and ocean shore middens contained high numbers of mussel *Mytilus planulatus*. Overall, 30 midden sites were recorded, primarily located within close proximity to Burrill Lake or the coast. Based on this research Hotchin developed the Burrill Lake archaeological precinct, which outlines areas of archaeological potential surrounding the lake.

Many of the middens identified by Hotchin (1988) within the area were described to be “of mounded form” which is considered to be uncommon on the south-east Australian coast. This provided a strong case for their protection and also high significance and archaeological potential. Immediate protection of eroding middens and conservation management plans for the area was recommended.

NOHC (1997) conducted a cultural heritage assessment to inform the Milton Ulladulla bypass route selection process (route i, route ii, and route iv) from Narrawallee to Termeil Lake and a maximum of 10 kilometres inland. Predictive modelling was also developed based on previous assessments and sites within the region. The following statements were made about geographic and regional variables within the study area:

- Open campsites (artefact scatters) are most likely to occur on relatively level, well drained ground, either adjacent to sources of fresh water and wetlands, or along crests of ridge and spur lines. In the study area, they are likely to occur along Croobyar Creek and possibly smaller creeks such as Millards and Racecourse Creeks. They may also be found around coastal wetlands, lakes and hinterland ridge and spur line crests.
- Topographically pronounced ridgelines which afford effective through-access across and relative to the surrounding landscape will tend to contain more and larger sites, mostly campsites with open artefact scatters.

- Estuarine midden sites are normally located close to the estuarine environment, on elevated ground.
- Coastal middens are frequently located on or near rocky headlands or rock platforms, adjacent to a creek mouth or hind dune water sources.
- Burial sites are generally found in landforms characterised by a relatively deep profile of soft sediments such as aeolian sand and alluvium. Burials can occur in the deposits of occupation sites such as middens and rockshelters.
- Scarred trees may occur in areas of remnant vegetation which contain trees of sufficient age.
- Quarry sites are associated with natural outcrops or accumulations of suitable rock types such as fine-grained igneous rocks, quartzites, and silcretes. Exposed silcrete within coastal cliffs and beach cobble deposits are characteristic quarry site locations on the south coast. Silcrete is the most likely rock source within the study area, however this may be impacted by European quarrying.
- The potential for sites such as rock shelters, grinding grooves and quarries to be present in the study area is dependent on the existence of suitable lithic formations. They are likely restricted to Conjola formation and along portions of the study area south of Woodstock.
- Isolated finds can occur anywhere in the landscape and may represent the random loss or deliberate discard of artefacts, or the remains of dispersed artefact scatters.
- The location of sites such as bora grounds and stone arrangements are difficult to predict and, considering the long period of European exploitation of this area, are unlikely to have survived. A stone arrangement was noted to occur four kilometres west of the current study area and it was recommended that further assessment was needed to determine its Aboriginal origin.

A survey of the study area was conducted in 1997. A number of previously unrecorded sites were identified. MUB1 is a potential scarred tree (Blackbutt) identified on a low gradient landform 850 metres north of Burrill Lake, MUB2 is an artefact scatter identified on a broad spur line crest one kilometre north of Burrill Lake, MUB3 is a potential scarred tree (Scribbly Gum) located on a spur line approximately 500-600 metres north of Kings Point Drive, and MUB4 is an artefact scatter located on a low board spur line approximately 100 metres north west of Croobyar Creek. MUB1 and MUB3 were assessed to have moderate archaeological significance and MUB2 and MUB4 were identified to contain research potential. It was recommended that scarred trees were preserved and left in situ, and subsurface testing occur at MUB2, MUB4, and identified PAD sites prior to any impacts.

Four PADs were also identified. PAD 1 was identified as a 40 by 20 metre elevated flat area in an alluvial valley at the confluence of two creeks. PAD 2 is a 40 by 40 metre elevated area on both sides of Croobyar Creek at the confluence of a tributary. PAD 3 is a 100 by 80 metre area of two alluvial terraces on the northern side of Croobyar Creek. PAD 4 is on a crest of a low rise spur line adjacent to a tributary within the Croobyar Creek floodplain. The report did not map these PADs, nor were they registered on the AHIMS database; however, grid references were included.

It was identified that the various route options would impact a number of sites. Route i contained three sites (a stone arrangement and two artefact scatters) and routes ii and iv contained a scarred tree. Route i also had the greatest potential for impact with 4.1 kilometres within moderate to high archaeological potential and 9.3 kilometres in low to moderate archaeological potential. Route ii contained 0.7 kilometres in moderate to high and 1.2 kilometres in low to moderate potential. Route iv contained 1.4 kilometres of moderate to high and 2.4 of low to moderate potential. Overall, route ii contained the least impact, including to historical sites within the study area.

NOHC (2001a) conducted a heritage assessment for the Conjola Regional Sewerage Scheme, for Bendalong, Manyana, Cunjurong Point, Lake Conjola, and Fishermans Paradise, located approximately 3.3 kilometres north of the study area. Background research identified a number of previously recorded sites within the study area including a midden site, artefact scatters, isolated finds and scarred trees, while dune landforms were highlighted to have potential to contain burials. Two areas of PAD, three shell middens, 12 artefact scatters, six isolated artefact finds and nine areas requiring archaeological monitoring were identified along the proposed pipeline routes. The PAD site was identified within an alluvial flat landform adjacent to a tributary creekline from Manyana Beach. Another PAD site was identified on the eastern bank of Lake Conjola estuary. Additional areas were also outlined for monitoring. Subsurface testing and monitoring was recommended.

NOHC (2001b) conducted a heritage assessment for the Milton to Ulladulla Sewerage Scheme. Background research identified 14 sites to be located in or within 150 metres of the study area, including PAD, midden, artefact scatter and quarry sites. A number of predictive statements were also provided for the assessment:

- Artefact scatters are likely to occur on level, well drained ground adjacent to drainage lines and wetlands or on crests of ridges and spurlines.
- Pronounced ridgelines are more likely to contain larger sites.
- Estuarine midden sites are likely to be located in close proximity to estuarine environments on elevated ground. Coastal middens are likely to occur on or near rocky headlands and rock platforms adjacent to creek mouths or hind-dune watersources.
- Burial sites are likely to occur in relatively deep soft sediments such as aeolian sand and alluvium in addition to occupation sites such as middens and rock shelters.
- Scarred trees can occur in areas of remnant vegetation.
- Rock shelters, grinding grooves and quarries require suitable underlying geology and rocky outcropping to be present.
- Isolated finds can occur anywhere in the landscape.
- Bora grounds and stone arrangements are difficult to predict and unlikely survived.

A survey of the area in 2001 relocated previously recorded sites and identified four additional previously unrecorded sites. These sites included two isolated finds (MU IF1 and MU IF2) and two midden sites (MU 1 and MU 2). Eleven PAD sites were identified with five having high to moderate potential to contain subsurface archaeological deposits. A number of recommendations were made that included a Consent to Destroy with Salvage, conservation of scar trees, avoidance of some Aboriginal sites and monitoring.

NOHC (2002) conducted an archaeological survey spanning from Narrawallee to Dolphin Point. Background research identified the landscape to contain grey sands on low gradients and orange brown clays towards ridges. No water courses were present within the study area. Several Aboriginal sites were identified during the survey including, two middens, 2 isolated artefacts, 11 PADs. One of the midden sites is located approximately 550 metres north of the study area, alongside the Narrawallee Inlet. A field investigation identified. An artefact scatter and two isolated finds were identified within a low gradient context on top of a ridge line. All artefacts were made of grey silcrete material and included flake, cores and flaked pieces. Salvage of the sites was recommended prior to construction. Two historic sites were identified during the field survey: post and rail fencelines and a possible tramway platform remnant.

