REPORT

Mid-North Coast Boating Investigations Package

MN-15 Back Creek Boating Access Improvements Investigation

Client: NSW Roads & Maritime Services

Reference: M&APA1311R001D02

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Royal HaskoningDHV

Enhancing Society Together

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Table of Contents

1 Introduction 1
1.1 Background 1
1.2 Objectives 1
1.3 Scope of Work 1
1.4 Acknowledgements 2
1.4.1 Consultation 2
2 Review of Background Information 3
3 Existing Environment 5
3.1 Planning Context 5
3.1.1 Land Ownership 5
3.1.2 Local Government 5
3.1.3 State Environmental Planning Policies 6
3.1.4 State Legislation 7
3.1.5 Commonwealth Legislation 8
3.2 Estuarine Processes 9
3.2.1 Wind Climate 9
3.2.2 Water Depths 12
3.2.3 Shoreline Morphology 12
3.2.4 Water Levels 13
3.2.5 Wave Action 15
3.2.6 Currents 15
3.2.7 Sediments and Sediment Transport 16
3.2.8 Water and Sediment Quality 16
3.3 Navigation 17
3.4 Shoreline Structures 18
3.5 Services 19
3.6 Ecology 19
3.7 Heritage 20
3.8 Foreshore Access and Traffic 22
4 Demand Assessment 24
4.1 Population and Tourism Trends 24
4.2 Boating Trends 24
4.3 Current Usage and Future Needs 24
5 Adequacy of Existing Boating Facilities 26
5.1 Regional Facilities 26

5.2 Back Creek 26
6 Opportunities and Constraints for Improved Boating Access 29
6.1 Entrance Bar 29
6.2 Available Vessel Draught 30
6.3 Manoeuvrability of Vessels 31
6.4 Access, Parking and Amenities 32
6.5 Waterway Structures 33
6.5.1 Boat Ramp 33
6.5.2 Wharf 34
6.6 Planning and Environmental Considerations 35
7 Boating Improvement Concept Options 37
7.1 General 37
7.2 Development of Existing Boat Ramp within Back Creek 37
7.2.1 Initial Concept Plan 37
7.2.2 Summary of Consultation Feedback 39
7.2.3 Final Concept Plan 39
7.3 Development of Existing Wharf along Buchanan Drive 39
7.3.1 Initial Concept Plan 39
7.3.2 Summary of Consultation Feedback 40
7.3.3 Final Concept Plan 40
7.4 New Facilities within Back Creek 40
7.4.1 Initial Concept Plan 40
7.4.2 Summary of Consultation Feedback 41
7.4.3 Final Concept Plan 41
7.5 Pedestrian / Public Access Connections 41
7.6 Preferred Concept Options 42
7.7 Further Studies and Investigations 42
8 References 43

Table of Tables

Table 1: Tidal Planes at South West Rocks (MHL, 2012) 13
Table 2: Non-indigenous heritage items listed in Kempsey LEP 2013 21

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Table of Figures

Figure 1 South West Rocks Precincts, Kempsey DCP (2013) 6
Figure 2: Winter wind rose at Smokey Cape Lighthouse weather station 10
Figure 3: Summer wind rose at Smokey Cape Lighthouse weather station 11
Figure 4: Coastal inundation of Back Creek (BMT WBM, 2013) 14
Figure 5: Tidal discharge at Back Creek boat ramp and at the creek entrance (MHL, 1977) 15
Figure 6: Acid sulfate soil map of South West Rocks Note: Red and pink shaded areas denote areas with high probability of ASS 17
Figure 7: RMS boating map – Back Creek 18
Figure 8: Artist's impression of new fishing platform currently being constructed by DPI-Lands 19
Figure 9: Historical concrete steps leading up to the Boatman's Cottage 21
Figure 9: Proposed Back Creek Cycleway (KSC, 2016) 23
Figure 10: Back Creek boat ramp, 7 April 2016 27
Figure 11: Bank erosion adjacent to Back Creek boat ramp, upstream (left) and downstream (right), 7 April 2016 28
Figure 12: Side view of typical cruise ship tender vessel 32
Figure 13: Proposed Back Creek All Ability Access Ramp (Source: Kempsey Shire Council) 33

Appendices

Appendix A: Maps
Appendix B: Stakeholder Engagement Plan
Appendix C: EPBC Act Protected Matters Report
Appendix D: BioNet Atlas of NSW Wildlife database search results
Appendix E: Back Creek Public/Pedestrian Access Study

1 Introduction

1.1 Background

Royal HaskoningDHV (RHDHV) has been engaged by Roads and Maritime Services (RMS) on behalf of Kempsey Shire Council (Council) to investigate recreational boating needs at Back Creek, South West Rocks. The investigation has been proposed to address several issues at Back Creek including:

- entrance and channel navigability;
- manoeuvrability of applicable vessels;
- the standard of boat launching facilities upstream of Humpty Back Bridge;
- balancing the needs of passive recreation users and motorised watercraft;
- ease of foreshore access; and,
- car parking and amenities.

Map 1 (**Appendix A**) provides a summary of the key features within the study area for the investigation.

1.2 Objectives

The objectives of the investigation are to:

- identify opportunities to better meet current and future recreational boating needs of the community;
- develop three (3) concept options for boating infrastructure improvements; and,
- determine how the boating infrastructure options integrate with the surrounding area and would be accessed, utilised and capitalised by the community; and,
- identify the feasibility of cruise line tenders to access Back Creek.

1.3 Scope of Work

The scope of work completed as part of the investigation included the following main tasks:

- review of background information;
- initial consultation with Council, community and government agency stakeholders;
- appraisal of existing environmental conditions;
- assessment of boating demand, condition of existing boating facilities and site requirements to meet future needs;
- identification of concept options for boating infrastructure development;
- conduct a study into pedestrian/public access connections to the town;
- identification and costing of further studies, design and construction of the concept options;
- face-to-face consultation with community stakeholders; and,
- finalisation of concept plans.

1.4 Acknowledgements

RHDHV gratefully acknowledges the assistance provided by Council staff and RMS in facilitating access to background information and reviewing the deliverables for the investigation.

1.4.1 Consultation

A number of stakeholders were consulted as part of the investigation to establish current issues and demands and future needs for boating infrastructure, and to provide feedback on the development of concept options. These stakeholders are identified within the Stakeholder Engagement Plan (refer **Appendix B**) and their valuable contributions to the preparation of the concept plans are outlined within **Sections 7.2.2**, **7.3.2** and **7.4.2** of this report.

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2 Review of Background Information

As part of the investigation a wide range of background information was reviewed to establish an understanding of the existing environment and opportunities and constraints associated with boating infrastructure. The information that was compiled as part of the investigation is listed below.

Council GIS data layers:

- cadastral boundaries;
- Council Land, Council-controlled Crown Land and Crown Land;
- Land zoning;
- SEPP14 wetland boundaries;
- marine vegetation mapping;
- terrestrial vegetation mapping;
- heritage areas;
- land contours;
- stormwater drainage;
- aerial photography.

RMS GIS data layers:

- navigation aids;
- navigation restrictions.

Mapping Data:

- South West Rocks Acid Sulfate Soils Map (DLWC, 1997)
- Boating Map 4B for Lower Macleay River Area (RMS, 2009)

Background Reports:

- Back Creek South West Rocks Sustainability Assessment Report (Letcher et. al., 2007);
- Macleay River Estuary Management Plan – Marine Infrastructure Assessment (GeoLINK, 2010);
- South West Rocks Fishing Port Investigation (Soros-Longworth & Mackenzie, 1978)
- Regional Boating Plan: Mid-North Coast Region (Transport for NSW, 2015)

Design Standards and Guidelines:

- AS 3962-2001 Guidelines for Design of Marinas
- AS 1428.1-2001 Design for access and mobility Part 1: General requirements for access – New building work
- AS 2890 Parking Facilities

- Coastal Engineering Manual (USACE, 2008)
- NSW Boat Ramp Facility Guidelines (RMS, 2015)

Environmental, Recreation and Tourism Data:

- Macleay River Estuary Processes Study (WMA Water, 2009);
- Kempsey Coastal Processes and Hazards Definition Study (BMT WBM, 2013)
- OEH NSW Tidal Planes Analysis: 1990-2010 Harmonic Analysis (MHL, 2012)
- NSW Boat Ownership and Storage: Growth Forecasts to 2026 (NSW Maritime, 2010)
- Tourism data within LGA Profile – Kempsey (Destination NSW, 2014)
- AHIMS Extensive Search – Site list report (OEH, 2016)
- RMS Mooring Licence and Vessel Registration Data (RMS, 2016)
- Bureau of Meteorology wind data from Smokey Cape Lighthouse (Station No. 059030)

Council and State planning documents:

- Kempsey Local Environment Plan 2013
- Kempsey Development Control Plan 2013
- Pedestrian Access and Mobility Plan (KSC, 2016);
- Plan of Management Horseshoe Bay Reserve South West Rocks (KSC, 2014)
- South West Rocks Urban Design Study and Town Centre Master Plan (Rupert G.H. Milne Home Landscape Consulting, 2013)
- Draft North Coast Regional Plan (NSW Department of Planning & Environment, 2016)

Full reference listings for key documents are provided in **Section 8**.

3 Existing Environment

3.1 Planning Context

3.1.1 Land Ownership

As shown on **Map 2.1** (**Appendix A**), the majority of foreshore land along Back Creek is Crown Reserve apart from land around New Entrance Road Bridge and an area of unreserved Crown land behind the Mayta Moran Close properties. It is understood that the Mayta Moran Close area is a former Aboriginal mission.

The Back Creek waterway below the mean high water mark is also unreserved Crown land.

Areas of Crown Reserve exist adjacent to the shorelines of Back Beach and Horseshoe Bay, as well as the small island located around 100 m west of Humpty Back Bridge.

Any works proposed to be undertaken on Crown land or Crown Reserve would require landowners consent and a licence for the use of Crown land from the NSW Land and Property Management Authority (LPMA).

3.1.2 Local Government

As shown on **Map 2.2** (**Appendix A**), the creek foreshores are either zoned E2 Environmental Conservation or RE1 Public Recreation under the *Kempsey Local Environmental Plan (LEP) 2013*. The creek waterway is zoned W1 Natural Waterways.

Under the Kempsey LEP, a range of privately developed boating infrastructure and facilities are permissible with consent in the W1, RE1, E2 and R1 zones. This includes:

- boat launching ramps;
- jetties; and
- wharf, or boating facilities.

Furthermore, provision of public access for recreational uses is consistent with RE1 zone objectives, and W1 zone objectives provide support for access for recreational fishing.

The *Kempsey Development Control Plan (DCP) 2013* divides the town centre into four precincts, as shown in **Figure 1**: Precinct P1 Public and Recreation Areas; Precinct P2 Village Commercial; Precinct P3 Tourist Accommodation Area; and Precinct P4 Village Character and Heritage.

Precinct P1 is further broken down into the following sub-precincts:

- Back Creek Foreshore Linear Park and Special Uses Area
- Maritime Heritage Grouping
- Horseshoe Bay Caravan Park
- Remaining open space areas including: Flagstaff Point, Horseshoe Bay Foreshore Park, Point Briner Headland and Trial Bay Park area.

The desired outcomes for the Back Creek Foreshore Linear Park and Special Uses Area are:

- retention of substantial areas of dense vegetation and large trees
- large building setbacks and low level built forms
- the relationship with nearby Maritime Heritage buildings and the Arts Hall (community hall)
- minimal vehicle access points and informal entry ways.



Figure 1 South West Rocks Precincts, Kempsey DCP (2013)

3.1.3 State Environmental Planning Policies

Under *State Environmental Planning Policy (Infrastructure) 2007*, consent is not required for development of wharf or boating facilities carried out by, or on behalf of, a public authority on any land. Furthermore, Division 25, Clause 25 of *SEPP (Infrastructure) 2007 - Waterway or foreshore management activities* states that "development for the purpose of waterway or foreshore management activities may be carried out by or on behalf of a public authority without consent on any land". This includes construction works (including dredging and land reclamation, if it is required for the construction of facilities) and routine maintenance works.

Large sections of the study area are designated as Coastal Wetlands under *SEPP 14 – Coastal Wetlands*, including the waterway upstream of Humpty Back Bridge (refer **Map 2.1**). However, this does not include the foreshore areas where the existing boat ramp is located, and also the foreshore between the existing public wharf and Humpty Back Bridge. Nevertheless, the provisions of *SEPP 14 – Coastal Wetlands* would need to be considered as part of an environmental assessment for any proposed developments in the study area to ensure that the values of coastal wetlands are protected.

SEPP 14 – Coastal Wetlands does not permit clearing, draining or filling of wetlands except with the consent of Council and the concurrence of the Director of the NSW Department of Planning and Environment. Considerations include the environmental effects of the works and consistency with conservation goals. It should be noted that *SEPP 14 - Coastal Wetlands* prevail over *SEPP (Infrastructure) 2007* in the event of any inconsistencies.

This means, for example, activities such as maintenance dredging of navigation channels or dredging in connection with/ or construction of wharf or boating facilities would require Council's consent and other concurrences, approvals and licences, not usually required under *SEPP (Infrastructure) 2007* for boating facilities carried out by, or on behalf of, a public authority. This is discussed further in **Section 3.1.4**.

It should be noted that *SEPP 14 – Coastal Wetlands* will be replaced by the new Coastal Management SEPP as part of the Coastal Reforms that are currently being developed. The draft Coastal Management SEPP contains similar provisions to SEPP 14 with regard to development consent.

3.1.4 State Legislation

The statutory basis for planning and environmental assessment in NSW is set out in the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation* 2000 (EP&A Regulation).

The vegetation mapping (**Map 2.3**, **Appendix A**) indicates that the study area includes endangered ecological communities (EECs) including saltmarsh and coastal wetlands. Saltmarsh EEC occurs along the southern foreshore of Back Creek just upstream of Humpty Back Bridge.

These and any other threatened or endangered species listed under the *Threatened Species Conservation Act 1995* (TSC Act) would require assessment in accordance with the requirements of the EP&A Act as part of any proposed developments in the study area. The assessment of impacts on EECs and threatened species must be carried out in accordance with the *Threatened Species Assessment Guidelines* (DECC, 2007).

Section 5A of the EP&A Act requires a number of factors to be taken into account when considering proposals that affect an EEC including: whether there would be adverse effects on the extent or composition of the ecological community; and whether the works constitute a key threatening process. Key threatening processes, as listed in Schedule 3 of the TSC Act include: alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands; and clearing of native vegetation.

Part 4 of the EP&A Act sets out the development assessment requirements for those developments that require consent. As noted previously, this includes developments in coastal wetlands which cover large portions of the study area including the creek entrance and the shallow area downstream of the boat ramp. Furthermore, these works would be declared as designated development under the EP&A Act and therefore require preparation of an Environmental Impact Statement (EIS). A Species Impact Statement (SIS) may also be required.

Potentially less stringent environmental assessment requirements may apply for any proposed works in sections of the study area that do not contain EECs, although the values of adjacent EECs would still need to be considered as part of the assessment. This includes the foreshore areas where the existing boat ramp is located, and also the foreshore between the existing public wharf and Humpty Back Bridge. As noted previously, the development of wharf and boating facilities in these areas undertaken by or on

behalf of public authorities is permissible without development consent. The environmental impact assessment requirements for such activities are specified under Part 5 of the EP&A Act.

For any works to be undertaken under Part 5 of the EP&A Act, the Minister or public authority which is responsible for deciding whether to approve or proceed with an activity (called a "determining authority", likely in this case to be Council) must examine and take into account to the fullest extent possible all matters which are likely to affect the environment if the activity goes ahead (s. 111 EP&A Act). As such, the works require the preparation of an Environmental Assessment. The factors to be taken into account in the Environmental Assessment are listed under Clause 228 of the EP&A Regulation 2000.

Where it is identified that an activity under Part 5 of the EP&A Act is likely to significantly affect the environment, threatened species, populations, ecological communities or their habitats, an EIS must be prepared and a SIS may also be required. If it is considered that the proposed works are not likely to significantly affect the environment, the Environmental Assessment takes the form of a Review of Environmental Factors (REF).

Zostera seagrass beds occur at discrete locations along the southern bank of Back Creek. However, seagrass is not mapped adjacent to the existing boat ramp and public wharf. Any proposals that involve disturbance or removal of marine vegetation (including mangroves), or activities involving dredging and reclamation work, would require a permit from DPI Fisheries in accordance with the *Fisheries Management Act 1994* (FM Act).

3.1.5 Commonwealth Legislation

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires that proposals for development or "actions" that have, will have, or are likely to have a significant impact on any matter of national environmental significance are to be referred to the Commonwealth Environment Minister for consideration and approval.

The EPBC Act identifies the following matters of national environmental significance (MNES):

- World heritage;
- National heritage;
- Wetlands of international importance (Ramsar);
- Listed threatened species and communities;
- Listed migratory species;
- Protection of the environment from nuclear actions;
- Marine environment.

Several threatened and migratory species occur within the study area (refer **Section 3.6**). Any proposal to undertake works would therefore require (as a minimum) Assessments of Significance for those species, populations and endangered ecological communities that have the potential to be impacted.