NOHC (2003) undertook subsurface excavations for Stage 1 of 'The Dairy' residential development following the results of a survey, which recorded 10 new stone artefacts sites. There were also six previously recorded sites within the area, which is located approximately 8.5 kilometres south of the study area. Thirty six backhoe

test pits were excavated across the study area and a total of 1,339 artefacts were recovered. Midden deposit was also encountered at two locations and dated to approximately 900 years. The artefact assemblage comprised complete flakes, flake pieces, asymmetric backed blades, bipolar flakes, single and multiplatform cores, elouras, scrapers and burins. Raw materials consisted of quartzite, basalt, rhyolite, quartz, silcrete, chert, crystal quartz and chalcedony. The results suggested that there was evidence for significant variation in the concentration and assemblage composition. Based on the density of artefacts recovered, NOHC estimated that 3,192,587 artefacts would be present across the entire site and a program of salvage was recommended.

Therin (2004) conducted an Aboriginal Heritage Assessment for the proposed upgrade of the Croobyar Creek Bridge, Princes Highway, located approximately 3.8 kilometres west of the study area. Background research identified that the Croobyar Creek is located within quaternary alluvium landforms surrounded by various drainage lines extending from Croobyar Creek. Only isolated disturbance through the construction of the bridge and superficial disturbance through agricultural practices was identified within the area, providing potential for archaeological deposits to remain. Previous archaeological research within the area had also located a number of sites nearby Croobyar Creek.

A search of the AHIMS register identified that open campsites, isolated finds, middens and scarred trees were common site types within the area. Analysis of these sites lead to the development of the following statements about what sites may be present in the vicinity of Croobyar Creek:

- A moderate to high density artefact scatter in proximity to Croobyar Creek.
- A low to moderate density artefact scatter away from the creek and on the hill slopes.
- An absence of Aboriginal site types requiring the presence of sandstone outcrops, rock shelters, grinding grooves, pigment art and engravings.
- A low potential for the presence of Aboriginal middens.
- The absence of scarred or carved trees due to the absence of trees.

Therin's survey of the area did not identify any sites. This was determined to be due to a lack of exposure within the area rather than a lack of archaeological presence. Due to this, it was determined that the study area had high potential for subsurface archaeological deposits. Both sides of the creekline were recorded to be areas of PAD and are located within the current study area. Test excavations were recommended.

NOHC (2005b) conducted a subsurface testing program at Croobyar Creek within the two areas of PAD identified by Therin (2004). A total of 18 pits were mechanically excavated and soil was wet sieved, recovering 206 artefacts. The artefact density across the site was determined to be low with areas of localised concentration. This portion of the study area was located within the Milton Mezonite formation. Soils were described to primarily comprise of brown loams with charcoal and large gravels grading to yellow/brown clay, reaching a depth of between 40 to 130 centimetres. Artefact material recovered from the site was dominated by silcrete, followed by quartz and included quartzite, chert and indeterminate materials. Flakes, bipolar flakes, cores, microblades, backed flakes, triangular microliths, Elouera, end scraper, and bondi points made up the assemblage. The presence of microblades was used to date the deposit to the late Holocene, which is typical of most other sites within the south coast of NSW. It was recommended that a salvage program and consent to destroy permit be obtained prior to development.

(Biosis 2021) conducted two surveys for the proposed Milton Ulladulla Bypass, located approximately 4 kilometres from the study area. The survey area consists of a bypass 12 kilometres long, starting approximately 4.2 kilometres north of Milton and finishing approximately 100 metres north-east of Burrill Lake. It is located in farmland and bushland approximately 1.6 kilometres west of the Ulladulla central business district and encompasses approximately 378 hectares. The probability of Aboriginal sites across the

entire area was deemed low. Fourteen previously unrecorded Aboriginal cultural heritage sites were identified during the archaeological survey, along with 23 areas of archaeological sensitivity. All PADs recorded during the survey were located on level ground adjacent to water sources or along ridges and crests. Likewise, the majority of surface artefact scatters and isolated artefacts were recorded in association with PADs. The dune landform east of the Princes Highway at Burrill Lake was identified by Aboriginal stakeholders as an area of cultural sensitivity that has high potential to contain extensive artefact scatters, middens and burials. It was determined that there was potential for development activities to impact Aboriginal sites and the identified sites or areas of archaeological sensitivity. Another survey was undertaken in 2025 in conjunction with the Milton Ulladulla Bypass project; five PADs and one surface artefact were identified.

Archaeological test excavations were conducted during 2021/2022, 2023 and 2025 with a team of Biosis archaeologists and Aboriginal Site Officers from Ulladulla LALC and South Coast Aboriginal Elders Corporation. The principal objectives of the test excavations were to identify and understand the nature, extent and significance of any areas of PAD within the study area.

The test excavation program consisted of a total of 469 test pits excavated across 22 PADs resulting in 3,713 artefacts being recorded. The test excavations identified a range of different site types across the areas of PAD. PAD 1 contained a high-density artefact deposit, which reflects an area of intensive use, either over long periods of time or by large groups of people. PAD 1 also contained the highest number of tools, particularly Bondi points. The large number of complete Bondi points in addition to the presence of backed Bondi point fragments suggest that manufacture has occurred on site, with a particular focus on the production of asymmetric points.

PAD 2, 3 and 7 showed moderate artefact densities and likely reflect less intensive site occupation patterns compared to PAD 1. These sites may have provided short term occupation to large groups or long-term occupation to smaller groups of people, thereby resulting in smaller artefact deposits. PADs 4, 6, 8, 9, 10, 13, 14, 17, 20, 21, 22, 24 and 25 contained low density artefact deposits, with less than 10 artefacts per square metre, and likely represent areas of low intensity occupation, potentially as a result of short-term occupation by small groups of people, or discard during transitory movement as part of travel and resource gathering. PADs 5, 11, 19 and 23 did not contain any artefacts and the small portion of PAD 18 that was tested also did not contain any artefacts.

3.3.1 Identified Aboriginal archaeological sites

An extensive search of the AHIMS database was conducted on 29 January 2026 (Client service ID: 1086831). The search identified 79 Aboriginal archaeological sites within a 4x4 kilometre search area, centred on the study area (Table 2). None of these registered sites are located within the study area (Figure 6). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied upon where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 93 results presented here, compared to the 79 sites identified in AHIMS.

Table 2 AHIMS search results

Site type	Occurrences	Frequency (%)
Artefact	53	56.99
Potential Archaeological Deposit (PAD)	18	19.35
Shell	13	13.98
Modified Tree (Carved or Scarred)	6	6.45
Burial	2	2.15
Stone Quarry	1	1.08
Total	93	100.00

A simple analysis of the Aboriginal cultural heritage sites registered within 4km of the study area indicates that the dominant site type is artefact sites, representing 56.99% (n=53), with PADs the second most commonly recorded site making up 19.35% of AHIMS records (n=18). Shell sites made up 13.98% (n=13) of AHIMS sites, Modified Trees 6.45% (n=6), Burials 2.15% (n=2) and Stone Quarry represented 1.08% (n=1) of AHIMS sites. All the sites were located within close proximity to reliable sources of water, were either exposed by the land clearing works (artefact scatters), in the areas with remnant native vegetation (scarred trees) or within areas of relevant geology for the burials and stone quarry.

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3.3.2 Predictive statements

A series of predictive statements have been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

These statements are based on:

- Local and regional site distribution in relation to landform features identified within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a series of predictive statements has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 3). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 3 Aboriginal site prediction statements

Site type	Site description	Potential
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	High: Stone artefacts have also previously been recorded in the local region on level, well-drained topographies in close proximity to reliable sources of fresh water. Due to the distance from permanent freshwater resources, the potential for artefacts to be present within the study area is assessed as high.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	High: Shell midden sites have been recorded in the vicinity of the study area. There is a high potential for shell middens to be located in association with permanent water sources, such as Narrawallee Creek.
PADs	Potential sub surface deposits of cultural material.	Moderate: PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present within areas adjacent to water courses or on high points in undisturbed landforms.
Burials	Aboriginal burial sites.	Moderate: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits will have the potential for Aboriginal burials. Some soil profiles within the study area are commonly associated with burials, such as sandy soils. Also, recorded burials along the south coast have been located within sandy deposits and middens.

Site type	Site description	Potential
Modified trees	Trees with cultural modifications	Low: Mature native trees have not survived within the study area due to historic land clearing. However, previously recorded modified trees have been identified within in close proximity to the study area.
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Low: The geology of the study area lacks suitable horizontal sandstone rock outcrops for axe-grinding grooves. Therefore, there is low potential for axe grinding grooves to occur in the study area.
Rock shelters with art and/or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Low: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are not present in the study area.
Quarries	Raw stone material procurement sites.	Low: There is one record of a quarry in the vicinity; however, it is unlikely to find a quarry within the study area due to the geological composition.
Aboriginal Ceremony and Dreaming sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area.
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There is no post-contact sites previously recorded in the study area and historical sources do not identify one. However, there is a conflict site located approximately 12 kilometres to the west of the study area.
Aboriginal Places	Aboriginal Places may not contain any 'archaeological' indicators of a site but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often, they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal political events commenced or particular buildings.	Low: There are currently no recorded Aboriginal historical associations for the study area.

4 Archaeological investigation

An archaeological investigation of the study area was undertaken on 5 February 2026 by Samantha Keats, Biosis Heritage Manager. The survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey aims

The principle aims of the survey were to:

- Undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of Aboriginal archaeological and cultural sensitivity.

4.2 Survey methods

The survey was conducted on foot. Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially been exploited by Aboriginal people.
- Landform elements, distinguishable areas of land approximately 40 metres across or with a 20 metre radius (CSIRO 2009).
- Photographs of the site indicating landform.
- GSV and areas of exposure.
- Observable past or present disturbances to the landscape from human or animal activities.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, GSV and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (94) coordinate system.

4.3 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the study area were GSV in the vegetated areas.

4.4 Visibility

In most archaeological reports and guidelines visibility refers to GSV and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010b). Visibility was high across the majority of the study area due to the dune landform (Photo 9), with areas of vegetation along the western edge reducing GSV (Photo 10).



Photo 9 High GSV due to the dune landform, facing west, scale 1 metre



Photo 10 Reduced GSV along the western edge of the study area, facing south, scale 1 metre

4.5 Exposure

Exposure refers to the geomorphic conditions of the local landform being surveyed and attempts to describe the relationship between those conditions and the likelihood the prevailing conditions provide for the exposure of (buried) archaeological materials. Whilst also usually expressed as a percentage estimate, exposure is different to visibility in that it is in part a summation of geomorphic processes, rather than a simple observation of the ground surface (Burke & Smith 2004, p. 79, DECCW 2010b). The majority of the study area is located within a beach and adjacent dune system, which displayed high levels of exposure due to wind and wave erosion (Photo 11). Areas of exposure were also present along access paths due to disturbances from use (Photo 12).



Photo 11 High levels of exposure due to nature of dune system, facing north-west, scale 1 metre



Photo 12 High levels of exposure due to nature of dune system, facing south, scale 1 metre

4.6 Disturbances

Disturbance levels within the study area were assessed during the visual inspection. Levels of disturbance were categorised through an inspection of the ground surface, landforms, and aerial imagery. Disturbance levels within the study area have been categorised according to the following criteria:

- High disturbance—the landform has been heavily disturbed and all natural soil horizons have been displaced or removed, these areas are unlikely to contain Aboriginal cultural material.
- Moderate disturbance—the landform has undergone disturbances to a certain degree, but the extent and nature of these disturbances cannot be fully quantified. Aboriginal cultural material may be present within these locations but is unlikely to be *in situ*.
- Low disturbance—the landform has not been significantly disturbed and is highly likely to contain intact soil horizons. Aboriginal cultural material if present is likely to be *in situ*.

Disturbance in the study area is associated with natural and human agents. Natural agents generally affect small areas and include the burrowing and scratching in soil by animals, such as wombats, foxes, rabbits and wallabies, and sometimes exposure from slumping or scouring. Disturbances associated with recent human action can include residential development such as landscaping and construction of residential buildings; construction of dams with raised walls; farming practices, such as initial vegetation clearance for creation of paddocks, fencing, stock grazing and stock piling; and agricultural practices such as market gardening.

The study area has experienced moderate levels of natural disturbance as the sandy soils of the Milton Basalts and Sands and Bherwerre Barrier soil landscape are susceptible to water scouring and animal burrowing. A succession of powerful east coast low weather systems has caused substantial coastal erosion in the southern part of the study area (Photo 13). Disturbances associated with recent human action are also evident within the study area such as construction of water treatment station (Photo 14) and pedestrian access to the beach (Photo 15).



Photo 13 Disturbances caused by coastal erosion, facing west, scale 1 metre



Photo 14 Disturbances from construction of water treatment station, facing south, scale 1 metre



Photo 15 Disturbances from pedestrian access to beach, facing south-east, scale 1 metre

4.7 Investigation results and discussion

The archaeological investigation consisted of a meandering transect which was walked across the study area. The results of the field investigation have been summarised in Figure 7. The assessment for areas that have low, moderate or high archaeological potential within the study area is based on a number of factors, including environmental conditions, geomorphological processes, past land use activities, results of previous archaeological studies, surveys and test excavations, and results of the current survey.

The study area is located within the coastal plains surrounding Ulladulla. This area spans a portion of the South Coast of NSW, bordered by the Narrawallee Inlet to the east and Burrill Lake to the north, providing an abundance of resources. A range of geological units underlie the study area including Alluvium and Estuarine Tidal Delta Flat to the north and Snapper Point Formation to the south. These landforms provide potential for a range of Aboriginal site types to be present. Narrawallee Creek is located to the north of the study area, which would have provided a number of resources including shellfish and therefore have the potential to contain midden, artefact and PAD sites nearby.

There are three soil landscapes present within the study area. Mitchell (2002) identified the beach dune and lagoon complexes of the Bherwerre Barrier soil landscape along the western part of the study area, the undulating slopes of the Wandandian Coastal Plains soil landscape in the central and south, and the low flat coastal hills of Milton Basalt and Sands soil landscape in the south. Deep dune land forms were identified within the study area, which would provide archaeological potential for sites such as artefacts, middens and burials.

A review of previous studies conducted within the region identified the potential for a range of sites to be present within the study area. Lampert (1971) conducted one of the earliest excavations within the South Coast at the Burrill Lake rock shelter producing one of the oldest dated sites on the NSW coast dated to approximately 20,000 years ago. NOHC (1997) previously conducted an archaeological investigation for the proposed route for the Milton Ulladulla bypass. Newly identified areas of PAD and artefact scatters were located on alluvial terraces nearby Croobyar Creek, in addition to scarred tree sites near Burrill Lake and

Kings Point. Archaeological potential mapping was also produced identifying areas of moderate and high potential within the study area. Previous predictive modelling by NOHC (2001), South East Archaeology (2005), Lampert (1971) and Biosis (2021) conducted in the Milton and Ulladulla region indicates that:

- Artefact scatters are most likely to occur on well-drained, level ground adjacent to sources of fresh water and wetlands or along spurlines and ridge crests.
- Middens will be located close to estuarine environments on level elevated ground, near rock headlands and platforms adjacent to creek mouths or near back dune water sources.
- Modified trees may occur in areas where remnant vegetation is present with trees of sufficient age.
- Burials may occur within deep soil profiles of aeolian sand and alluvium, as well as in deposits associated with middens and rock shelters.
- Rock shelters and grinding groove sites will be restricted to suitable lithic formations such as the Conjola formation.
- Ceremonial sites, such as bora grounds and stone arrangements, are unlikely to have survived in areas where ground modification and European occupation occur; however, they may be present in undisturbed areas.