3.2 Estuarine Processes

3.2.1 Wind Climate

The wind climate within South West Rocks is best represented by the Bureau of Meteorology (BoM) weather station at Smokey Cape Lighthouse (Station No. 059030). This station is located approximately 6 km away from the entrance to Back Creek. A review of monthly wind roses available on the BoM website (accessed 1 July 2016, refer **Figure 2** and **Figure 3**) indicates that winds are seasonal. This seasonality is characterised following a typical NSW coastal trend of:

- stronger southerly and south- westerly winds in winter;
- northerly winds in summer, and
- both southerly and northerly winds common in autumn and spring.

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Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 30 Sep 2010)

Custom times selected, refer to attached note for details

SOUTH WEST ROCKS (SMOKY CAPE LIGHTHOUSE)

Site No: 059030 • Opened Jan 1939 • Still Open • Latitude: -30.9225° • Longitude: 153.087° • Elevation 117m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.

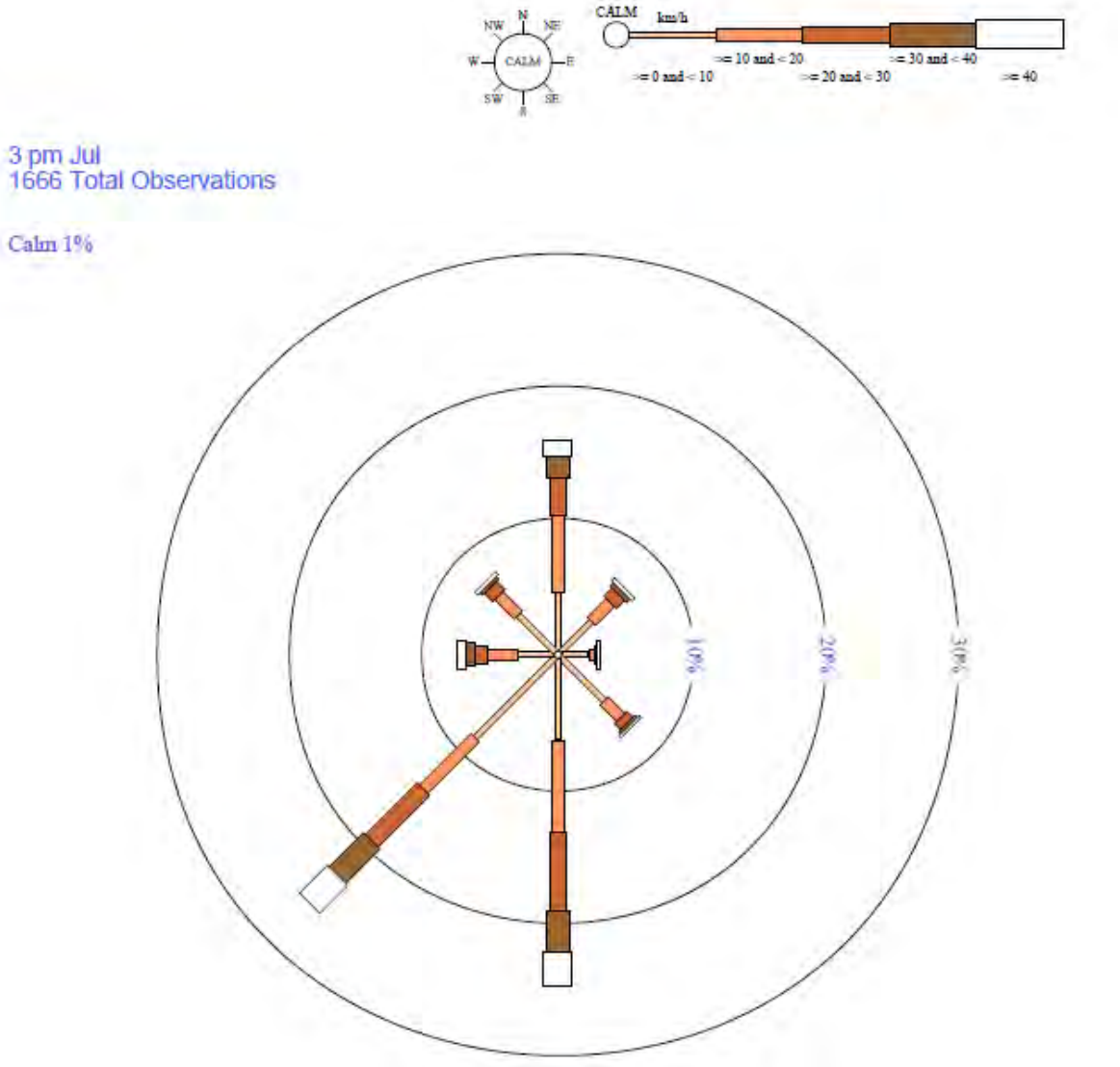


Figure 2: Winter wind rose at Smokey Cape Lighthouse weather station

Rose of Wind direction versus Wind speed in km/h (01 Jan 1957 to 30 Sep 2010)

Custom times selected, refer to attached note for details

SOUTH WEST ROCKS (SMOKY CAPE LIGHTHOUSE)

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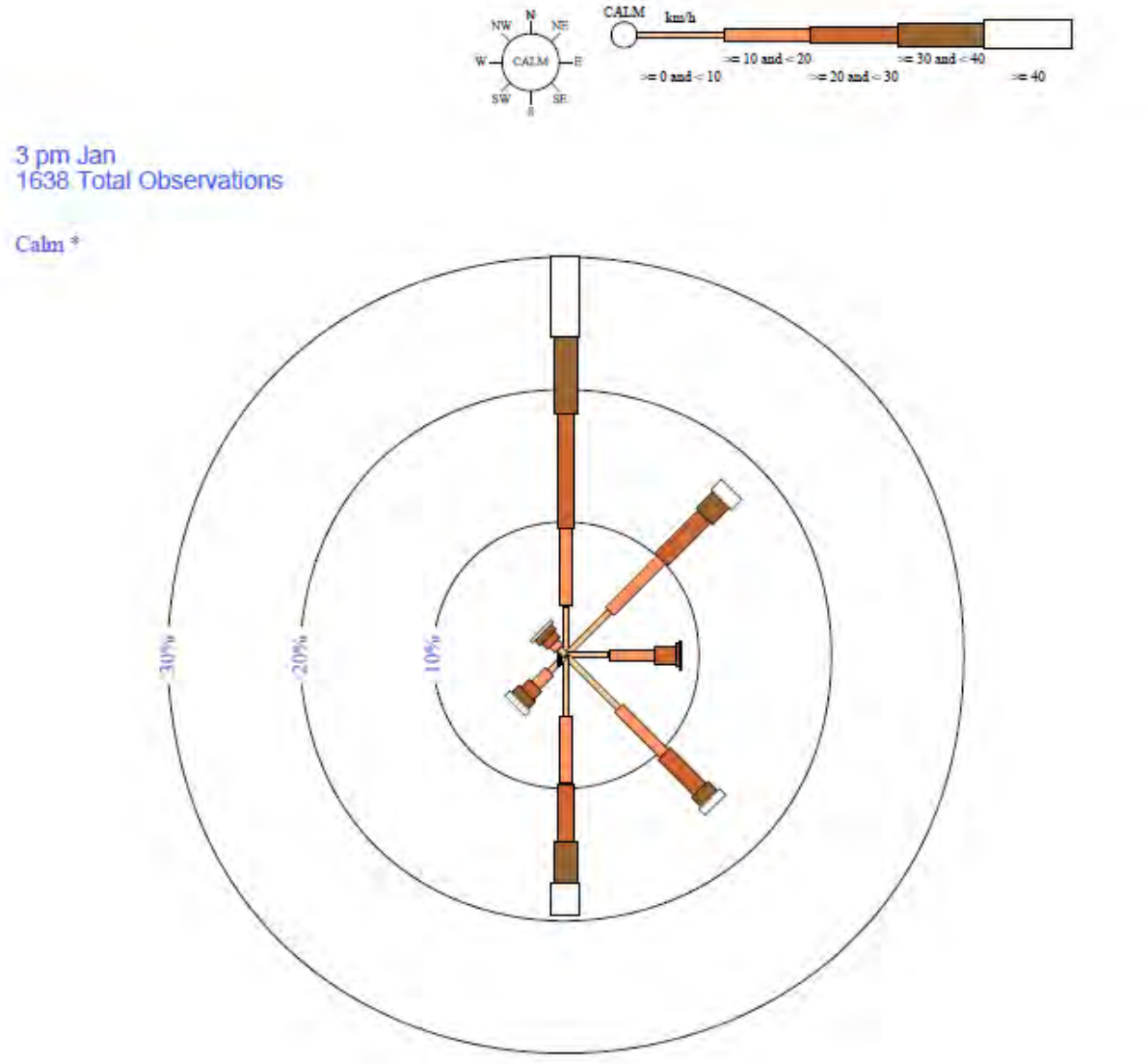


Figure 3: Summer wind rose at Smokey Cape Lighthouse weather station

3.2.2 Water Depths

All reference to Reduced Level (RL) in this report is given in metres above, or below, Australian Height Datum (AHD). AHD is a local datum which is approximately equal to current Mean Sea Level at the coastline of mainland Australia.

A hydrographic survey of the study area was undertaken on 7 and 8 September 2016 by Astute Surveying. The survey coverage and results are indicated on the survey plan provided in **Map 2.5** (**Appendix A**).

Bed levels through the entrance area are around RL -1.3 to -1.5. This means that water depths of around 0.9 to 1.1m occur at Mean Low Water Springs (MLWS) tidal level. MLWS occurs at around RL -0.4 at Back Creek (refer **Section 3.2.4**).

Bed levels of around RL -2.5 occur adjacent to the existing public wharf. Moving upstream, bed levels in the main channel vary as follows:

- downstream of Humpty Back Bridge - RL -1.3 to -1.6 (water depths of 0.9 to 1.2m at MLWS);
- around Humpty Back Bridge - RL -2.5 (water depths of 2.1m at MLWS);
- upstream of Humpty Back Bridge - RL-1.5 to -2 for around 250m, reducing to around RL -1 over the final 350m approach to the boat ramp (water depths of 0.6m to 1.6m at MLWS).

The 100m wide sand shoal located immediately upstream of Humpty Back Bridge is characterised by bed levels of around RL 0.2 to 0.5. As such, water depths of around 0.2m to 0.5m would occur in this area at Mean High Water Springs (MHWS) tidal level. MHWS occurs at around RL 0.7 at Back Creek (refer **Section 3.2.4**). The bed is exposed (i.e. above the water line) under most tidal conditions.

Bed levels immediately downstream of Humpty Back Bridge vary between around RL -0.5 and 0.2. This corresponds to water depths of 0.5m to 1.2m at MHWS, with the bed almost completely exposed at MLWS.

3.2.3 Shoreline Morphology

Back Creek is a typical shallow coastal estuary with intertidal mangroves amongst mud and sand flats. The entrance to Back Creek has been trained with a rock wall extending along both sides of the creek. A bar extends across the mouth of the creek which at low tides can be difficult to cross. The northern side of Back Creek is characterised by a typical dune environment which transitions to an intertidal mangrove estuary upstream of Humpty Back Bridge.

The southern side of Back Creek has been developed with a rock wall lining the foreshore from the entrance to Humpty Back Bridge. A 25 m long public wharf extends over the rock wall at the northern end of Buchanan Drive and is utilised by fisherman and pedestrians. Buchanan Drive is positioned along the rock wall and is utilised by the public as it enables access to the pedestrian bridge over Back Creek. Upstream of the bridge a small tributary exists which is lined by mangroves. Intertidal sand flats exist between the bridge and the upstream tributary.

Upstream towards the existing boat ramp, the bank is lined with trees with a grass flat that the caravan park fringes on. Bank erosion is evident near the boat ramp which may be attributed to boat wash. Upstream from the boat ramp, Back Creek remains undeveloped and is fringed on both sides by mangroves. Back Creek extends inland to within 500m of the main arm of the Macleay River.

3.2.4 Water Levels

Water levels within Back Creek vary primarily in response to astronomical tides, although storm surge (barometric and wind set-up) and freshwater flooding may also influence water levels from time to time. Sea level rise will have a long-term effect on water levels.

The study area is subject to semi-diurnal tides (i.e. two high tides and two low tides per day) that propagate through the Back Creek entrance. An analysis of data collected from the tide gauge at South West Rocks on the Macleay River between 1990 and 2010 was carried out by Manly Hydraulics Laboratory (MHL, 2012) to determine tidal planes. The latest available (2009-2010) tidal planes are summarised in **Table 1**. While this data refers to the Macleay River at South West Rocks, it is considered to also apply to Back Creek given the relative proximity of both locations to the river entrance.

The *Kempsey Coastal Processes and Hazard Definition Study* (BMT WBM, 2013) mapped coastal inundation of Back Creek due to storm surge (refer **Figure 4**). This mapping indicates that the entire study foreshore is at an 'Almost Certain' risk of inundation during the design storm event, over the Immediate planning period .

Table 1: Tidal Planes at South West Rocks (MHL, 2012)

Tidal Plane	Water Level (m AHD)
High High Water Solstice Springs (HHWSS)	1.023
Mean High Water Springs (MHWS)	0.675
Mean High Water (MHW)	0.563
Mean High Water Neaps (MHWN)	0.451
Mean Sea Level (MSL)	0.118
Mean Low Water Neaps (MLWN)	-0.214
Mean Low Water (MLW)	-0.326
Mean Low Water Springs (MLWS)	-0.439
Indian Springs Low Water (ISLW)	-0.687

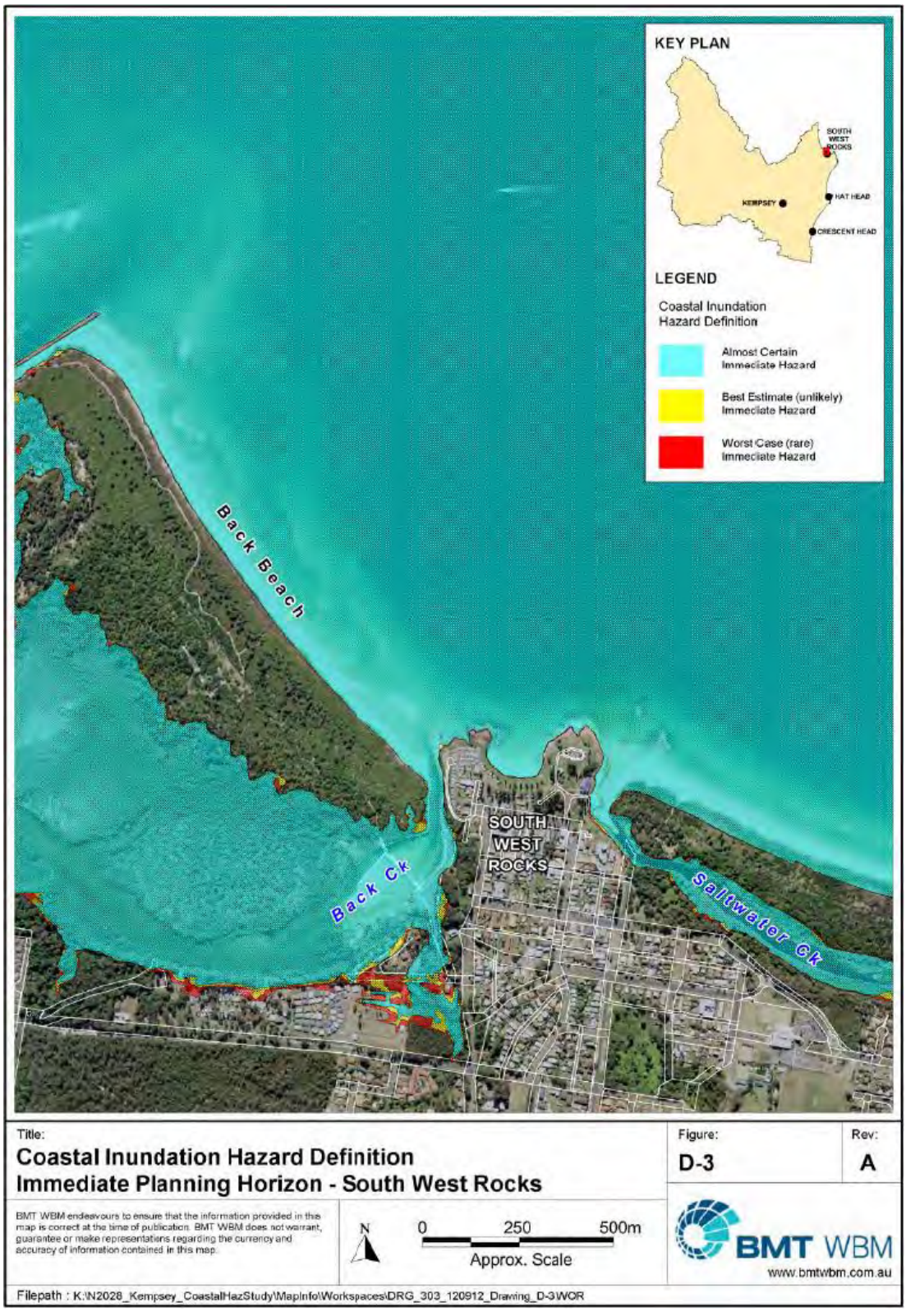


Figure 4: Coastal inundation of Back Creek (BMT WBM, 2013)

3.2.5 Wave Action

Due to its position within Back Creek, the existing boat ramp is sheltered from swell waves that may penetrate through the entrance. During significant northerly swell events, waves may enter the Back Creek estuary impacting an area along Buchanan Drive up to Humpty Back Bridge.