Biosis' comprehensive survey for the Milton Ulladulla Bypass (Biosis 2021) supported the predictive models developed for the Milton and Ulladulla area. All PADs recorded during the survey were located on level ground adjacent to water sources or along ridges and crests. Likewise, the majority of surface artefact scatters and isolated artefacts were recorded in association with PADs. The dune landform east of the Princes Highway at Burrill Lake was identified by Aboriginal stakeholders as an area of cultural sensitivity that has high potential to contain extensive artefact scatters, middens and burials. This PAD is also associated with Blackburn Point and the cultural values identified by NOHC (2021). Aboriginal stakeholders also identified the area either side of Kings Point Drive as a resource and gathering zone and likely part of Aboriginal travel routes between Didthol (also known as Pigeon House Mountain) and the coast.

During the survey, one new Aboriginal site (AHIMS 58-1-1158/Narrawallee Beach Dog Access AS1) and an area of PAD were identified within the study area. AHIMS 58-1-1158/Narrawallee Beach Dog Access AS1 consists of a low density artefact scatter (Photo 16 and Photo 17) consisting of one silcrete proximal flake fragment and one silcrete single platform core located eroding out of the side of the PAD. The PAD is located on the edge of the beach at the base of a disused set of stairs and measures 30 metres by 20 metres (Photo 18). It has been subjected to coastal erosion and due to the presence of artefacts eroding from the side, this PAD has been assessed as high potential to contain further artefacts.



Photo 16 **Single platform silcrete core, scale 10 centimetres**



Photo 17 **Silcrete proximal flake fragment, scale 10 centimetres**



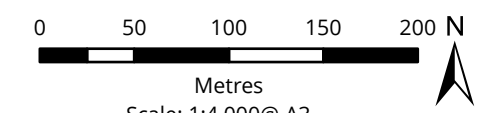
Photo 18 PAD within the study area with artefacts eroding out of the bank, facing west, scale 1 metre

The survey for this assessment confirmed that some parts of the study area had been subject to moderate ground disturbance, such as coastal erosion, vegetation removal, installation of beach access stairs and construction sewerage pump station. All of these disturbances have had an influence on Aboriginal site integrity at these locations. Past activities such as excavations while constructing the sewerage pump station and associated infrastructure are likely to have caused horizontal and vertical movements of artefacts, and significant land modifications. These activities would have caused the destruction and removal of cultural material. However, evidence suggests that despite these disturbances there is potential for Aboriginal sites to be present, with some potential for undisturbed deposits to be identified at depth in intact dune landforms. Vegetation clearance would also have caused some vertical and horizontal movements of cultural material due the removal of trees. Coastal erosion would also have displaced artefacts significantly.

Based on the archaeological survey and background review conducted as part of this assessment, parts of the study area were assessed as having high archaeological potential to contain further subsurface cultural deposits. The remaining portions of the study area have been assessed as having low archaeological potential (Figure 8).



- Legend**
- Study area
 - Lot
 - PAD
 - Survey track
 - + Surface artefact



Metres
 Scale: 1:4,000@ A3
 Coordinate System:
 GDA2020 MGA Zone 56

biosis
 APEM Group

Matter: 43836, Date: 10 March 2026,
 Prepared for: SJK, Prepared by: LH, Last edited by: hliswoyo
 Location: P:\43800s\43836\Mapping\43836_NarrawalleeBeachDogAccessArea_ADDA,
 Layout: 43836_ADDA_F7_SurveyResults



- Legend**
- Study area
 - Lot
- Archaeological potential**
- High
 - Low
 - High - Surface artefact

Figure 8 Areas of potential

0 50 100 150 200 N

Metres

Scale: 1:4,000@ A3

Coordinate System: GDA2020 MGA Zone 56

biosis
APEMGroup

Matter: 43836, Date: 10 March 2026,
Prepared for: SJK, Prepared by: LH, Last edited by: hliswoyo
Location: P:\43800s\43836\Mapping\43836_NarrawalleeBeachDogAccessArea_ADDA,
Layout: 43836_ADDA_F8_ArchPotential

5 Conclusions and recommendations

5.1 Conclusions

It is likely Aboriginal people utilised the study area for both occupation and access to resources. One new Aboriginal site (AHIMS 58-1-1158/Narrawallee Beach Dog Access AS1) and one area of PAD were identified during the archaeological survey. These sites should be avoided where possible. The remaining portion of the study area was determined to contain low archaeological potential due to disturbances from coastal erosion, vegetation removal, installation of beach access stairs and construction of a sewerage pump station.

As the proposed activity within the study area is an extension of the dog off-leash activity to 24 hours, seven days per week from 1 May to 1 October each year, and the provision of dog on-leash access from the Victor Avenue steps and the Surfers' Avenue steps to the dog off-leash area, ground disturbing works are not anticipated. If impact to AHIMS 58-1-1158/Narrawallee Beach Dog Access AS1 and the area of PAD cannot be avoided, then further assessment would be required in the form of an Aboriginal Cultural Heritage Assessment (ACHA).

The results of this assessment are also demonstrated in the due diligence flow chart provided by the Code (Figure 9).

5.2 Recommendations

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
 - the Burra Charter.
 - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

Council proposes to extend the dog off-leash activity to 24 hours, 7 days per week from 1 May to 1 October each year and provide dog on-leash access from the Victor Avenue steps and the Surfers' Avenue steps to the dog off-leash area. These works have a low likelihood of causing impacts to Aboriginal sites and no further archaeological assessment is required subject to recommendations 2 and 3 below.

Recommendation 2: Discovery of unanticipated Aboriginal objects

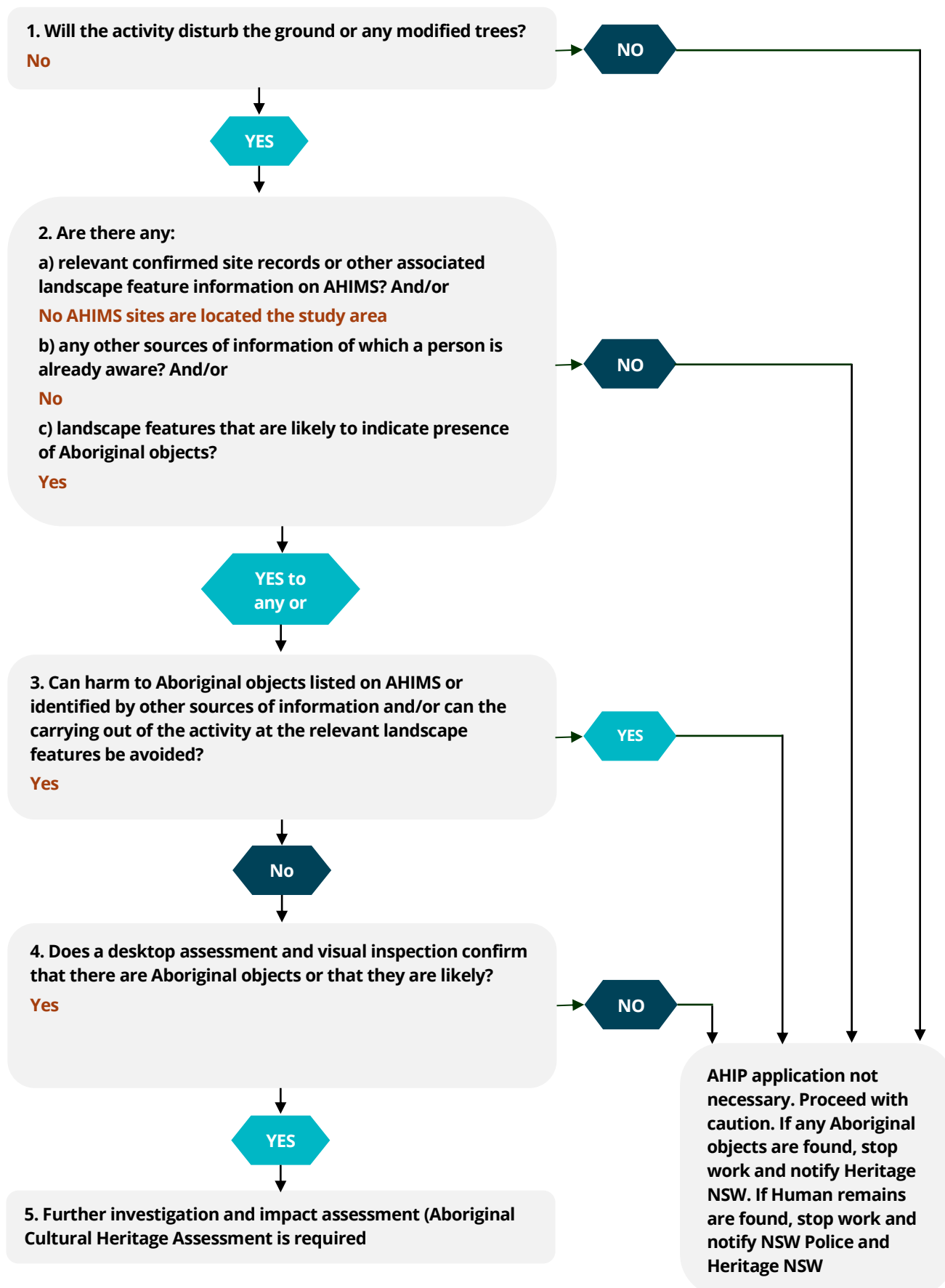
All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by the Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity, and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying the Heritage NSW and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal ancestral remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

Figure 9 Due diligence flow chart



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Appendix 1 AHIMS search results

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Appendix 4 Noise impact assessment

Noise Assessment

Dog Off-Leach Activity and Dog On-Leach Access

Narrawallee Beach, NSW

Prepared For: Biosis Pty Ltd

April 2026

MAC262685-01RP1



mulleracoustic.com

Document Information

Noise Assessment

Dog Off-Leach Activity and Dog On-Leach Access

Narrawallee Beach, NSW

Prepared for: Biosis Pty Ltd

14/17-27 Power Avenue

Alexandria NSW 2015

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Biosis Pty Ltd (Biosis), on behalf of Shoalhaven City Council (Council) to prepare a Noise Assessment (NA) to quantify emissions associated with the dog off-leash activity and dog on-leash access to Narrawallee Beach, NSW.

This assessment has been undertaken in accordance with the following documents:

- Australian Standard / New Zealand Standard AS/NZS 2107:2016 Recommended design sound levels and reverberation times for building interiors;
- NSW Department of Environment, Climate Change and Water (DECCW) – NSW Road Noise Policy (RNP), March 2011;
- NSW Environment Protection Authority (EPA), Approved methods for the measurement and analysis of environmental noise in NSW, 2022; and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Project Description

2.1 Background

Narrawallee Beach currently offers a designated, timed off-leash area for dogs within the middle section of the beach between the Matron Porter Drive beach track and Bernie's Rock (refer to **Figure 1**). Temporary restrictions prohibit accessing the beach through the southern Surfers Avenue or Victor Avenue stairs.

Current dog off-leash hours extend from 4pm to 8am during the 'Summer' period (1 October to 30 April) and 3pm to 10am during the 'Winter' (1 May to 30 September). Dogs must be on-leash at all other times.

Council is proposing to extend dog off-leash activities to 24 hours, seven days per week from 1 May to 1 October each year, within the area BA3 to BA8 (refer to **Figure 1**). Additionally, Council is proposing to allow dog on-leash access from the Surfers Avenue and Victor Avenue stairs.

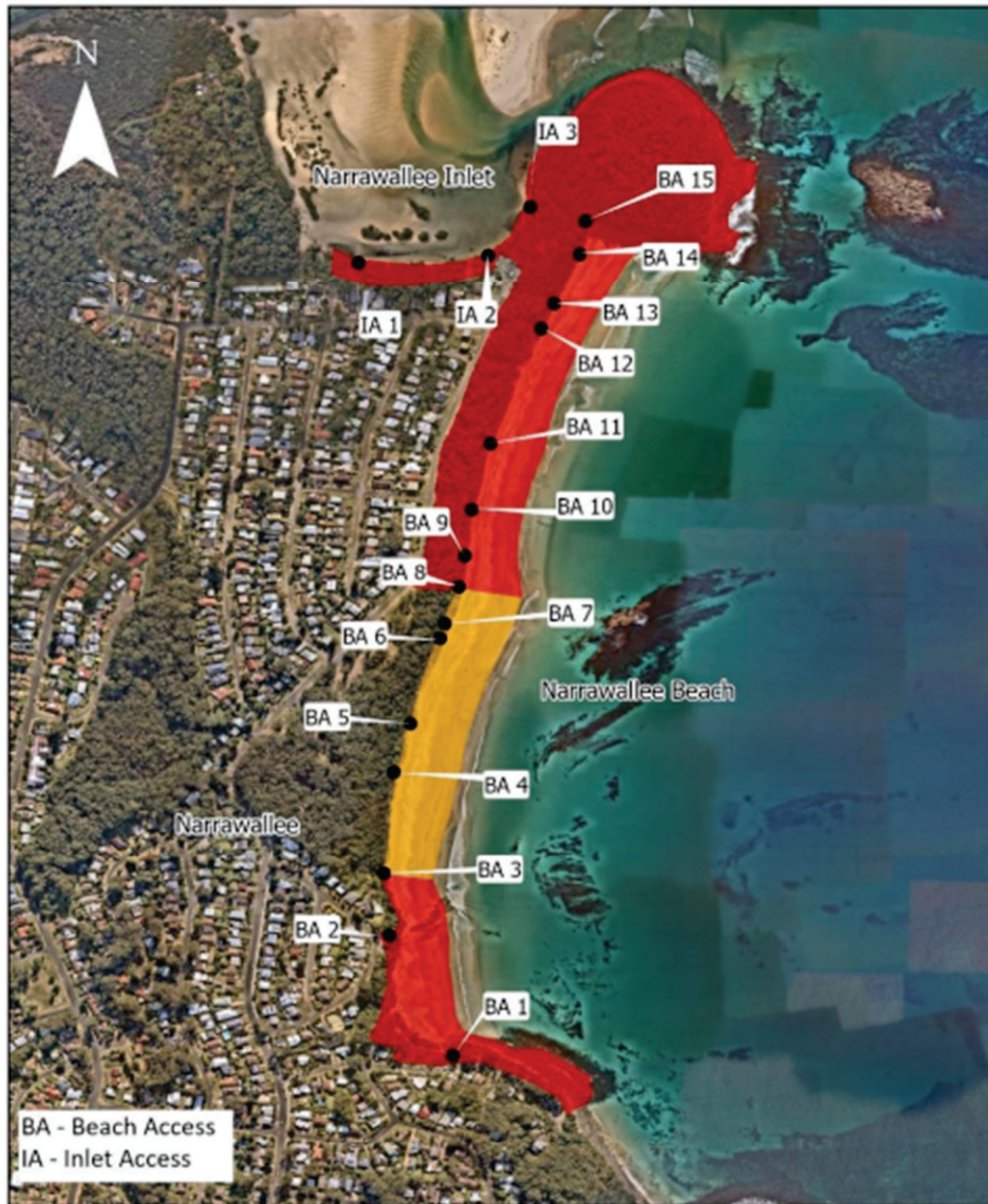
2.2 Receiver Review

The NA has predicted potential noise impacts to the following receivers:

- Dog off-leash activity – residential receivers fronting Matron Porter Drive and Victor Avenue;
- Dog on-leash access – residential receivers fronting Victor Avenue and Surfers Avenue; and
- Road traffic noise – residential receivers fronting Victor Avenue and Surfers Avenue.

Figure 2 provides a locality plan showing the position of these receivers.