Wind waves that are generated from winds blowing over the surface of the waterway are generally small in height (relative to swell waves) and have a relatively short period (usually between 2 and 3 seconds). The wave height experienced at a particular site depends on fetch length (waterway distance over which the wind blows), water depth, and the wind conditions (speed, direction and duration). Due to small river widths and meandering alignment of Back Creek, shallow subtidal and intertidal areas, wind fetches within the study area would not be expected to allow the generation of significant wave action as a result of wind energy.

The dominant wave energy along Back Creek would be due to boat wake. This is attributed to the transit of larger boats operating out of Back Creek. To reduce boat wakes in Back Creek a 4 knot speed limit has been introduced. While wave monitoring has not been undertaken in the study area, it is understood that large cruisers travelling at low speeds may generate boat wake with wave heights up to 0.5m with short wave periods of 2 to 3 seconds.

3.2.6 Currents

Little information regarding tidal and flood currents is available for Back Creek. A tidal survey of Back Creek was undertaken by Manly Hydraulics Laboratory in 1977 (refer **Figure 5**). The survey found that the maximum tidal flow discharge at the boat ramp was 28m^3/s. This condition occurred on the outgoing tide. A similar flow discharge was recorded at the creek mouth. However, it should be noted that flow is dependent upon sedimentation patterns and size/location of sand shoals, which is variable over time (MHL, 1977).

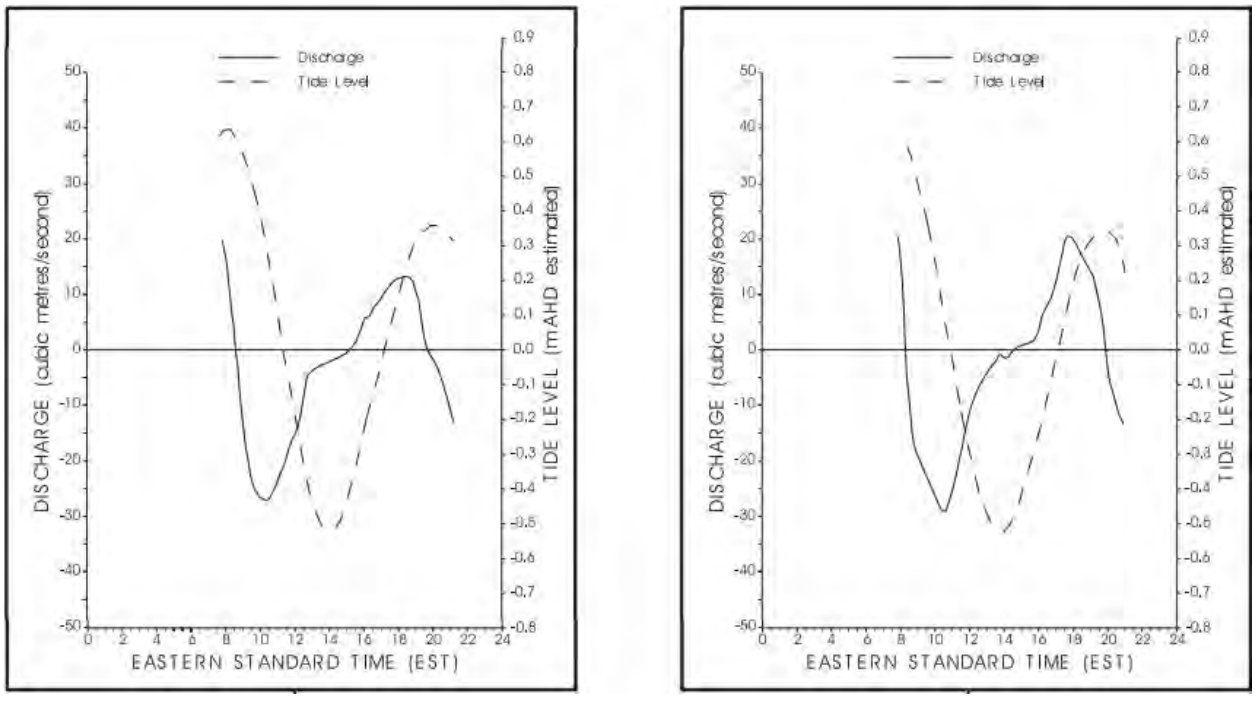


Figure 5: Tidal discharge at Back Creek boat ramp and at the creek entrance (MHL, 1977)

Based on feedback from the stakeholder consultation, it is understood that strong tidal currents occur through the relatively narrow channel between the creek entrance and the existing public wharf at the end of Buchanan Drive. Furthermore, eddy currents are known to occur in the relatively deep section of the channel immediately upstream of the wharf. We are not aware of any data collection activities having been undertaken for currents in Back Creek.

3.2.7 Sediments and Sediment Transport

The *Macleay River Estuary Processes Study* (WMA Water, 2009) conducted sediment analyses of the Macleay River. The composition of sediments in the Macleay Valley is determined by the typical bedrock types in the area, including metasediments, granitoids and basalt. The bed sediments typically show high quantities of quartz with lesser amounts of feldspars and clays. There is a lack of information regarding Back Creek sediments. Accordingly, reference to WMA Water (2009) was made to classify Back Creek sediments.

Due to the proximity of the study area to the coast the sediment would be predominately coastal sands. These sands are comprised of fine well rounded grains of predominately quartz. Back Creek can be classified as a marine tidal zone. The sediment in this zone is marine derived and is typified by intertidal flats with low bank heights. Sand and mud shoals are influenced by individual flood events from the Macleay River spilling over into Back Creek. However, tidal and wind processes dominate the formation of shoals and influence the location of sand banks, mangroves and salt marshes (WMA Water, 2009).

3.2.8 Water and Sediment Quality

Limited information on water quality exists for Back Creek. However, due to Back Creek's small catchment area and isolation from the Macleay River, it is considered that few potential pollution sources exist. Notwithstanding this general observation, urban runoff from the township of South West Rocks after heavy rainfall events has the potential to impact on water quality. A report by Kempsey Shire Council (Council), titled "State of the Beaches 2004-2005", monitored Back Creek for faecal coliform levels for five months. It was found that faecal coliform levels were below the median guideline limit, with relatively elevated levels recorded after periods of heavy rainfall (Beachwatch, 2005).

A review of the Acid Sulfate Soils (ASS) Map for the South West Rocks Area (**Figure 6**) indicates that the majority of the study area is classed as estuarine landforms with a high probability of ASS occurring below ground level. Specifically, the area just downstream of the existing boat ramp to midway along Buchanan Drive is classed as having a high probability of ASS being at or near the ground surface. The majority of the dune on the northern bank of Back Creek and in the intertidal zones to the west of Back Creek is classed as having a high probability of ASS occurring within 1 m of the ground surface.

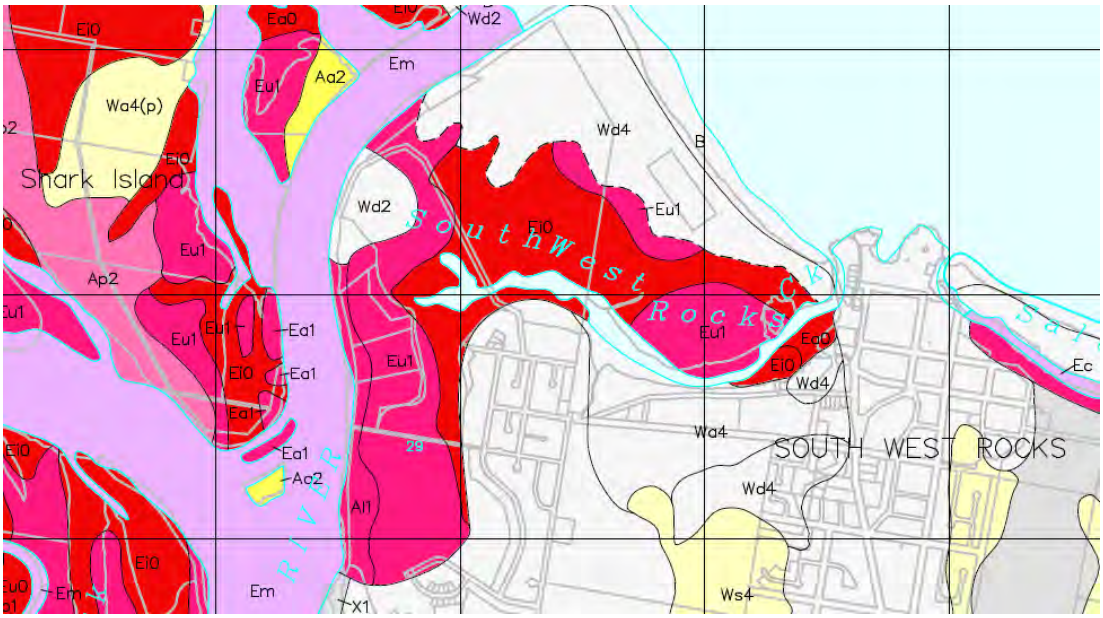


Figure 6: Acid sulfate soil map of South West Rocks
Note: Red and pink shaded areas denote areas with high probability of ASS

3.3 Navigation

A review of RMS boating maps for Back Creek (**Figure 7**) was undertaken to assess navigation within Back Creek. Back Creek is marked with navigation aids in several areas including:

- starboard buoys mark the limit of the channel from the existing boat ramp to upstream of the pedestrian bridge;
- port buoys mark the limit of the channel from the existing boat ramp to upstream of the pedestrian bridge; and,
- a lit port beacon, marks the entrance to the Creek mouth.

In addition to physical markers, the RMS Boating Map for the region warns that the mouth of Back Creek is a “Dangerous Area, Breaks at Times”. A caution for the entrance bar crossing is also given. A speed restriction of 4 knots is in place throughout the length of the waterway. A “No Wash” zone is located upstream of the pedestrian bridge to protect sensitive foreshore areas and to mitigate bank erosion.



Figure 7: RMS boating map – Back Creek

3.4 Shoreline Structures

The boat ramp located adjacent to the South West Rocks Tourist Park is the primary shoreline structure that facilitates boating access at Back Creek. The facility is a two-lane grooved concrete ramp that is subject to relatively low tidal velocities which facilitates single person launching. A large cleared and sealed area is available behind the ramp for access/manoeuvring. The space can accommodate around 40 unsealed car/trailer spaces around the perimeter of the sealed area, although no formal line marking exists.

The 25 m long public wharf extending from the end of Buchanan Drive primarily facilitates land-based fishing. The rock training walls that extend along both sides of the creek entrance also facilitate land-based fishing.

In October 2016, Department of Primary Industries (DPI) - Lands commenced construction of a 25 m long fishing platform attached to Humpty Back Bridge on the footprint of a dilapidated mooring jetty that was demolished in 2015. The new fishing platform is located between the creek channel and sandflat which is exposed at low tide. An artist's impression of the structure is shown in **Figure 8**.



Figure 8: Artist's impression of new fishing platform currently being constructed by DPI-Lands

3.5 Services

A Dial Before You Dig search was undertaken for the study area to identify existing services.

Power is available at the existing boat ramp, with existing lighting provided. Water is currently provided via a connection from the caravan park. Mains water and sewer connections are currently unavailable at the boat ramp. It is understood that the closest available connections are located in Gregory Street. Telecommunications connections are not available at the boat ramp.

Power is available throughout the wharf foreshore reserve, with existing lighting currently provided along Buchanan Drive, as well as over the pedestrian bridge. Mains water and sewer connections are currently unavailable within the wharf foreshore reserve, although connections are available between the wharf and Ocean Drive. Telecommunications connections are not available within the wharf foreshore reserve.

3.6 Ecology

As shown in **Map 2.3** (**Appendix A**), the Back Creek Estuary supports a range of highly valued aquatic habitats including:

- seagrass;
- saltmarsh; and,
- mangrove communities.

The Back Creek foreshore is generally characterised by mangrove forests that stretch the entire length of the estuary. Wetlands exist to the south of Back Creek and to the west near the Macleay River. A Local Environmental Study conducted into an area 1km south of the boat ramp stated that the surrounding wetland comprises wet heathland and shrubland typical of coastal lowlands of the North Coast vegetation type (Wells Environmental Services, 2011).

North of Back Creek, behind the coastal dune, littoral and sub-tropical coastal forest exists. Subtropical coastal forest fringes the wetland to the west of Back Creek (GECO Environmental, 2005). Wells

Environmental Services (2011) found that the sub-tropical coastal forests contained four preferred Koala feed trees which include:

- Scribbly Gum;
- Tallowwood;
- Red Forrest Gum; and,
- Swamp Mahogany.

The study area contains habitat for threatened and international migratory species, identified via a desktop search of the following online databases:

- EPBC Act Protected Matters Search Tool; and
- BioNet Atlas of NSW Wildlife database (minimum 10km search radius).

The EPBC Act Protected Matters Report (**Appendix C**) for the study area listed:

- one (1) threatened ecological community;
- 56 threatened species (of which 22 are listed as endangered or critically endangered); and,
- 48 migratory species (of which 9 are listed as endangered or critically endangered).

The NSW Wildlife Atlas search results for the study area (**Appendix D**) listed 1,016 species of flora and fauna that are known to occur in the immediate vicinity of the study area. This includes 384 species that are protected under the *NSW Threatened Species Conservation Act 1995* (TSC Act).

The wetland and inter tidal areas provide an important foraging ground for many species of birds which include Migratory Waders and Oystercatchers, and the Black-necked Stork. The surrounding mangrove forests provide roosting habitat for many other species of birds.

The Macleay River Estuary Study 2010 which included Back Creek found category 1 weeds exist in lower Back Creek. These weeds include madeira vine, balloon vine, cats claw creeper, spike rush, small-leaved privet, water hyacinth, and bitou bush.

The Macleay River Estuary which is inclusive of the Back Creek is thought to provide habitat for one threatened species of aquatic habitat; the Black Cod. This species is known to inhabit lower river rock walls in the North Coast of NSW. The rock wall that lines the Back Creek estuary is likely habitat for the Black Cod. The estuary would also provide habitat to many other typical coastal aquatic species (GECO Environmental, 2005).

3.7 Heritage

A search of the OEH Aboriginal Heritage Information System (AHIMS) indicated that 23 Aboriginal heritage sites occur in the study area. These primarily include middens located near the creek foreshore within the mangrove stands, and the “Old School Midden” located within the wharf foreshore reserve. There is also an Aboriginal site located between the overgrown access track from Gregory Street and the private road off Gregory Street. It should also be noted that additional unrecorded Aboriginal sites are likely to occur within the study area, possibly including developed sections of the waterway.

Non-indigenous heritage items or places listed in the Kempsey LEP are indicated on **Map 2.1** and listed in **Table 2**.

Table 2: Non-indigenous heritage items listed in Kempsey LEP 2013

Item Number	Description
I74	School of Arts on Gregory Street
I77	Three residences on Memorial Avenue
I78	Monument stones on Memorial Avenue
I79	South West Rocks pilot station complex—comprising the former pilot's house and the remaining 3 former boatmen's cottages, including the South West Rocks Police Station
I80	Flagstaff on Ocean Drive
I81	Monument on Point Briner Foreshore Reserve

In addition, Council staff identified a local historical section of the wharf foreshore reserve (T Dickson, pers. comm., 23/12/16). It consists of a concrete slab and steps up to the Boatman's Cottage as shown in **Figure 9**.



Figure 9: Historical concrete steps leading up to the Boatman's Cottage

3.8 Foreshore Access and Traffic

Existing vehicle access to the foreshore is as follows:

- Maintenance access track off O'Keefe Road to the seaward section of the entrance (currently used for entrance clearing works).
- Public sealed access via O'Keefe Road (fronting Horseshoe Bay Holiday Park) to Point Briner with informal parking around a cul-de-sac.
- Public sealed access via Ocean Drive on the eastern side of the wharf foreshore reserve, terminating to the north of a private road to the foreshore reserve café.
- Private concrete road from Gregory Street to the foreshore reserve café.
- Public sealed access via Buchanan Drive along the wharf foreshore reserve, with informal parking along the roadway.
- Public access via the sealed road off Gordon Young Drive to the public boat ramp and informal parking, at the western end of the South West Rocks Tourist Park.

Existing pedestrian access along the foreshore is as follows:

- Concrete footpath from Horseshoe Bay connecting to a new boardwalk around Point Briner and onto O'Keefe Road.
- Concrete footpath from O'Keefe Road to a pedestrian bridge fronting an old concrete structure (possibly the remains of the old pilot boatshed slipway), then a short section of concrete path connecting to the wharf and Buchanan Drive.
- A footbridge across a small tributary of Back Creek, connecting to Mayta Moran Close via a concrete footpath between two houses.
- From the intersection of Mayta Moran Close and Fig Tree Lane, informal access through the grassed foreshore reserve fronting South West Rocks Tourist Park, to the boat ramp access road.