Figure 1: Narrawallee Beach Dog Access



Legend

- Access points
- Timed off-leash dog access
- Dogs prohibited

0 120 240 480 Meters

Shoalhaven
City Council

FIGURE 2

Receiver Locations

MAC262685-01

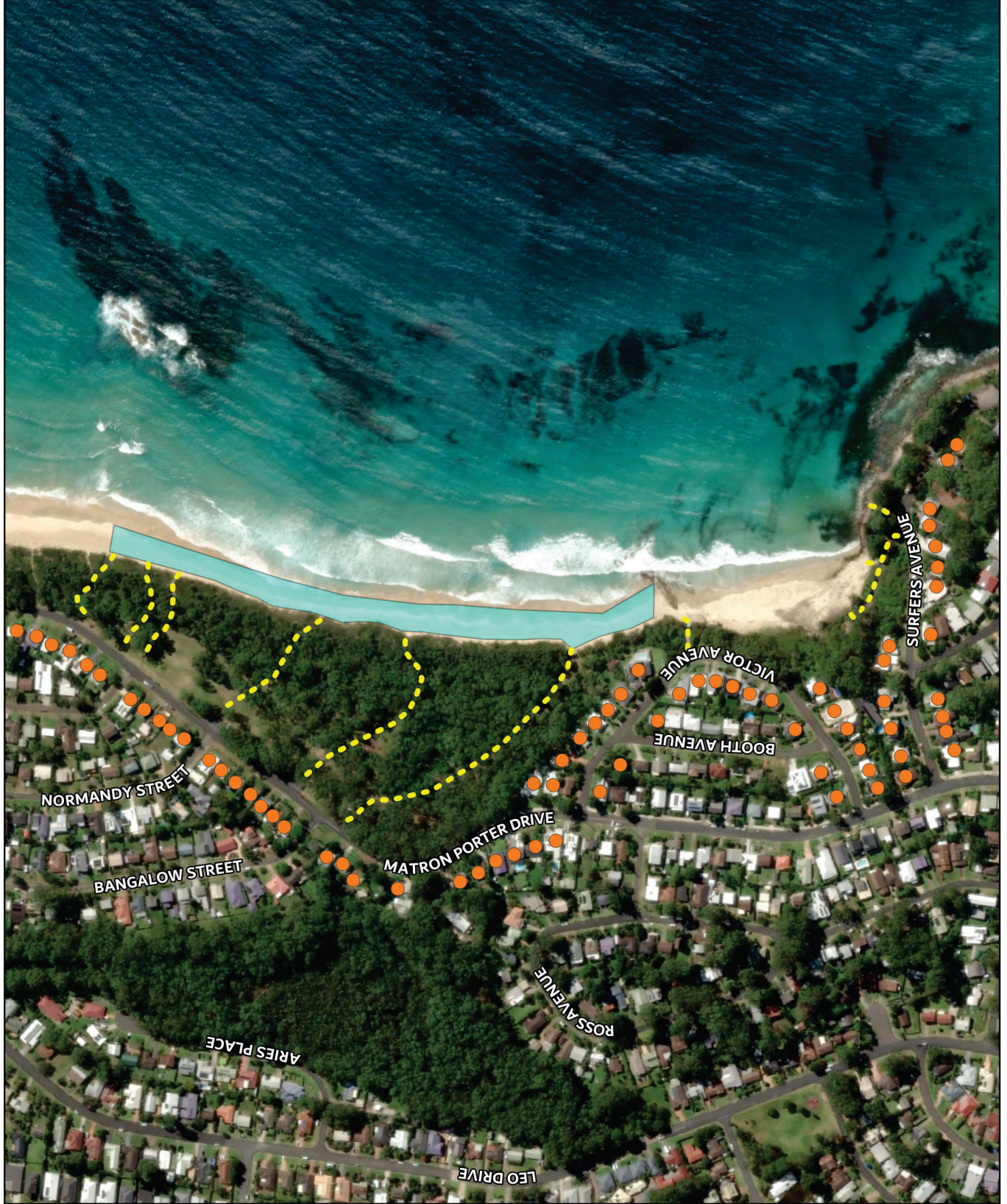
Narrawallee Dog Beach

KEY

Residential Receivers

Dog Off-Leash Area

Beach Access Points



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3 Noise Policies and Criteria

3.1 Companion Animals Act 1998

The control of domestic animals, specifically cats and dogs, is administered under the Companion Animals Act 1998 (CAA).

In accordance with the CAA, a dog is considered to be a nuisance if the dog makes a noise, by barking or otherwise, that persistently occurs or continues to such a degree or extent that it unreasonably interferes with the peace, comfort or convenience of any person in any other premises.

The CAA does not prescribe noise levels that may be considered a nuisance.

3.2 Australian/New Zealand Standard AS/NZS 2107:2016

Australian/New Zealand Standard *AS/NZS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors* recommends design criteria for conditions affecting the acoustic environment within building interiors to ensure a healthy, comfortable and productive environment for the occupants. The recommended design sound levels take into account the building type and function of the areas.

For residential buildings in suburban areas or near minor roads, AS/NZS 2107:2016 recommends the following internal noise levels:

- Living Areas: up to 40dB LAeq(period); and
- Sleeping Areas: up to 35dB LAeq(period).

3.3 Maximum Noise Level Assessment

AS/NZS 2107:2016 does not prescribe maximum noise levels for internal spaces to minimise the potential for sleep disturbance effects. The most comprehensive advice regarding maximum noise levels events is provided by the EPA's NSW Road Noise Policy (RNP), 2011.

Section 5.4 of the RNP outlines that a maximum internal noise level of 50-55dBA is unlikely to awaken people from sleep. Taking into account a 10dB loss for a partially open window an external level of 65dBA is unlikely to awaken internal occupants.

3.4 Road Noise Policy

The road traffic noise criteria are provided in the Road Noise Policy (RNP), 2011. The policy sets out noise criteria (refer **Table 1**) applicable to different road classifications for the purpose of quantifying traffic noise impacts.

Table 1 Road Traffic Noise Assessment Criteria

Road category	Type of project/development	Assessment Criteria – dBA	
		Day (7am to 10pm)	Night (10pm to 7am)
Local roads	Existing residences affected by		
	additional traffic on local roads generated by land use developments	55dB LAeq(1hr)	50dB LAeq(1hr)

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dBA, which is generally accepted as the threshold of perceptibility to a change in noise level.

4 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2026.1) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE¹. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

4.1 Operational Assessment Scenarios

Council is proposing to extend dog off-leash activities within the middle section of Narrawallee Beach (area BA3 to BA8) to 24 hours per day. Currently, dog off-leash hours extend from 4pm to 8am between 1 October to 30 April, and 3pm to 10am between 1 May to 30 September. Council Ranger observations (2022 to 2025) identified current usage rates of up to a maximum of 60 dogs and a median of 9 dogs on Narrawallee Beach at any one time. Dogs are currently permitted on-leash 24 hours per day.

Council anticipates that extending dog off-leash activities to 24 hours per day may result in the following changes to usage patterns:

- With an increase in dog off-leash time availability, usage may be more spread out over a 24-hour period, thereby reducing the concentration of dogs any one time; or
- Increased accessibility may draw more dog owners to Narrawallee Beach.

¹ Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

Where the dog off-leash time availability results in a more spread-out usage pattern, it is anticipated that noise from dog activity would be reduced compared to current conditions.

Where increased accessibility attracts more dog owners to Narrawallee Beach, to generate an increase in noise levels of more than 2dBA, which represents the threshold of perceptibility for most people, dog activity would need to increase by 60% to about 96 dogs at any one time.

To quantify existing noise levels from dog activity for the median and maximum usage rates, and the 60% increase in usage, the following scenarios were modelled for Narrawallee Beach (BA3 to BA8):

- 9 dogs on the beach at any one time;
- 60 dogs on the beach at any one time; and
- 96 dogs on the beach at any one time.

The dog activity was modelled as an area source across the dog off-leash area between BA3 and BA8. Access to the dog off-leash area was modelled as a moving source with a typical walking speed of 5km/h. Access was spread evenly across the existing six access points between BA3 and BA8. Sound Power Levels (SWLs) were based on measurements taken by MAC of an off-leash dog park with a usage rate of 15 dogs over a 15-minute period (84dB LAeq(15min)).

Additionally, Council is proposing to allow dog on-leash access from the Surfers Avenue and Victor Avenue stairs. Observations from the Council Ranger between 2021 and 2023, prior to access via Surfers Avenue stairs and Victor Avenue stairs ceasing, identified a usage of up to 10 dogs on-leash accessing the dog off-leash area.

The modelled sound power levels for each scenario are provided in **Table 2**.

Table 2 Sound Power Levels dBA (re 10⁻¹² Watts)

Parameter	Model Item	Total SWL, dB LAeq(15min) ¹			Constant Barking SWL, dB LAeq
		9 Dogs	60 Dogs	96 Dogs	
Off-Leash Area	Area Source	82	90	92	n/a
Access	Moving Source ²	n/a	n/a	n/a	84
Maximum Noise Level Assessment (LAmax), Night time periods (10pm to 7am)					
Single Bark Event				99	

Note 1: SWL calculated from measurement of dogs at off-leash dog park over period of 15 minutes.

Note 2: Modelled as a moving point source assuming dog barking constantly.

4.2 Road Traffic Noise Assessment Methodology

Due to the low traffic volume generated by the project over a typical day during the construction phase, road traffic noise calculation methods such as Calculation of Road Traffic Noise (CRTN - ISBN 0 11 550847 3) by Department of Transport (UK) 1988 or Traffic Noise Model (TNM) by the United States Department of Transport, Federal Highway Administration are not considered appropriate as they are primarily intended to calculate noise emissions from motorways and highways. Whilst each method has a low volume correction, the project traffic volume is out of the scope of these methods.

Therefore, road traffic noise has been modelled using iNoise modelling software using ISO 9613-1 and ISO 9613-2 calculation methods, representing the road traffic as “moving sources” along the local roads using the parameters presented in **Table 3**. It is noted that Council does not have existing traffic volume data for the local road network. Therefore, the assessment has compared additional traffic noise levels associated with the maximum number of dog walkers accessing the dog off-leash area from Surfers Avenue and Victor Avenue (10 vehicles during a one hour period) with the assessment criteria to determine whether the increase in road traffic noise levels is within the 2dB increase criterion.

Table 3 Road Traffic Noise Modelling Parameters

Road Segment	Lw dBA re 10^{-12} W	Movements/hr	Speed, km/h	Source Height, m ¹
Surfers Avenue	96	10	40	0.5
Victor Avenue	96	10	40	0.5

Note 1: Height above ground level.

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5 Assessment Results

5.1 Dog Off-Leash Area

Noise predictions from the dog off-leash area (BA3 to BA8), including access from Matron Porter Drive have been quantified at residential receivers off Matron Porter Drive and Victor Avenue and are presented in **Table 4**. To determine internal noise levels, a 10dB reduction across the building façade was applied, consistent with guidance from the Noise Policy for Industry (NPI) (EPA, 2017) and Environmental Noise Management Manual (ENMM) (RTA, 2000).

The results of the assessment demonstrate that noise levels from dog off-leash activities on Narrawallee Beach are anticipated to be below the AS/NZS 2107:2016 internal design sound levels for the current median and maximum dog usage rates, as well as the 60% increase (+2dB) scenario.

Table 4 Noise Predictions – All Receivers

Scenario	Internal Predicted Noise Level Range, dB LAeq(period)	Noise Limits, dB LAeq(period) ¹		Compliant
		Living Areas	Sleeping Areas	
9 Dogs	<25	40	35	✓
60 Dogs	<25 to 26	40	35	✓
96 Dogs	<25 to 28	40	35	✓

Note 1: 10dB reduction for external to internal noise levels based on light framed building with window partially open for ventilation in accordance with NPI and ENMM.

Noise contour plots for external noise levels (ie 10dB attenuation across building facades not applied), are provided in **Appendix B**.

5.2 Dog On-Leash Access

Noise predictions from the dog on-leash access via the Surfers Avenue and Victor Avenue stairs are presented in **Table 5** and **Appendix B**. To determine internal noise levels, a 10dB reduction across the building façade was applied, consistent with NPI and ENMM.

The results of the assessment demonstrate that noise levels from dog on-leash access to Narrawallee Beach via the Victor Avenue and Surfers Avenue stairs are anticipated to be below the AS/NZS 2107:2016 internal design sound levels at all receiver locations.

Table 5 Noise Predictions – All Receivers

Receiver	Internal Predicted Noise Level Range, dB LAeq(period)	Noise Limits, dB LAeq(period) ¹		Compliant
		Living Areas	Sleeping Areas	
Victor Ave	<20	40	35	✓
Surfers Ave	<25	40	35	✓

Note 1: 10dB reduction for external to internal noise levels based on light framed building with window partially open for ventilation in accordance with the NPI and ENMM.

5.2.1 Maximum Noise Level Assessment

In assessing the potential for sleep disturbance effects, a sound power level of 99dBA for a single bark event adopted for maximum noise level (L_{Amax}) events during the night period.

Predicted noise levels L_{Amax} events for assessed receivers are presented in **Table 6**. Results identify that the maximum noise trigger levels will be satisfied for all assessed receivers.

Table 6 Maximum Noise Level Assessment

Receiver	Predicted Noise Level, dB L _{Amax} (internal)	Maximum Trigger Levels, dB L _{Amax} (internal)	Compliant
Victor Ave	48	55	✓
Surfers Ave	51	55	✓

Note 1: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am.

5.3 Road Traffic Noise Assessment

Predicted road traffic noise levels generated by dog owners accessing the Victor Avenue and Surfers Avenue stairs are presented in **Table 7**. The results of the analysis demonstrates that road traffic noise levels from additional traffic generated by dog owners would satisfy the RNP criteria during the day and night periods, assuming up to 10 vehicles in any one hour. Furthermore, where road traffic noise levels are already higher than the assessment criteria, the increase in road traffic noise levels would be up to 1.1dB for receivers on Victor Avenue and up to 0.9dB for receivers on Surfers Avenue. Hence, the potential increases in road traffic noise levels are expected to be below the RNP +2dB increase criterion.

Table 7 Operational Road Traffic Noise Levels

Receiver	Period	Assessment Criteria dB LAeq(period)	Calculated Traffic Noise dB LAeq(period)	Change in Traffic Noise, dB	Compliant
Victor Ave	Day	55 LAeq(1hr)	44.4	0.4	✓
	Night	50 LAeq(1hr)		1.1	✓
Surfers Ave	Day	55 LAeq(1hr)	43.6	0.3	✓
	Night	50 LAeq(1hr)		0.9	✓

Note: Day period: 7am to 10pm; Night period: 10pm to 7am.

6 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment (NA) to quantify emissions associated with the dog off-leash activity and dog on-leash access to Narrawallee Beach, NSW. The assessment has also considered road traffic noise impacts associated with additional traffic on Victor Avenue and Surfers Avenue, as well as potential sleep disturbance effects from dogs barking during the night period / early morning period.

The results of the assessment demonstrated that noise levels from dog off-leash activities on Narrawallee Beach are anticipated to be below the AS/NZS 2107:2016 internal design sound levels for all assessed scenarios. The highest internal noise levels are expected to be up to 28dB LAeq(period) for receivers on Victor Avenue for the 60% increase (96 dogs) scenario.

The assessment of noise emissions from the dog on-leash access to Narrawallee Beach via the Victor Avenue and Surfers Avenue stairs demonstrated that noise levels are anticipated to be below the AS/NZS 2107:2016 internal design sound levels at all receiver locations, with the highest internal noise levels predicted at up to 22dB LAeq(period) for receivers on Surfers Avenue.