Pedestrian links to the foreshore/ foreshore parks are as follows:

- Informal access to O'Keefe Road from the north-western end of Horseshoe Bay Holiday Park.
- Concrete footpath from Gregory Street beside South West Rocks Community Hall with a flight of steps down to Ocean Drive.
- Overgrown track from Gregory Street to Buchanan Drive, adjacent to the private concrete road.
- Access to the western side of the entrance via Humpty Back Bridge, with a walking track to the northern side of Back Creek entrance.
- Walking track behind Back Beach to the Macleay River entrance.
- Informal tracks behind residences in Mayta Moran Close.
- Clearing in the foreshore vegetation with bank protection providing direct water access, approximately half way between Fig Tree Lane and the boat ramp.

It should also be noted that the *Pedestrian Access and Mobility Plan – Kempsey Local Government Area* (KSC, 2016) proposes a shared pedestrian/ cycleway linking the Back Creek entrance with the boat ramp and Gordon Young Drive, as shown in **Figure 10**.

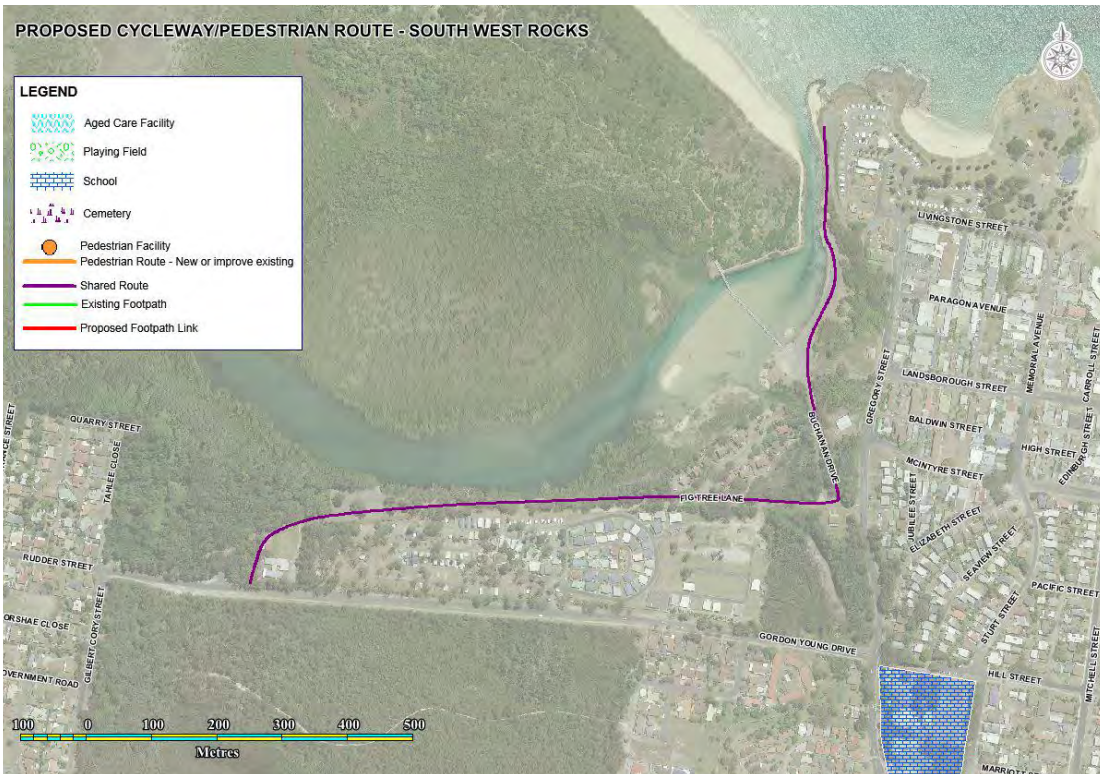


Figure 10: Proposed Back Creek Cycleway (KSC, 2016)

4 Demand Assessment

4.1 Population and Tourism Trends

The demand for boating infrastructure in the South West Rocks area is being driven by population growth and the dependence of these townships on tourism for business and growth.

According to a Population Projections Report by Blueprint Planning Consultants (2012), Kempsey Shire is predicted to grow by around 3,000 people between 2006 and 2031 (from 28,600 to 31,600), with 45% of this growth expected to occur in South West Rocks. The projected average annual population growth rate for Kempsey Shire is 0.42% for the period 2006-2031.

Due to its location, South West Rocks is a major attraction for tourism especially in the summer and autumn months. It could also be said that recreational fishing contributes to tourism within the area as South West Rocks seasonally produces exceptional fishing opportunities. Available tourism data from Destination NSW (2014) indicates that the four year rolling annual average for the number of visitors (overnight and domestic daytrips) to the Kempsey LGA was 496,000 in September 2014. The total annual spend associated with this tourism was estimated at $171 million. As such, it is evident that businesses in the Kempsey LGA benefit significantly from the tourism industry.

4.2 Boating Trends

Based on boat registration data provided by RMS (dated 19 February 2016) for postcodes in the regions surrounding Back Creek (2431, 2440, 2441), there are 2,675 boats with a current or expired registration.

It is also important to consider the surrounding regions of South West Rocks, as during certain times of year these regions would add considerably to boating demand for the study area. The regions of the Mid North Coast have a combined 42,000 boat licence holders which represents 8% of all boating licences in NSW. The *Regional Boating Plan: Mid North Coast Region* (Transport for NSW, 2015) has identified that for the Mid North Coast region there are 20,000 registered recreational vessels, with open runabouts comprising 70% of registered vessels. The majority of vessels are between 2m and 6m in length and therefore classed as trailerable vessels. This regional demand places further pressure on existing boat ramps and parking spaces.

According to the *NSW Boat Ownership and Storage Growth Forecast to 2026* (NSW Maritime, 2010), boat ownership in NSW is expected to grow by 2.9% annually. The report also identified that the North Coast region (inclusive of South West Rocks) would have a 4% growth rate in vessel ownership, exceeding the state-wide growth rate. It also indicated that the North Coast would have greater growth in trailerable vessels. This growth further increases pressure on existing boating infrastructure and heightens demand for new infrastructure.

4.3 Current Usage and Future Needs

The existing boat ramp at Back Creek is primarily used by boat owners as an access point into Trial Bay. The boat ramp is important as it is located close to the caravan park and it provides the best access to Trial Bay rather than via the Macleay River bar or Laggers Point. In general, this is because the Macleay River entrance can be dangerous or impassable on certain swells and tides, while the Laggers Point beach launching ramp at Trial Bay is generally considered to be inadequate for meeting the needs of the boating community (refer **Section 5.1**).

A boat ramp access count took place between 9 April 2016 and 16 April 2016, which revealed that over a weekly period 47 boats used the ramp. The highest daily count was 17 which occurred on a Sunday and the highest hourly total (five vessels) occurred from 1-2 pm on both the Sunday and Tuesday. It must be noted that this count occurred during Term 1 school holidays. However, feedback from the stakeholder consultation indicated that up to around 70 boats may use the ramp in a single day during peak holiday periods. It must also be stated that the use of this ramp is constrained by the available parking.

Further development in the Macleay River area would only increase the demand for boating infrastructure.

5 Adequacy of Existing Boating Facilities

5.1 Regional Facilities

According to RMS there are currently 14 boat ramps within the Macleay River area. However, since the Back Creek ramp is primarily used as an access point for vessels to Trial Bay, there are only two other boat ramps that would reasonably be used as access points to Trial Bay: Mattys Flat boat ramp and the Laggers Point beach launching ramp at Trial Bay.

The Mattys Flat boat ramp, located on the eastern bank of the Macleay River, is a two lane ramp with a central on-ramp pontoon that separates each lane. The boat ramp is protected from currents on both sides. This boat ramp facilitates single person launching and has a large parking facility comprising 46 spaces. The Mattys Flat boat ramp provides access to Trial Bay via the Macleay River entrance bar which can be impassable depending on the swell height, direction and tide (low tide being considerably worse than high tide).

The Laggers Point boat ramp at Trial Bay is a concrete ramp that runs onto the sand. This ramp is sheltered from all but northerly winds and swell, thereby facilitating vessel launching under most conditions. However, a lack of parking exists at the site and the ramp is a point of conflict with the neighbouring caravan park due to noise arising from early morning departures from the boat ramp. A boom gate has been installed to control access hours for the boat ramp.

The Laggers Point boat ramp area is currently being upgraded with funding from a NSW Boating Now grant. The upgrade covers road repairs, drainage and road widening; extra parking for cars and boat trailers; and rehabilitation of the waterfront picnic area.

The Laggers Point boat ramp is subject to siltation and a 4WD vehicle is required to launch vessels to prevent bogging in the soft sand along the beach. This limits the number of vessels that can be launched from this particular boat ramp. Overall, the Laggers Point facility and location is not considered to represent a long-term solution to boating needs in the area.

Back Creek provides the best access to Trial Bay as the entrance bar is protected from all swell and wind directions except from the north. This protection allows vessels out to sea when the Macleay River Bar may be considered too dangerous. Again the entrance bar is best attempted on incoming tides. A description of the existing boating facilities in Back Creek is provided in **Section 5.2** below.

5.2 Back Creek

Back Creek boat ramp (**Figure 11**) is located approximately 1km upstream of the creek entrance, just upstream of the caravan park off Gordon Young Drive. The facility is a two-lane grooved concrete ramp that is subject to relatively low tidal velocities which facilitates single person launching.



Figure 11: Back Creek boat ramp, 7 April 2016

The following observations were made by RHDHV staff during an inspection of the existing Back Creek boat ramp facility in April 2016:

- The facility is a two-lane grooved concrete boat ramp with a 10.2 m usable width and measured slopes of 5.5 degrees at the waterline, 5.5 to 6.0 degrees mid-ramp, and 5.5 to 6.0 degrees at top of ramp (i.e. approximately 1V:10H throughout). These slopes are slightly flatter than the recommended range of 1V:9H to 1V:7H (RMS, 2015).
- A fish cleaning table is provided on the eastern (downstream) side of the ramp. It is a relatively old structure but is still serviceable.
- Good manoeuvring space is available at the head of ramp.
- A wash-down bay is provided on the western (upstream) side of ramp, which is a little too narrow to fit two trailers alongside each other. Wash-down drainage runs back into the creek with no collection pit or treatment.
- A second fish cleaning table is provided behind the wash-down bay, end of concrete base structure appears to have cracked and settled due to undercutting of creek bank
- Three rubbish bins are available along the foreshore adjacent to the ramp.
- A large cleared and sealed area is available behind the ramp for access/manoeuvring. It appears that the area can accommodate around 30-40 unsealed car/trailer spaces around the perimeter of the sealed area, although no formal line marking exists.
- Embankments on both sides of the boat ramp are protected with basalt rock and rock protection extends along creek bank on eastern (downstream) side of ramp with larger sized sandstone boulders used and evidence of bank undercutting behind (**Figure 12**).

- Bank undercutting is also evident on the western (upstream) side of the boat ramp in front of the wash-down bay.
- Large trees line the creek bank on either side of ramp with a mature stand of mangroves existing on the western (upstream) side.
- A picnic table is provided on the grassed area within the middle of the turning circle.
- Opinions expressed by fisherman using the ramp at time of inspection included:
    - could have 20 boats using facility at times (maximum usage)
    - ramp has poor access to ocean (entrance shoals)
    - between boat ramp and footbridge, need to tilt motor up to get out due to shallow water
    - before the rock training walls were constructed, boats could get in and out
    - sand extraction is not helping the entrance
    - should be no walls, as it just helps build up of sand
    - generally can't get in and out of entrance at low tide, when there is no roll (waves) you can idle out
    - toe depth at the ramp is adequate
    - more rubbish bins are needed
    - their boats are too small to exit the Macleay River so they use Back Creek
    - did not like the idea of on-ramp pontoon at Back Creek
    - marking of parking bays is not needed (possibly because ramp is secluded and usage is relatively low)
    - ramp has a good slope.





Figure 12: Bank erosion adjacent to Back Creek boat ramp, upstream (left) and downstream (right), 7 April 2016

Overall, the existing boat ramp facility in Back Creek is considered to be in a serviceable condition and is generally adequate for meeting the needs of user groups. However, the channel between the boat ramp and the footbridge can become quite shallow and present a hazard to safe navigation, while entrance navigability can also be hazardous particularly around low tide.

6 Opportunities and Constraints for Improved Boating Access

6.1 Entrance Bar

The entrance to Back Creek at Point Briner is considered to provide reasonably safe ocean passage, particularly in comparison to the Macleay River entrance bar. Indeed, the Macleay River entrance is currently considered to be unsafe, with the navigation leads and lights recently decommissioned by RMS. This has resulted in increased use of Back Creek for small vessels accessing the ocean.

The entrance to Back Creek is dredged on a near-continual basis. Licencing for entrance dredging is managed by the DPI-Lands. Sand is removed by drag-line and stockpiled onshore to be sold by a Contractor. Sand removal is undertaken on a commercial basis and not for providing safe navigation. Nevertheless, feedback received from stakeholder consultation indicated that current dredging operations are undertaken regularly and have resulted in improved navigation conditions compared to recent years. However, it must be noted that regular dredging cannot be guaranteed in the future, especially if there is insufficient commercial justification for ongoing sand removal.

Despite the ongoing dredging works, the shallow bar and entrance shoals in Back Creek are a navigation hazard that requires management. It is understood that navigation through the entrance is especially limited around low tide, particularly when waves are propagating through the entrance. It is common for small vessels to be manually dragged across the shallow bar around low tide. However, feedback from the consultation indicated that this was not a significant issue due to the small size of vessels that typically access the area.

If the entrance was required to accommodate access for larger vessels, and/or maintained navigable depths under all tidal conditions, significant entrance management works would be necessary. For example, cruise ship tender vessels typically operate with a manned draught of around 1m, and would generally require navigable access at all times.

Options to improve navigation across the entrance bar are outlined below. It should be noted that the implementation of any of these options would be subject to approval by DPI – Lands and availability of funding.

1. Increasing the rate of drag lining. However, the following constraints exist for this option:
    - The drag-lining operations are physically restricted to a fixed distance immediately upstream and downstream of the entrance area due to the available space for operation of plant and equipment.
    - The spatial extent of dredging operations is also limited by the maximum swing of the dredge arm.
    - Based on the above points, there is limited scope for expanding the area within the entrance where dredging works can be undertaken.
    - Existing licensing arrangements do not require the operator to maintain navigable depths. Separate arrangements would be required to satisfy this objective.
2. Regular maintenance dredging. However, the following constraints exist for this option:
    - Expensive, with commitment required for ongoing works.
    - Maintenance dredging operations may conflict with existing commercial operations.

- As noted in **Section 3.1.4**, stringent Environmental Assessment requirements would apply for any proposed entrance dredging works given that this area is classified under *SEPP 14 – Coastal Wetlands*. This is discussed further in **Section 6.6**.
- Based on the above points, it is considered that a Feasibility Study would need to be undertaken to investigate the possibility of dredging the entrance area. The scope of such a study would include the following:
  - assessment of required navigational depths based on vessel type and usage within Back Creek (current and future);
  - assessment of dredging volumes;
  - assessment of the geotechnical properties of bed materials in the study area;
  - options for disposal and/or beneficial reuse of dredged material;
  - description of the legislative and planning approvals framework for implementing dredging works;
  - consideration of alternatives to dredging (e.g. increased drag lining, training structures, sand bypassing, 'do nothing');
  - consideration of opportunities to undertake works as part of any existing government programs (e.g. NSW regional ports strategy that Crown Lands is currently undertaking);
  - costings and construction methodology.

3. Construction/extension of entrance training structures.
   - This would likely involve construction of a training wall on the western side of the entrance, and extension of the eastern training wall.
   - This would be very expensive to construct (several million dollars), and would also require a commitment to ongoing maintenance dredging works.
4. Permanent sand bypassing system, which relocates sand from the entrance area to a location further north along Back Beach. This option would likely be cost prohibitive and therefore has not been considered further.

6.2 Available Vessel Draught

As noted in **Section 3.2.2**, water depths vary between the entrance and the boat ramp as follows (at MLWS):

- entrance area - 0.9m to 1.1m (Note: this does not account for wave action which results in variable water levels that reduce navigation safety);
- downstream of Humpty Back Bridge - 0.9m to 1.2m;
- around Humpty Back Bridge - 2.1m; and,
- upstream of Humpty Back Bridge - 0.6m to 1.6m, with depth reducing moving upstream.

Small vessels up to around 5m to 6m length typically access Back Creek. These vessels typically operate with a draught of around 0.5m to 1m. As such, navigation issues related to available vessel draught arise in the entrance area (refer **Section 6.1**) and also in the area immediately downstream of the boat ramp.

The following is noted regarding the shallow area downstream of the boat ramp:

- Feedback from consultation indicated that vessel navigation through this area is an issue. Vessels can run aground at times, which may require skippers to manually drag their vessels to deeper water.
- Navigation is generally managed by ensuring that the vessels travel slowly within the designated channel and skippers remain vigilant. This is not a major issue for the types of vessels that typically use the waterway.
- A slight deepening of this section of the waterway would improve navigation to and from the boat ramp.
- As noted in **Section 3.1.4**, stringent Environmental Assessment requirements would apply for any proposed dredging works in this section of the waterway given that this area is classified under *SEPP 14 – Coastal Wetlands*. This is discussed further in **Section 6.6**.

6.3 Manoeuvrability of Vessels

The navigation channel between the boat ramp and bridge is up to around 15m wide. However, vessel manoeuvring is restricted by the shallow water depths as described in **Section 6.2**.

Vessel movement under the bridge is restricted by the available overhead clearance. Based on a survey of the footbridge undertaken by the (former) Department of Public Works in 1981, the underside of the footbridge at the crown is at a level of around RL 6. The vertical clearance at MHWS is around 5.3m. The channel width reduces to around 8m under the bridge. This means that only small vessels (5m to 6m with low/no cabin) are able to navigate upstream of the bridge and access the boat ramp. This restricts the types of vessels that are attracted to Back Creek, precluding vessel types such as yachts and small cruisers. However, this is not considered to be a major issue given that the demand for boating facilities is primarily driven by smaller vessels that typically use the waterway at present.

Moving downstream, the navigation channel between the existing wharf and entrance area is less than 10m wide, which is considered to be adequate for existing and future recreational boating needs in the waterway. This width allows for up to two vessels travelling side by side in either direction.

Stakeholders have mooted the possibility of providing infrastructure within Back Creek to accommodate cruise ship tender vessels. It is envisaged that this would involve retrofitting the existing wharf structure at the end of Buchanan Drive (refer **Section 7.2**). These vessels are typically 10m to 15m in length (**Figure 13**), reasonably manoeuvrable, with the ability to turn on their length if required. If such vessels operated from the wharf in Back Creek, their departure path would involve travelling slightly upstream of the narrow (~10m wide) entrance channel, to a point where the channel widens to around 15m to 20m, to facilitate turning. Nevertheless, further widening (dredging) of this turning area may be necessary to accommodate cruise ship tender vessels (or other similar vessels).

The technical feasibility of undertaking dredging operations in this area would be suitably informed by a geotechnical engineering assessment, particularly considering that outcrops of partially submerged rocks are visible in parts of Back Creek and could limit the potential dredge depth. Another important consideration would be the rate of sand infilling due to natural processes. High infilling rates could render non-feasible a proposal which involves dredging in the lower reach of Back Creek.

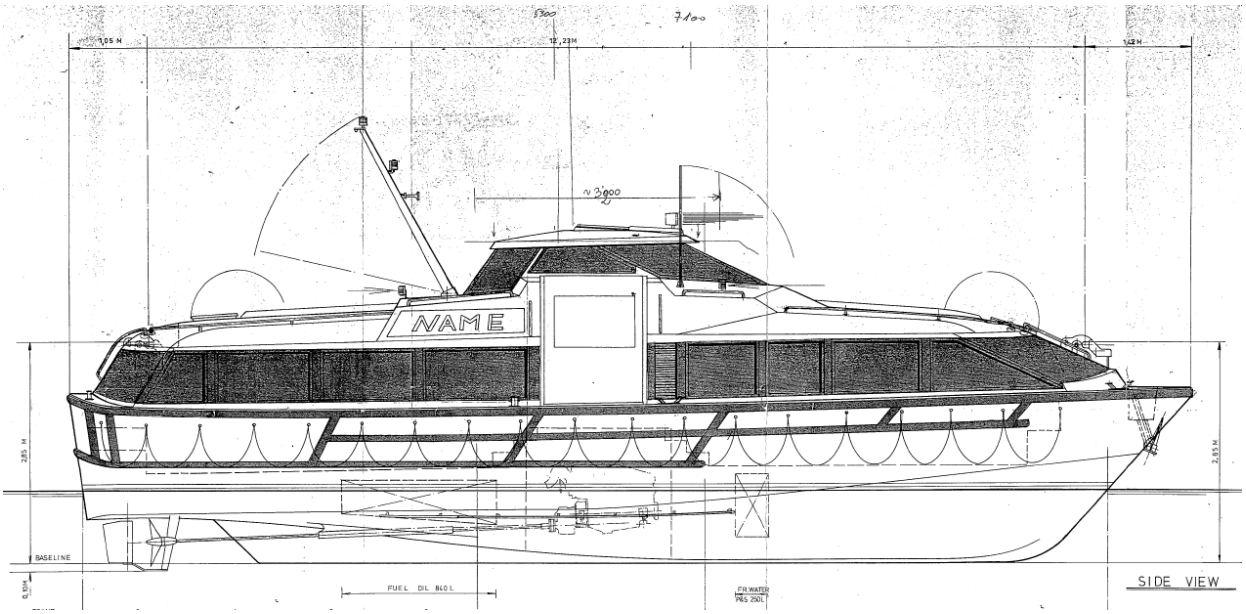


Figure 13: Side view of typical cruise ship tender vessel

6.4 Access, Parking and Amenities

Opportunities include:

- The existing boat ramp has ample space available for the provision of adequate formalised parking. There is also space and services available for other amenities, including fish cleaning tables, wash-down bays, toilet blocks, BBQs etc.
- The existing formal and informal pedestrian and vehicle access routes and parking provide opportunities for additional linkages. Existing and proposed structures; e.g. wharf and fishing platform, also provide direct access to the water's edge and are vantage points to enjoy views of the creek upstream and downstream.
- Part of Buchanan Drive could be readily relocated to the east of the grassed parkland between the wharf and Humpty Back Bridge to create more green space directly adjoining the waterway. This could include formal carparks at each end; i.e. adjacent to the wharf, and adjacent to the café/ Humpty Back Bridge. Part of the existing asphalt roadway adjacent to the creek could then become a shared pathway.
- Based on consultation feedback, it is understood that all-ability access to the foreshore is strongly desired by the local community. There are existing plans for an all-ability ramp in the area immediately downstream of Humpty Back Bridge (**Figure 14**). In addition, there is an opportunity to provide waterway access for passive watercraft (canoes, kayaks, stand-up paddleboards) on the upstream side of the bridge.
- The natural and cultural heritage values of the area provide opportunities for interpretation (e.g. naming the boat ramp access road, reserves and paths to reflect the local maritime or indigenous history).

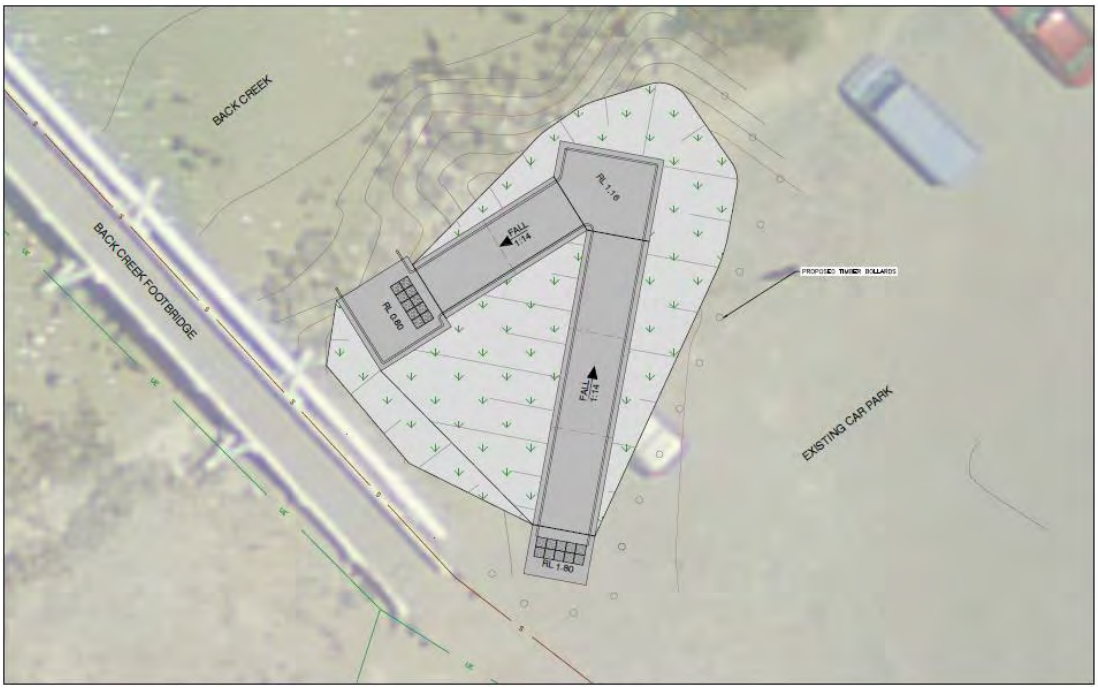


Figure 14: Proposed Back Creek All Ability Access Ramp
(Source: Kempsey Shire Council)

Constraints include:

- There is a steep embankment between the Buchanan Drive foreshore and the town centre which makes provision of access difficult for people with restricted mobility.
- There is a lack of existing amenities at both the boat ramp and the foreshore at the end of Buchanan Drive. The consultation feedback indicated that these facilities are desired by the local community. New facilities should be considered as part of any infrastructure development.
- The foreshore area at the end of Buchanan Drive is understood to be highly utilised, especially during peak holiday periods, with limited parking available. The provision of additional boating facilities would increase the usage of this area, which may result in further congestion and reduce overall amenity.

6.5 Waterway Structures

Opportunities and constraints regarding possible development of the existing boat ramp and wharf facilities are outlined in the sections below.

6.5.1 Boat Ramp

Overall, the existing boat ramp facility in Back Creek is considered to be in a serviceable condition and is generally adequate for meeting the needs of user groups. Concerns have been raised by members of the community regarding the condition of the lower section of the ramp, with large voids presenting a risk of injury to users. In general, it is considered that repairs would be required within the next two years. Upgrading the existing ramp would improve recreational boating amenity in the area.

The advantages of upgrading the existing boat ramp include:

- There is sufficient space available to accommodate the facility, including parking and car/trailer manoeuvring.
- This location is well known and provides easy access to the waterway, particularly from the South West Rocks Tourist Park. Relocating the boat ramp elsewhere in South West Rocks may result in traffic congestion and reduced amenity.
- This location is separated entirely from the passive recreation area near Humpty Back Bridge. Feedback from the consultation has indicated that vessel launching should occur away from this area (i.e. similar to present conditions).
- The bushland setting around the ramp area provides an attractive landing point and picnicking area (if facilitated by tables, bench seats etc.).
- The site is located away from valued *Zostera* seagrass beds, mangroves and saltmarsh. Furthermore, it is not mapped as a SEPP 14 Coastal Wetland area.
- New amenity facilities could be considered as part of the upgrade.

The disadvantages of upgrading the existing boat ramp include:

- Channel navigation issues (**Section 3.3**). While dredging works could address this issue, statutory restrictions apply (refer **Section 6.6**).
- Requires demolition and reconstruction of existing ramp, and implementation of new amenities (fish cleaning tables etc) at substantial cost.

6.5.2 Wharf

The existing public wharf at the end of Buchanan Drive is not conducive to vessel use due to the fixed deck height at around RL 1.5, which does not permit loading and unloading of passengers under most tides (refer **Section 2.3.4**). At present, the wharf is primarily used for fishing. As noted previously, stakeholders have mooted the possibility of retrofitting the existing wharf structure to accommodate cruise ship tender vessels. This could be provided with a floating pontoon and gangway, or a user-friendly fender system.

The advantages of upgrading the existing wharf include:

- Potential for significant commercial opportunities in the local region. Other commercial operators (i.e. apart from cruise ships) could also be attracted to the region.
- The existing wharf could be readily retrofitted at a reasonable cost.
- The wharf location at the upstream end of the entrance channel would likely facilitate the necessary vessel manoeuvring for large commercial vessels, particularly if the pontoon is located slightly upstream of the existing wharf where the channel widens. Otherwise, some widening of the turning area may be necessary.
- Other vessels could make use of the facility as a temporary tie-up location, which would benefit the boating community and provide improved access to the wharf foreshore area. This would include vessels larger than those that typically utilise the Back Creek waterway, such as yachts and small to medium-sized cruisers.

- Emergency services such as Marine Rescue, Surf Life Saving Australia and the Water Police could utilise a retrofitted wharf, which is not currently possible. This would reduce emergency response times and increase the overall level of public safety.
- Existing access provisions could be utilised or readily modified to accommodate increased usage.

The disadvantages of upgrading the existing wharf include:

- Entrance navigation issues (**Section 3.1**) would need to be assessed further to ensure that commercial opportunities associated with upgrading the wharf can be realised. This is a key constraint associated with this option.
- It is understood that strong tidal currents occur through the relatively narrow channel between the creek entrance and the wharf. This may make it difficult to berth vessels within the narrow channel, including the waterway adjacent to the wharf. However, this issue could potentially be avoided by positioning the pontoon slightly upstream of the wharf where the channel widens significantly, although this approach would necessitate dredging works (refer **Section 7.3**).
- It would result in increased vessel activity in the downstream region, which may conflict with passive recreation values expressed by the local community. However, provided the increased vessel activity does not extend to near the bridge, this would not likely be a significant issue.
- If vessels were permitted to tie-up along the entire length of the existing wharf, this would reduce the space available for fishing when vessels utilise the facility, noting that the wharf is currently a popular fishing location. This may result in conflicts between vessel users and land-based fishers. This could be managed by designating a section of the facility as a fishing platform, or retaining a portion of the wharf frontage for fishing.

6.6 Planning and Environmental Considerations

Opportunities include:

- The foreshores are in public ownership and a large part of the southern and eastern foreshore is zoned RE1 in the Kempsey LEP. Provision of public access for recreational uses is consistent with the RE1 zone objectives, and the W1 zone objectives provide support for access for recreational fishing.

Constraints include:

- Sections of the foreshore are zoned E2 where the mapped SEPP 14 wetland extends landward of the creek waterway. The E2 zoned area at the entrance has been modified by entrance works and access tracks, reducing its environmental value.
- Large sections of the study area are designated as *SEPP 14 - Coastal Wetlands*, including the waterway upstream of Humpty Back Bridge and the creek entrance area extending upstream to the existing public wharf. The provisions of SEPP 14 would need to be considered as part of an environmental assessment for any proposed developments in the study area to ensure that the values of coastal wetlands are protected. For example, SEPP 14 does not permit clearing, draining or filling of wetlands. As such, any proposal involving dredging works in SEPP 14 areas would require development consent in accordance with Clause 7 of SEPP 14. Furthermore, the works would be considered designated development and therefore require preparation of an EIS and complementary studies. For example, this would be expected to include an investigation into altered hydrodynamic and morphological processes in the creek system due to the dredging works, and the possible impacts of these changes on coastal wetlands and other ecological receptors.

- The study area includes saltmarsh (listed as an EEC under the TSC Act) around the southern foreshore upstream of Humpty Back Bridge, as well as mangroves which are protected under the FM Act. Relevant legislation and the various environmental planning instruments place restrictions on development and activities and, as such, development in this area should be avoided.
- The majority of the study area comprises sediments with a high probability of ASS occurring within 1m of the ground level. Careful management of ASS would be required for any works that disturb these sediments.
- The recorded Aboriginal sites are protected under the *National Parks and Wildlife Act 1974*.

7 Boating Improvement Concept Options

7.1 General

Three (3) boating infrastructure improvement options are proposed as follows:

1. Upgrading the existing boat ramp within Back Creek, including formalised parking and improved amenities.
2. Development of the existing wharf along Buchanan Drive, including provision of a floating pontoon and gangway to facilitate vessel tie-up immediately upstream of the wharf.
3. Development of a dinghy skid immediately upstream of Humpty Back Bridge to facilitate launching of passive recreation watercraft.

These options are described in detail in the following sections.

It should be noted that consideration was also given to developing a concept option that involved relocating the existing boat ramp to the area downstream of Humpty Back Bridge. An advantage of this option is that the area upstream of the bridge could then be made available exclusively for passive craft use, while also avoiding the channel navigation issues noted in **Section 6.2**. Furthermore, this would reduce the potential for conflicts between swimmers and vessel users in the channel around Humpty Back Bridge. However, this option was not considered to be feasible based on the following:

- A new boat ramp at the end of Buchanan Drive would significantly increase usage of the foreshore wharf reserve, which is already subject to congestion and limited parking during peak holiday periods. This would likely lead to an increased potential for conflict between vessel users and other members of the community, and reduce the overall amenity of this area.
- A new boat ramp would result in increased vessel traffic downstream of the bridge, increasing the potential for conflict between vessel users and passive recreation user groups in this area during peak holiday periods. As noted previously, feedback from community consultation strongly indicated that vessel launching and retrieval should be well removed from this area.
- The cost to develop a new boat ramp would be difficult to justify considering the availability and serviceable condition of the existing facility located less than 1km upstream.