An assessment of potential sleep disturbance effects from single bark events during the night period / early morning demonstrated that internal noise levels are not anticipated to exceed the RNP guideline value for maximum internal noise levels at any of the assessed receiver locations.

Road traffic noise levels from additional vehicles on Victor Avenue and Surfers Avenue demonstrated that noise level increases are predicted to be below the +2dB RNP increase criterion at all assessed receiver locations.

Accordingly, the Noise Assessment supports the extension of dog off-leash activities on Narrawallee Beach to 24 hours, and the allowance of dog on-leash access from the Surfers Avenue and Victor Avenue stairs.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

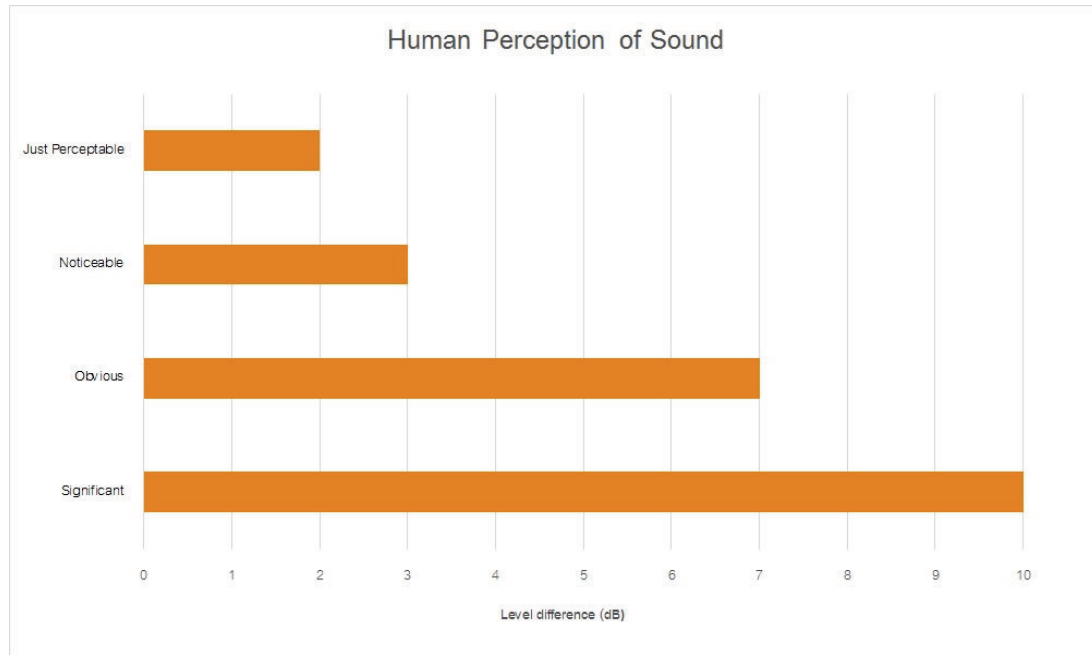
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmx	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Appendix B – Noise Contour Plots

FIGURE B1

Noise Contours

Existing Median (9 Dogs)

Dog Off-Leash Area

MAC262685-01

Narrawallee Dog Beach

KEY

L_{Aeq}(period) Noise Contours

35dB

40dB

45dB

50dB

0 35 70 105 140 m



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FIGURE B2

Noise Contours

Existing Maximum (60 Dogs)

Dog Off-Leash Area

MAC262685-01

Narrawallee Dog Beach

KEY

LAeq(period) Noise Contours

35dB

40dB

45dB

50dB

0 35 70 105 140 m



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FIGURE B3

Noise Contours

60% Increase (96 Dogs)

Dog Off-Leash Area

MAC262685-01

Narrawallee Dog Beach

KEY

LAeq(period) Noise Contours

35dB

40dB

45dB

50dB

0 35 70 105 140 m



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FIGURE B4

Noise Contours
Dog On-Leash Access
MAC262685-01
Narrawallee Dog Beach

KEY

LAeq(period) Noise Contours

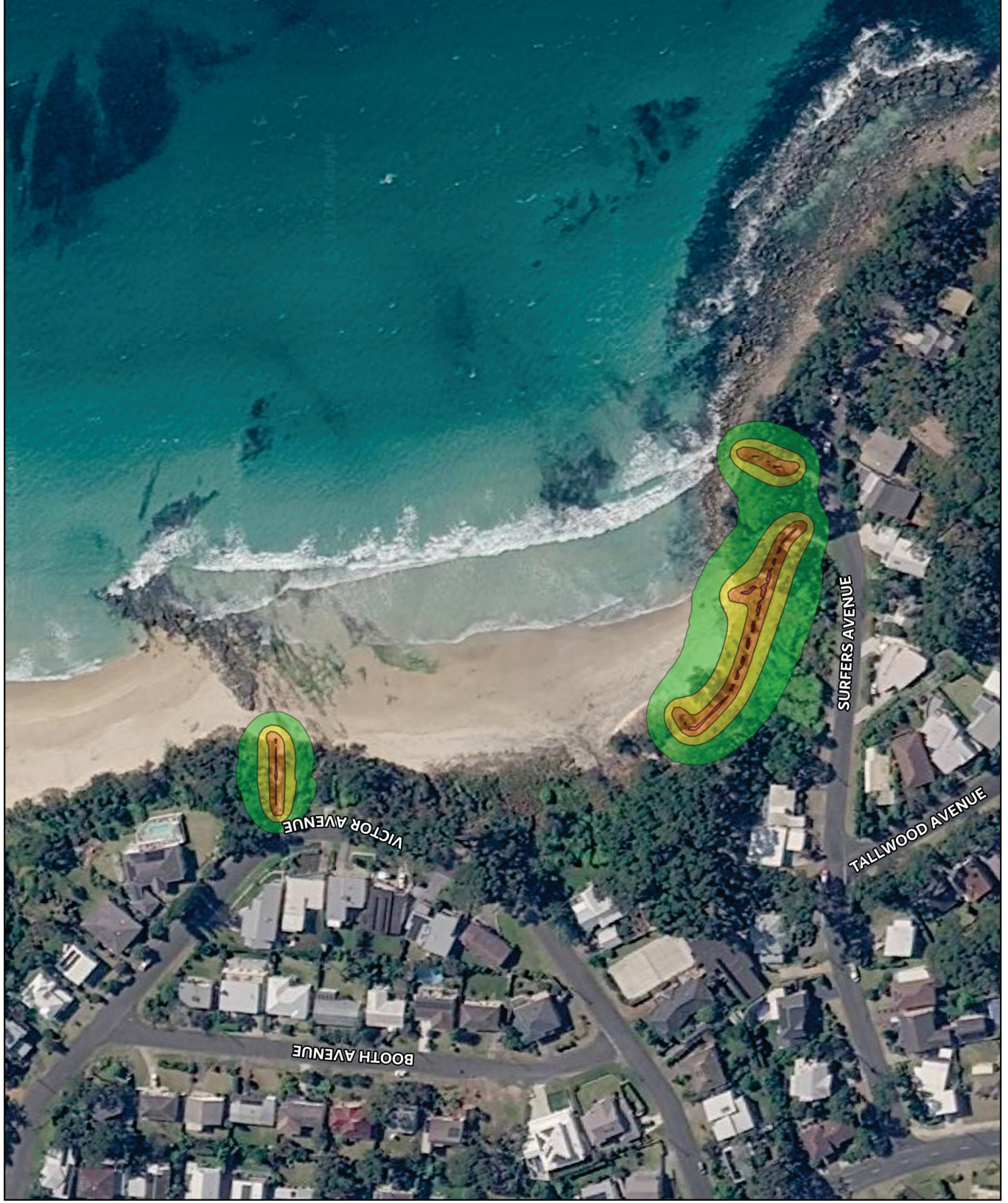
35dB

40dB

45dB

50dB

0 20 40 60 80 m





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