7.2 Development of Existing Boat Ramp within Back Creek

7.2.1 Initial Concept Plan

The initial concept plan for the proposed upgrade of the existing boat launching facility at Back Creek is shown on **Map 3.1** (refer **Appendix A**).

The existing concrete ramp is considered to be in a reasonable condition, although voids are present in the lower portion of the ramp which presents a risk to public safety. The 10.2m width of the ramp is sufficient for accommodating two lanes, while the ramp slope of approximately 1V:10H is adequate. As such, it is proposed that the existing concrete ramp is retained with repairs undertaken in damaged sections as required.

Bank erosion immediately upstream and downstream of the boat ramp would be addressed through the placement of new rip-rap rock protection in exposed sections, and repairs/upgrades to the existing rock protection.

A 1.5m wide on-ramp pontoon would be installed along the upstream side of the ramp to provide a structure for boat holding. The usable width of the ramp would reduce to around 5.7m while the pontoon is in use (based on a 3m width to allow vessel mooring), which would reduce the number of launching lanes from two to one when the pontoon is in use. However, this is not considered to present any significant issues for the anticipated ramp usage.

The pontoon would need to extend beyond the ramp toe to provide a usable berth length at the Design Low Water Level (ISLW, which occurs at around RL -0.7, refer **Section 3.2.4**) of 1.5 times the length of the design vessel in accordance with the *NSW Boat Ramp Facility Guidelines* (RMS, 2015).

Formalised parking could be established in the existing bitumen area opposite the head of the ramp. There is sufficient space to accommodate a total of 28 car and trailer parking spaces. It is noted that the proposed number of car and trailer parking spaces is low compared to the recommendations in RMS (2015), which recommends approximately 25 to 30 spaces per lane. However, the proposed upgraded parking configuration is deemed sufficient based on anecdotal evidence for demand at the facility.

The accessway would be 8m wide to allow sufficient manoeuvring area for access to the adjacent 45 degree car and trailer parking. The car/trailer spaces would be provided with a width of 3m and length of 12.5m in accordance with RMS (2015). Vehicle access throughout the parking area would be one-way. A total of 23 car only spaces are also proposed within the facility on the downstream side of the ramp, including at least two disabled spaces. The new car-only parking spaces would be 5.4m long and 2.6m wide in accordance with AS 2890.

Two (2) rigging and two (2) de-rigging/wash-down bays would be provided to improve the amenity of the boat ramp by reducing congestion around the crest of the boat ramp. The rigging bays would be 3.5m wide and 20m long in accordance with RMS (2015), while drive-through de-rigging bays have been conveniently located opposite the ramp within the carpark. Signage should be provided to advise users that the de-rigging bays are not drive-through parking areas. A garbage facility would be located near the de-rigging bay. Wash down facilities may include a fee for use, which would reduce wastage of water. It is envisaged that such a facility would be favoured by tourists who would be able to wash their boats before travelling home.

Car parking spaces would be positioned on the existing asphalt surface while the trailer bays would be grassed. Grassed areas are preferred to increase water infiltration, reduce runoff and maintain the rural aesthetics of the area. Timber bollards would be installed at the rear of all parking bays to delineate the parking areas and prevent vehicles driving across the proposed shared path.

The existing fish cleaning tables and wash-down bay would be replaced with new facilities. Additional lighting is also proposed immediately downstream of the ramp.

Ancillary amenities that could also be provided include:

- toilet facilities in the reserve area adjacent to car-only spaces on the eastern side of the facility;
- additional garbage facilities at the boat ramp; and,
- additional picnic tables and BBQs within the existing grassed area .

7.2.2 Summary of Consultation Feedback

To be completed following consultation.

7.2.3 Final Concept Plan

To be completed following consultation.

7.3 Development of Existing Wharf along Buchanan Drive

7.3.1 Initial Concept Plan

The initial concept plan for the proposed wharf development is shown on **Map 3.2** (refer **Appendix A**).

This option comprises an aluminium gangway and pontoons, designed for the purpose of unloading/loading of passengers from boats. The structure could also provide tie-up locations for day use.

Consideration was given to locating the pontoon and gangway adjacent to the existing wharf. However, due to the strong tidal currents that are understood to occur in this section of the waterway (refer **Section 3.2.6**), it could be expected that this arrangement may be impractical due to difficulties in restraining vessels.

Therefore, the pontoon has been located approximately 20m upstream of the wharf where weaker currents would naturally occur due to the wider channel. However, existing bed levels in this section of the waterway are around RL -0.5 to RL -1. Based on AS 3962, the minimum depth required adjacent to the pontoon would be around 1.2m for a 6m power boat vessel, increasing to 1.7m for a 15m power boat vessel. Given that the Design Low Water Level (ISLW) occurs at around RL -0.7, the minimum bed level to facilitate berthing of vessels in Back Creek occurs at around RL -1.9 (6m vessel) to RL -2.4 (15m vessel).

Dredging of 1m to 2m depth of sediment would therefore be necessary to achieve the minimum required depths for berthing of vessels adjacent to the proposed pontoon. Ongoing maintenance dredging may also be necessary to ensure sufficient navigable depths into the future. Such a project would require careful consideration of a wide range of environmental, statutory, financial and social factors. As such, a Feasibility Study would need to be undertaken to adequately investigate the prospect of dredging in this area, with a scope similar to that outlined for entrance dredging in **Section 6.1**. In particular, the dredging depth may be limited by the presence of bedrock in this area which may render this option non-feasible. Furthermore, the structural condition of the wharf may need to be assessed.

The pontoons (polyethylene floats, concrete deck, restrained with piles) would be 3.8m wide and extend over a length of 30m. This would enable berthing of up to around four small vessels at a time (i.e. vessels 5m to 6m long), or one to two large vessels (e.g. commercial vessels 10m to 15m in length).

The gangway would be 18m long with a maximum slope of 1V:8H to facilitate assisted wheelchair access in accordance with AS 3962. It should be noted that AS 3962 defines the maximum slope as the slope that would occur at a water level of Chart Datum (RL -0.925), which is below the minimum water level that would be expected to occur at Back Creek (MHL, 2014). In comparison, a gangway slope of around 1V:10H would occur at the Design Low Water Level (ISLW, which occurs at around RL -0.7, refer **Section 3.2.4**).

According to AS 1428.1, the maximum permissible slope for unassisted wheelchair access is 1V:14H. This design slope would also apply if the wharf was to be utilised as a public transport facility. A slope of 1V:14H would not be exceeded for water levels above RL -0.2 (assuming a pontoon freeboard of 0.4m in accordance with RMS (2015)), which at Back Creek occurs around 75% of the time (MHL, 2014).

The upgraded wharf facility would be directly supported by a formalised car park and passenger drop-off bay that utilises the existing bitumen area located adjacent to the foreshore immediately upstream of the wharf. Additional car parking spaces would be provided along the entire length of Buchanan Drive within the wharf foreshore reserve. The new car parking spaces would be 5.4m long and 2.6m wide in accordance with the AS 2890. A total of 80 car-only spaces are proposed within the wharf foreshore reserve as follows:

- 24 spaces immediately upstream of Humpty Back Bridge;
- 34 spaces fronting the café; and,
- 22 spaces along the roadway between the café and wharf.

A turning circle would be provided within the wharf carpark to facilitate vehicles exiting the wharf foreshore reserve. The dimensions of the turning bay would facilitate manoeuvring of a 12.5m long single unit bus.

The passenger drop-off bay would facilitate the movement of large groups of people associated with any commercial boating operations, and could also be utilised by the public as a convenient spot to unload people and equipment for fishing etc.

7.3.2 Summary of Consultation Feedback

To be completed following consultation.

7.3.3 Final Concept Plan

To be completed following consultation.

7.4 New Facilities within Back Creek

7.4.1 Initial Concept Plan

This option would involve construction of a small craft launching facility (dinghy skid) immediately upstream of Humpty Back Bridge. This structure would facilitate launching of passive recreation craft such as canoes, kayaks and stand-up paddleboards.

The initial concept plan for the proposed dinghy skid is shown on **Map 3.2** (refer **Appendix A**).

The proposed dinghy skid structure comprises a 2.5m wide, sloped (1V:8H) enduroplank (or equivalent) deck. The structure would be supported on bearers and joists, and concrete footings or piles, as required.

It is noted that the dinghy skid has not been designed to facilitate disabled access to the foreshore. It has been assumed that this access would be made available via the all-ability ramp currently proposed for the area immediately downstream of the bridge (**Figure 14**). As such, the dinghy skid is considered to be a complementary facility to the all-ability ramp, rather than an alternative option.

However, the dinghy skid design could be modified to facilitate disabled access if required. This would require a flattening of the slope to 1V:14H, the provision of handrails, incorporating landings every 9m, and any other requirements set out in AS 1428.1.

Bank erosion immediately upstream and downstream of the dinghy skid would be addressed through the placement of new rip-rap rock protection in exposed sections, and repairs/upgrades to the existing rock protection.

The small craft launching facility would be supported by a formalised car park that utilises the existing bitumen area located adjacent to the foreshore immediately upstream of Humpty Back Bridge. There is sufficient space to accommodate a total of 24 car parking spaces, including several disabled spaces. The new car parking spaces would be 5.4m long and 2.6m wide in accordance with the AS 2890.

The existing grassed area located on the western side of the bitumen car parking surface could be retained as a picnic area, possibly with picnic tables and other facilities provided.

7.4.2 Summary of Consultation Feedback

To be completed following consultation.

7.4.3 Final Concept Plan

To be completed following consultation.

7.5 Pedestrian / Public Access Connections

The scope of work for these investigations included a study into pedestrian/ public access connections to the town for each of the options identified to determine how the boating infrastructure options at Back Creek integrate with the surrounding area and would be accessed, utilised and capitalised by the community from South West Rocks and surrounding areas.

The Back Creek Access Study is provided in **Appendix E**.

The Access Study identified opportunities and constraints to improve access to boating and foreshore facilities, as well as links from the foreshore to the South West Rocks Town Centre. The recommendations set out below are made. Access concept plans were developed for the study area, as shown in **Maps A1** and **A2** (**Appendix E**).

- Separate pedestrian and vehicle access between the new boardwalk around Point Briner to the path connecting to the footbridge and wharf.
- Formalise parking at the northern end of O'Keefe Road.
- Consider relocating part of Buchanan Drive to the east of the grassed parkland between the wharf and Humpty Back Bridge to create more green space directly adjoining the waterway with formal carparks at each end, i.e. adjacent to the wharf, and adjacent to the café/ Humpty Back Bridge.
- Provide all-tide access for commercial and private vessels to utilise the existing public wharf through the provision of floating pontoons and a gangway (i.e. Option 2 of the boating

infrastructure improvement options, refer **Section 7.3**). This option would be supported by pedestrian and vehicle connections that provide direct access to the town centre.

- Part of the existing asphalt roadway adjacent to the creek could become a shared pathway that provides direct pedestrian access to the town centre.
- Close the Ocean Drive access at the community hall and construct a footpath along the existing vehicle track alignment to connect with the new green space adjacent to creek.
- Provide kayak/ canoe access immediately upstream of Humpty Back Bridge (i.e. Option 3 of the boating infrastructure improvement options, refer **Section 7.4**).
- Create a grassed area fronting Humpty Back Bridge.
- Implement the shared pathway alignment proposed KSC (2016) (**Figure 10**). This pathway would provide a connection between the boat ramp foreshore in the south and the wharf foreshore reserve to the north.
- Reduce the width of Buchanan Drive or use the road shoulder for continuation of the shared pathway to the existing footbridge over the small tributary to Back Creek.
- Construct a new footpath immediately south of the church (opposite the end of McIntyre Street) to connect with the existing footbridge and new shared path.
- Formalise parking at the boat ramp, i.e. provision of separate car and car with trailer parking (i.e. Option 1 of the boating infrastructure improvement options, refer **Section 7.2**).
- All carpark designs to consider provision for overflow parking during peak periods.
- Consider naming the boat ramp access road, reserves and paths to reflect the local maritime history.
- Where possible, pedestrian access should avoid steps and grades should be suitable for mobility scooters (1V:8H maximum slope). Disabled spaces to be designated at all carparks.
- Additional park facilities should also be considered, e.g. picnic tables and amenities blocks.

7.6 Preferred Concept Options

To be completed following consultation.

7.7 Further Studies and Investigations

To be completed following consultation.

8 References

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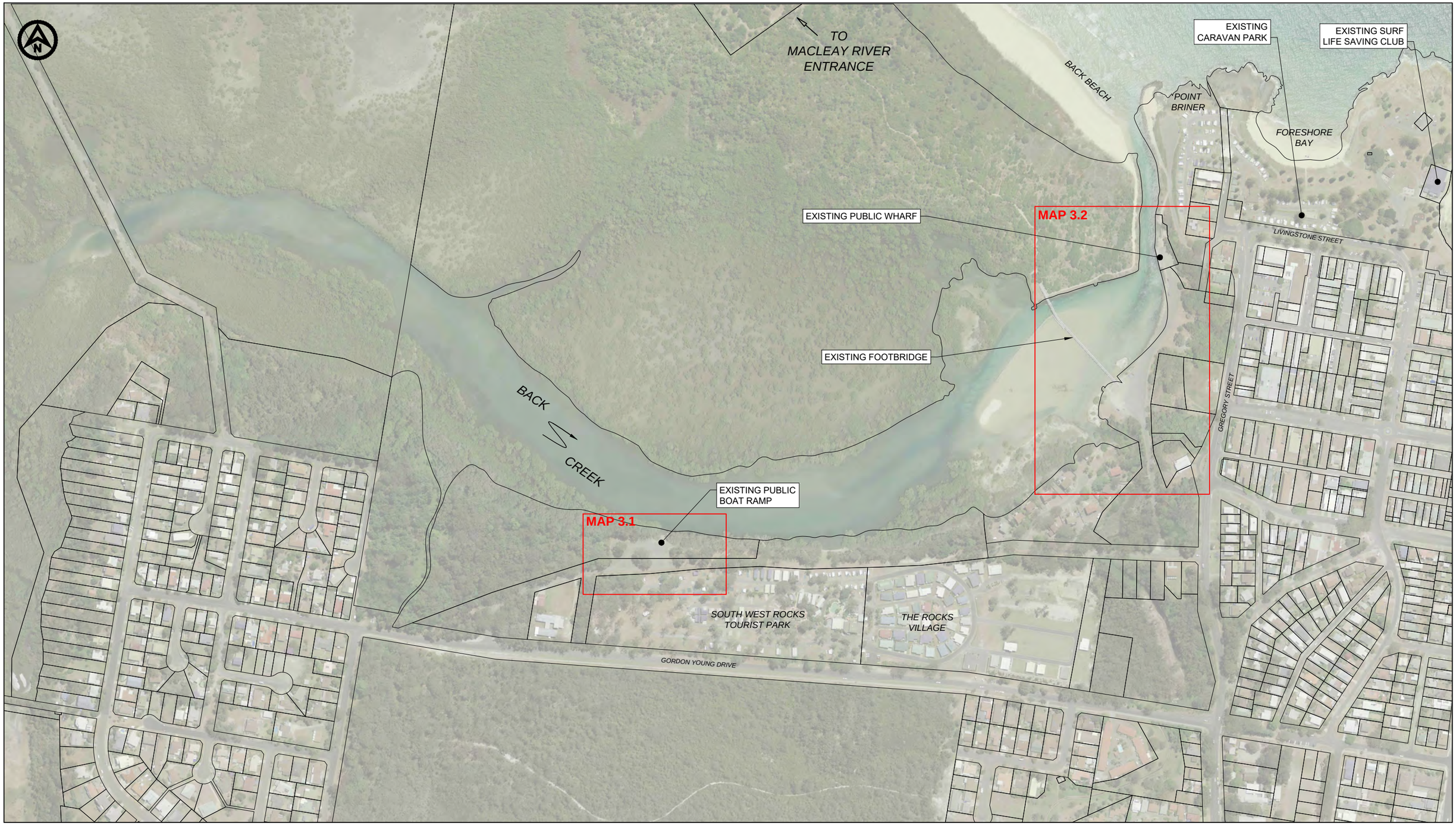
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Appendix A: Maps

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MN-15 - BACK CREEK
STUDY AREA
MAP 1



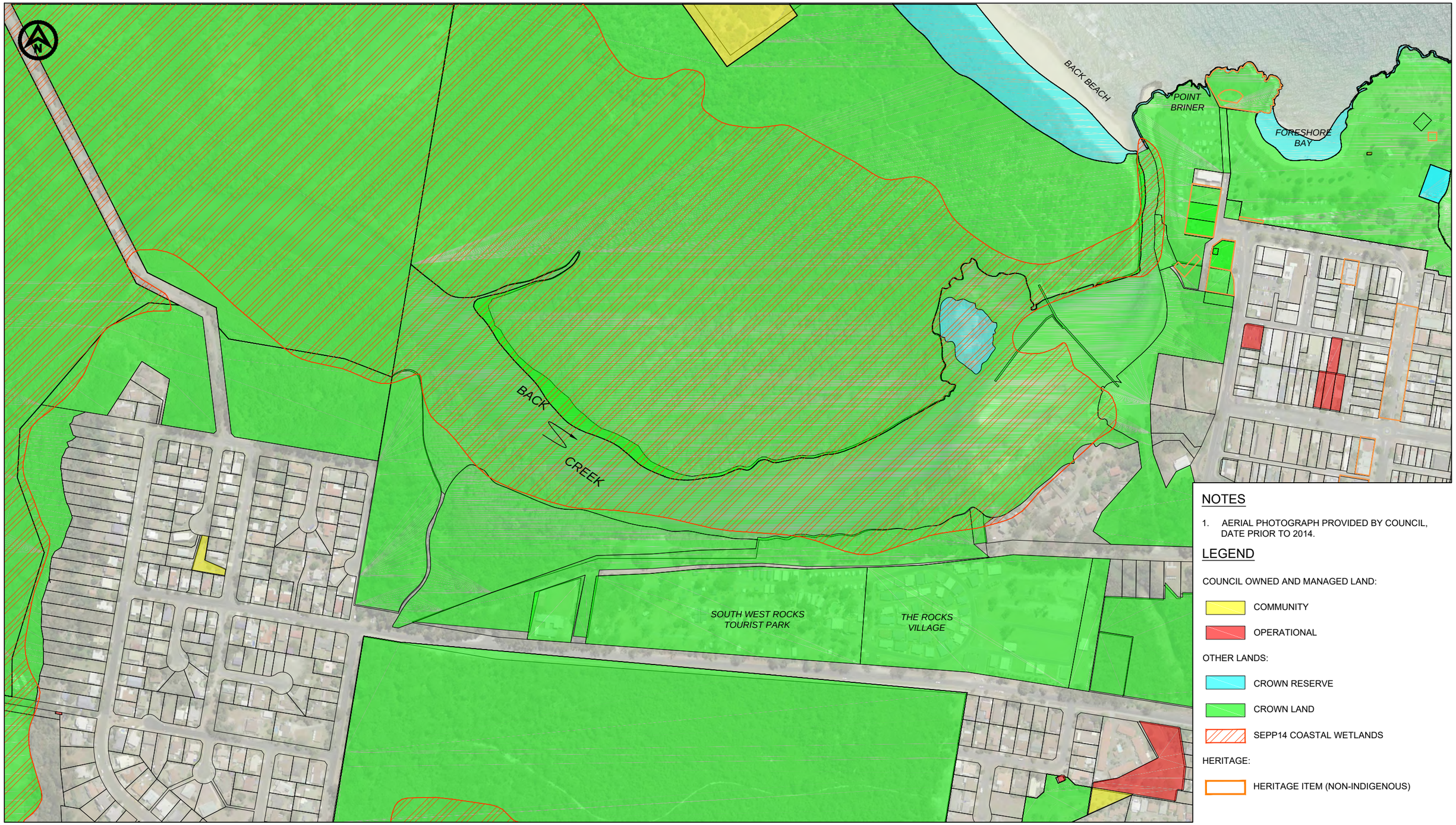
50 0 50 100 150 200 250m
1:2500 (A1) 1:5000 (A3)

NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.

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MN-15 - BACK CREEK
CONSTRAINTS MAPPING
LAND OWNERSHIP AND HERITAGE
MAP 2.1



NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.

LEGEND

COUNCIL OWNED AND MANAGED LAND:

- COMMUNITY
- OPERATIONAL

OTHER LANDS:

- CROWN RESERVE
- CROWN LAND
- SEPP14 COASTAL WETLANDS

HERITAGE:

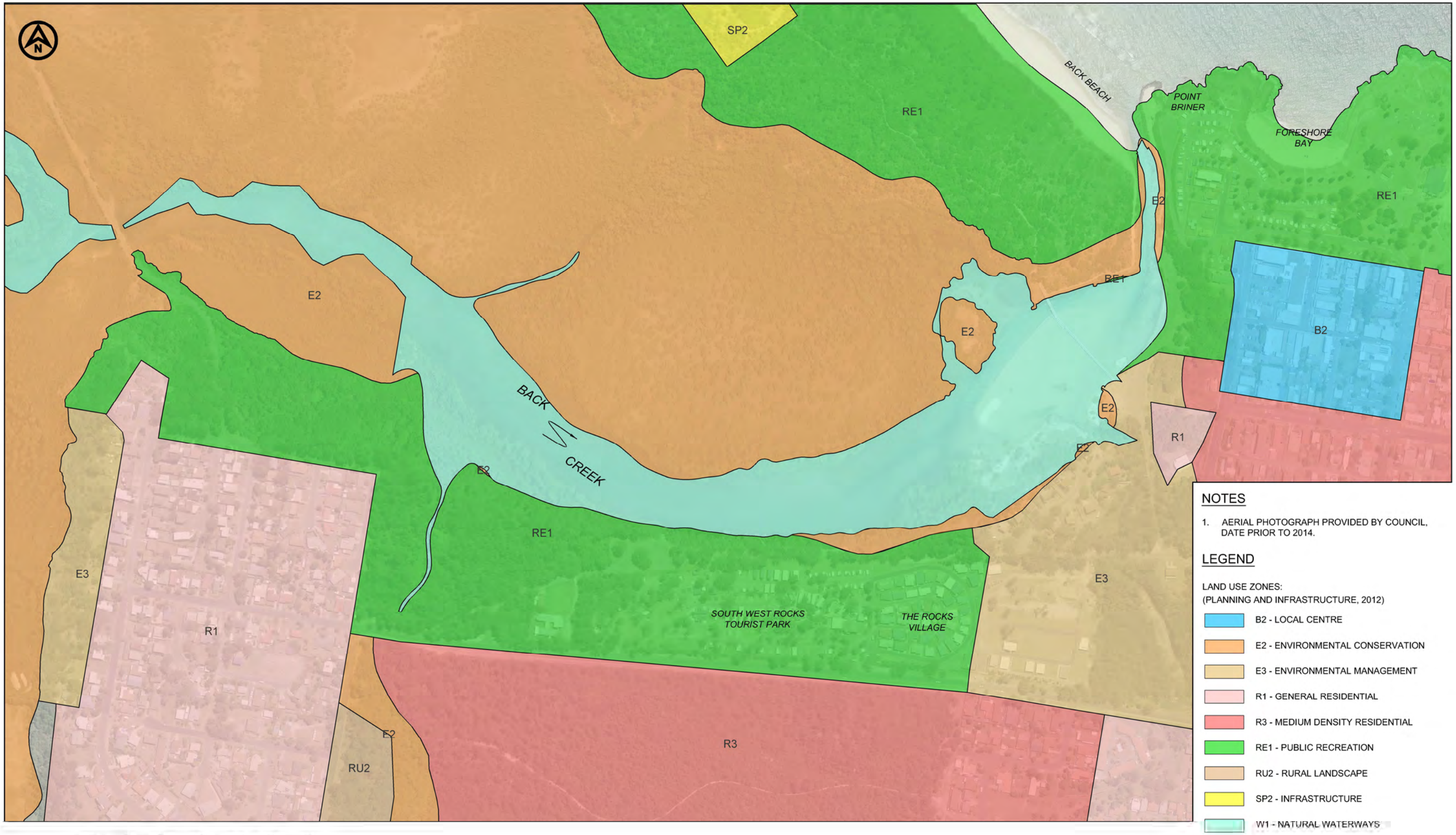
- HERITAGE ITEM (NON-INDIGENOUS)

50 0 50 100 150 200 250m

1:2500 (A1) 1:5000 (A3)

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MN-15 - BACK CREEK
CONSTRAINTS MAPPING
LAND USE ZONES
MAP 2.2



NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.

LEGEND

LAND USE ZONES:
(PLANNING AND INFRASTRUCTURE, 2012)

- B2 - LOCAL CENTRE
- E2 - ENVIRONMENTAL CONSERVATION
- E3 - ENVIRONMENTAL MANAGEMENT
- R1 - GENERAL RESIDENTIAL
- R3 - MEDIUM DENSITY RESIDENTIAL
- RE1 - PUBLIC RECREATION
- RU2 - RURAL LANDSCAPE
- SP2 - INFRASTRUCTURE
- W1 - NATURAL WATERWAYS

50 0 50 100 150 200 250m
1:2500 (A1) 1:5000 (A3)

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MN-15 - BACK CREEK
CONSTRAINTS MAPPING
MARINE VEGETATION
MAP 2.3



50 0 50 100 150 200 250m
1:2500 (A1) 1:5000 (A3)

NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.

LEGEND

MARINE VEGETATION (DPI, 2005):

SALTMARSH AND MANGROVES:

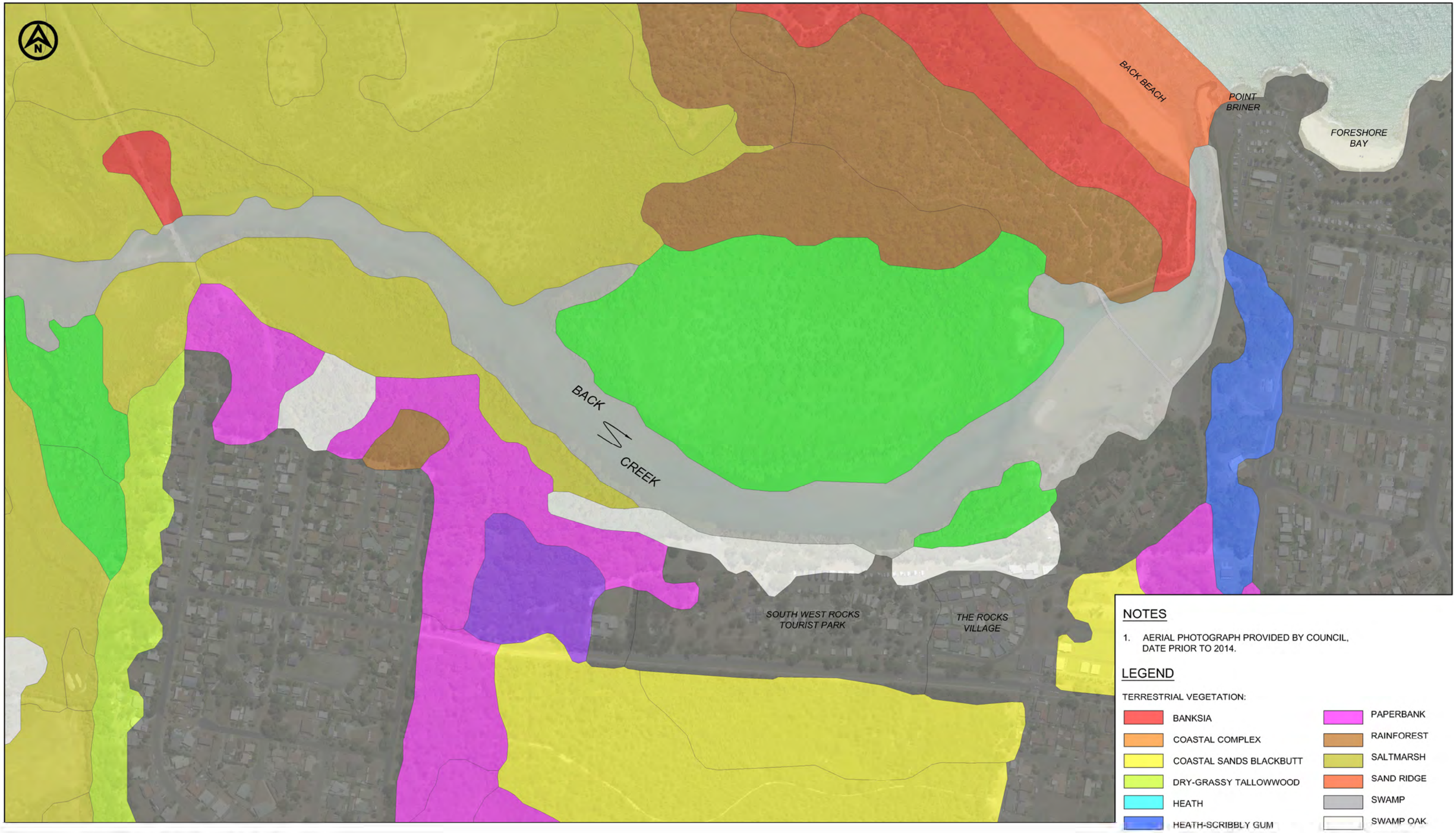
- SALTMARSH
- MANGROVE
- MANGROVE/SALTMARSH

SEAGRASS:

- ZOSTERA

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MN-15 - BACK CREEK
CONSTRAINTS MAPPING
TERRESTRIAL VEGETATION
MAP 2.4



50 0 50 100 150 200 250m
1:2500 (A1) 1:5000 (A3)

NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.

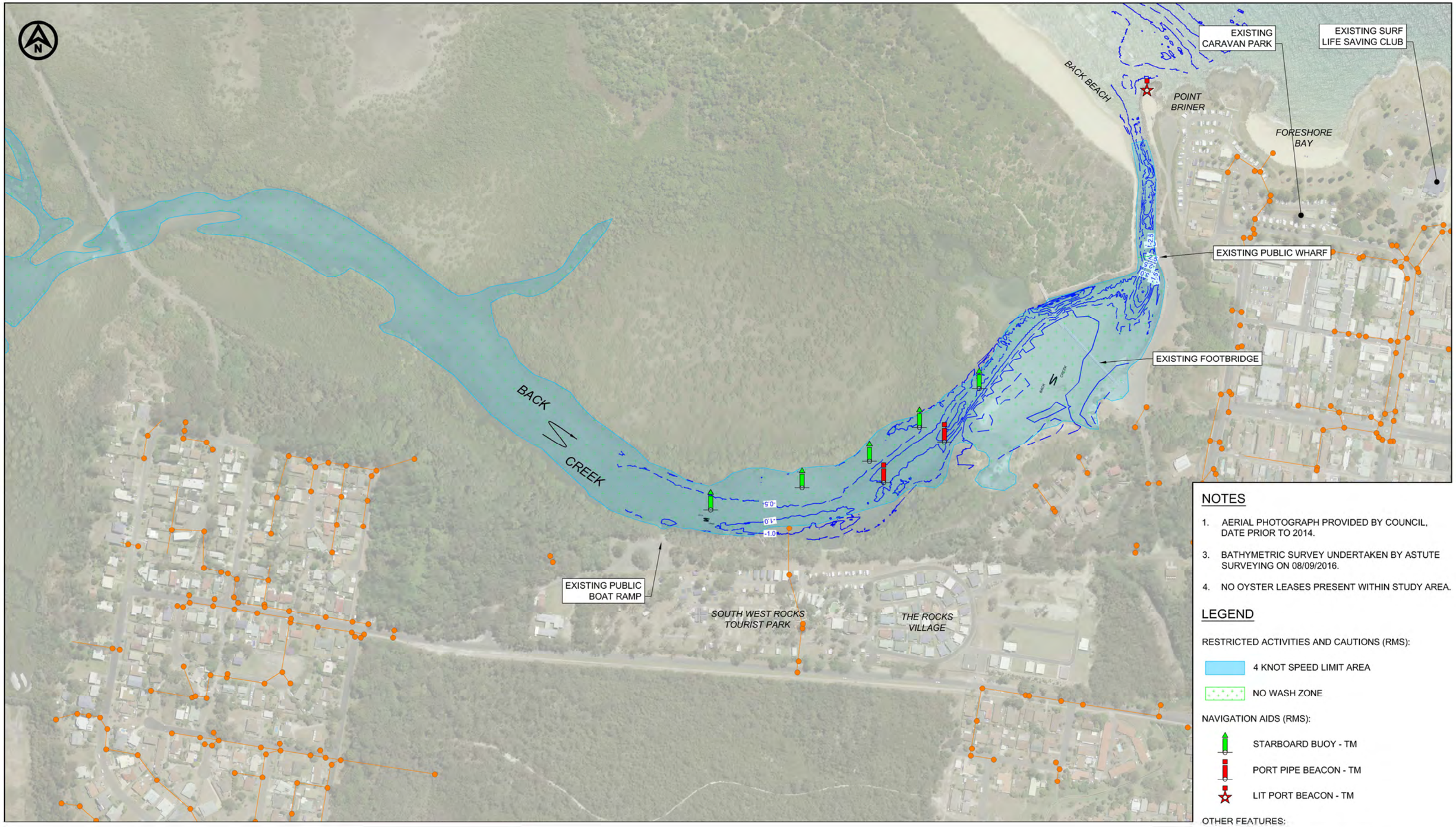
LEGEND

TERRESTRIAL VEGETATION:

- BANKSIA
- COASTAL COMPLEX
- COASTAL SANDS BLACKBUTT
- DRY-GRASSY TALLOWWOOD
- HEATH
- HEATH-SCRIBBLY GUM
- MANGROVE
- OPEN COASTAL BRUSHBOX
- PAPERBANK
- RAINFOREST
- SALTMARSH
- SAND RIDGE
- SWAMP
- SWAMP OAK
- URBAN

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MN-15 - BACK CREEK
CONSTRAINTS MAPPING
MARITIME AND OTHER FEATURES
MAP 2.5



NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.
3. BATHYMETRIC SURVEY UNDERTAKEN BY ASTUTE SURVEYING ON 08/09/2016.
4. NO OYSTER LEASES PRESENT WITHIN STUDY AREA.

LEGEND

RESTRICTED ACTIVITIES AND CAUTIONS (RMS):

- 4 KNOT SPEED LIMIT AREA
- NO WASH ZONE

NAVIGATION AIDS (RMS):

- STARBOARD BUOY - TM
- PORT PIPE BEACON - TM
- LIT PORT BEACON - TM

OTHER FEATURES:

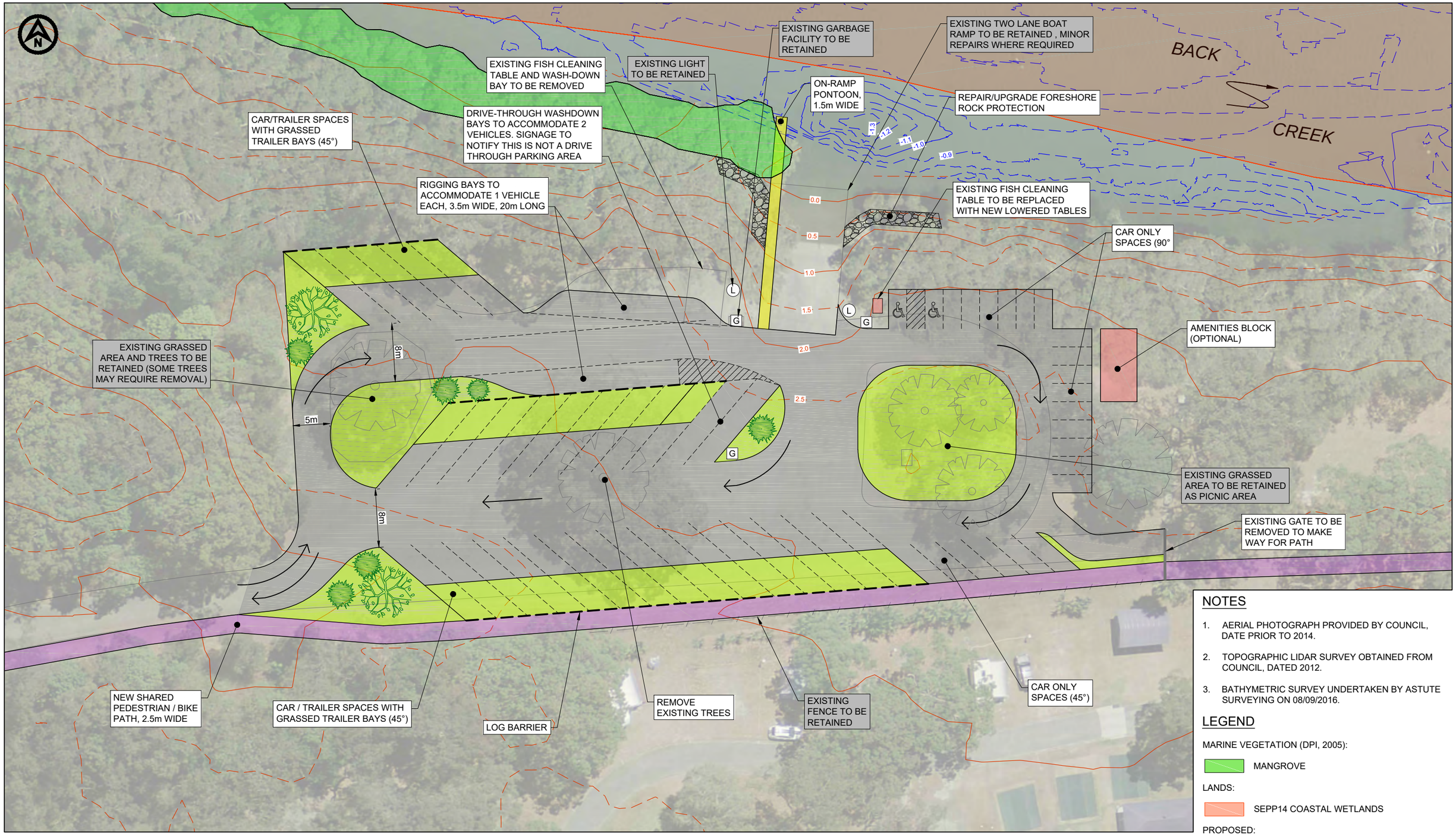
- STORMWATER PIPE AND PIT

50 0 50 100 150 200 250m
1:2500 (A1) 1:5000 (A3)

AUSTRALIAN HEIGHT DATUM

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MN-15 - BACK CREEK
CONCEPT DESIGN
SOUTH
MAP 3.1



NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.
2. TOPOGRAPHIC LIDAR SURVEY OBTAINED FROM COUNCIL, DATED 2012.
3. BATHYMETRIC SURVEY UNDERTAKEN BY ASTUTE SURVEYING ON 08/09/2016.

LEGEND

MARINE VEGETATION (DPI, 2005):

MANGROVE

LANDS:

SEPP14 COASTAL WETLANDS

PROPOSED:

(L) LIGHTING

[G] GARBAGE FACILITY

5 0 5 10 15 20 25m
1:250 (A1) 1:500 (A3)

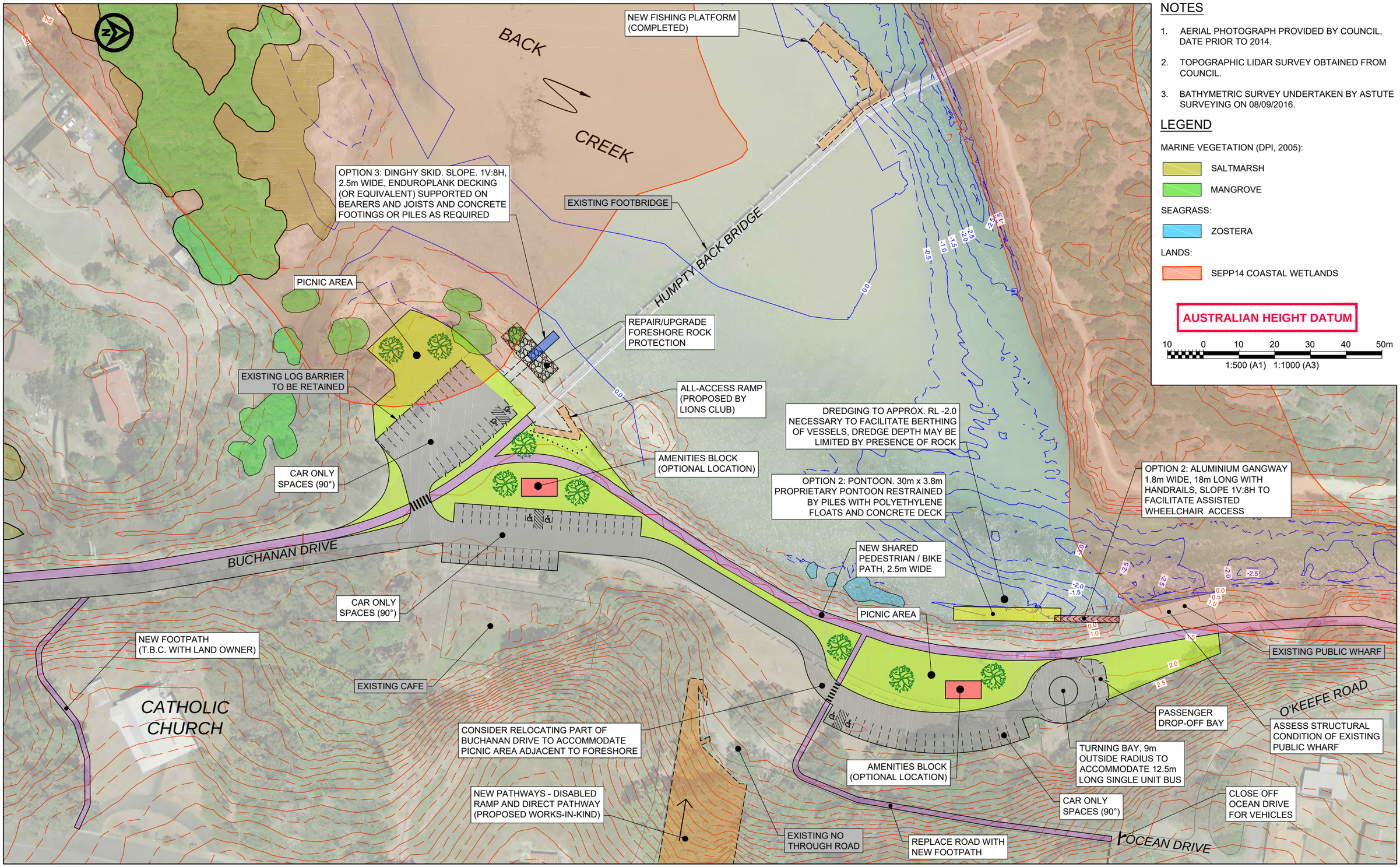
AUSTRALIAN HEIGHT DATUM

Royal HaskoningDHV
Enhancing Society Together

MN-15 - BACK CREEK CONCEPT DESIGN

NORTH

MAP 3.2



NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.
2. TOPOGRAPHIC LIDAR SURVEY OBTAINED FROM COUNCIL.
3. BATHYMETRIC SURVEY UNDERTAKEN BY ASTUTE SURVEYING ON 08/09/2016.

LEGEND

MARINE VEGETATION (DPI, 2005):

- SALTMARSH
- MANGROVE

SEAGRASS:

- ZOSTERA

LANDS:

- SEPP14 COASTAL WETLANDS

AUSTRALIAN HEIGHT DATUM

10 0 10 20 30 40 50m

1:500 (A1) 1:1000 (A3)

PA1311
MID NORTH COAST BOATING PLANS
\\HKA-SERVER\Public\CURRENT JOBS\~PA1311 - Mid North Coast Boating Plans\E02 Working Drawings\MN15-Back Creek\PA1311-Maps-MN15.dwg

SAVED: 23-Feb-17

Appendix B: Stakeholder Engagement Plan

Royal HaskoningDHV
Enhancing Society Together

Note / Memo

Haskoning Australia PTY Ltd.
Maritime & Aviation

To:	Indee Chandrawansa (RMS) and Trevor Dickson (Kempsey Shire Council)
From:	Matthew Potter
Date:	03 June 2016
Copy:	Gary Blumberg (RHDHV) and Heather Nelson (RHDHV)
Our reference:	M&APA1311N003F01
Classification:	Project related

Subject: **Mid North Coast Boating Investigations Package**
MN-15 Back Creek - Stakeholder Engagement Plan

General

Consultation with the community and stakeholders is proposed in accordance with the study components outlined in Mid North Coast Boating Investigations Package Proposal for Consultancy Services (the "Proposal"). This would include:

- Stakeholder Engagement Plan (SEP);
- Initial consultation with community stakeholders;
- Initial consultation with agencies;
- Drop-in information session on opportunities and constraints for improved boating facilities and access;
- Drop-in feedback session on options;
- Summary of Consultation Feedback; and,
- Organisational structure and responsibilities.

The revised program amended 11 May 2016 has been applied to this SEP.

Stakeholder Engagement Plan (SEP)

The SEP is outlined in this memorandum to be issued in draft and finalised in consultation with Roads and Maritime Services (RMS) and Kempsey Shire Council. RMS has confirmed that it is acceptable for RHDHV to liaise directly with Council in relation to stakeholder engagement generally, with RMS copied into all correspondence.

Initial Consultation with Community Stakeholders

Stakeholder consultations are proposed during Weeks 8 (starting 23 May) to 29 (starting 17 October) of the program. This would initially comprise telephone interviews with representatives from relevant community groups, which would include:

Group	Name	Contact Details
Seabreeze Beach Hotel Fishing Club	Peter Askew (Secretary)	0402 021631
South West Rocks Ratepayers Association	Stan Keifer (Secretary)	04270077912
South West Rocks Rotary	Diana Clarke (President)	04130173428
South West Rocks Senior Citizens	Carol Foran (President)	(02) 65 665586
South West Rocks Lions	David Dickenson (President)	(02) 65 665827
Eco Fishers		secretary.ecofishers@hotmail.com
South West Rocks Chamber of Commerce	Sandy Brandon (Executive Officer)	0407 007580

General points of discussion would include:

- existing recreational use/user groups, any conflicts between these users/groups or with heritage or ecological values;
- community preferences for boating facilities and associated amenities to cater for current and potential future uses;
- limitations or issues with existing facilities including adequacy of access;
- facility usage levels and peak usage periods; and,
- locations suitable for new facilities and preferred improvement/upgrade of existing facilities.

Phone discussions would be recorded in written notes and incorporated as necessary in the assessment of existing boating infrastructure and development of draft concepts for boating improvement sites.

Initial Consultation with Agencies

Initial consultation with agency stakeholders would comprise telephone interviews with the following key representatives from RMS listed in the table below. Points of discussion would be similar to those outlined above for community stakeholders:

Name	Title	Contact Details
Rod McDonagh	Manager Operations North	0418 494 153 / (02) 6565 9803 Rod.McDonagh@rms.nsw.gov.au
Dean Moore	Senior Boating Safety Officer	0418 434 164 / (02) 6691 9506 Dean.Moore@rms.nsw.gov.au
Marcus Cahill	Senior Boating Safety Officer (Mid North Coast)	0455 093 266 / (02) 6618 5103 Marcus.Cahill@rms.nsw.gov.au
Nathan Hanley	Crown Lands, Newcastle	Reserves & Reserve Trusts, 1300 886 235, reserves@crownland.nsw.gov.au
Terry Hemmingway	Group Leader, Property Management, Crown Lands	02 6591 3573 terrence.hemmingway@crownland.nsw.gov.au
	Mid North Coast – Regional Development Australia	02 5525 1500 http://www.rdamnc.org.au/contact-us/
Edward Moran	Elder, Southwest Rocks Aboriginal Corporation	0401 375 525
Bryan van der Walt	Recreational Fishing Programs Manager	Bryan.vanderwalt@dpi.nsw.gov.au
Russel Madeley Simon XX (tbc)	NPWS Area Manager Trial Bay National Park Ranger	(02) 6566 6168

Drop-in Information Sessions

Three hour drop-in sessions would be convened at the South West Rocks SLSC on weekday afternoons in Weeks 22 (starting 29 August) and 29 (starting 17 October). The community stakeholder contacts would be notified of the drop-in sessions and requested to notify their respective community groups of the time and date of the drop-in sessions. It would be requested that Council advertise the drop-in sessions through print or online media.

We would facilitate opportunities for the public who have registered an interest but are unable to attend our face to face consultation sessions to provide feedback in two ways:

(i) We would liaise with Council and provide suitable concise written content for any information bulletin that Council issues to advertise for community sessions. We expect that this would be posted to Council's web site and Facebook site (if available), to any community web noticeboard and also inserted in local newspapers. All bulletins would invite feedback via email and mobile number (set up toll free through 1800 REVERSE for both text or voice) of the responsible team member(s) from RHDHV. In consultation with Council, RHDHV would assist to facilitate the dissemination of this material to any relevant forums and noticeboards as required.

(ii) We would hand-deliver to community representatives at the drop-in centre site suitable concise written material for posting in hard-copy on Progress Association or similar noticeboards. This material would also invite feedback via the email address and mobile number (set up toll free through 1800 REVERSE for both text or voice) of the responsible team member(s) from RHDHV.

Draft Concept Plans would be presented at the 2nd drop-in session to provide an opportunity for the community to discuss the plans and any specific concerns regarding the plans. RHDHV would be responsible for collation, organisation and interpretation of community and stakeholder feedback to be included in the Consultation Feedback deliverables.

Summary of Consultation Feedback

Following the drop-in sessions and community meetings, RHDHV would summarise the community consultation comments on opportunities and constraints from the 1st session as a draft Summary of Consultation Feedback for Council and RMS review and to inform development of Concept Plans. Similarly, RHDHV would summarise the community consultation comments from the 2nd session with the proposed changes to the Concept Plans. Our draft Feedback Summary from the 1st session would be submitted in Week 23 (starting 5 September) and finalised in Week 26 (starting 26 September). The final version of the Feedback Summary would be incorporated into the Final Report as an Appendix, incorporating the community consultation comments from the 2nd session.

Organisational Structure and Responsibilities

The team at RHDHV would be responsible for preparing all material for the Draft Concept Plans. RHDHV staff would record all discussions from phone interviews and face-to-face consultation. RHDHV would be responsible for the collation, organisation and interpretation of community and stakeholder feedback and the information would assist in developing the Concept Plans for inclusion in the Final Report.

While the cost of organising the on-site community engagement sessions would be the responsibility of RHDHV, it is noted that Council would facilitate and pay for the venue and advertising in print and online media. RHDHV would ensure that Council is given its required notice to coordinate any community consultation sessions

Should you have any queries regarding the above, please contact the undersigned.

Yours faithfully
Royal HaskoningDHV





Matthew Potter
Senior Engineer
Maritime and Aviation

Gary Blumberg
Principal Engineer
Maritime and Aviation

Appendix C: EPBC Act Protected Matters Report

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

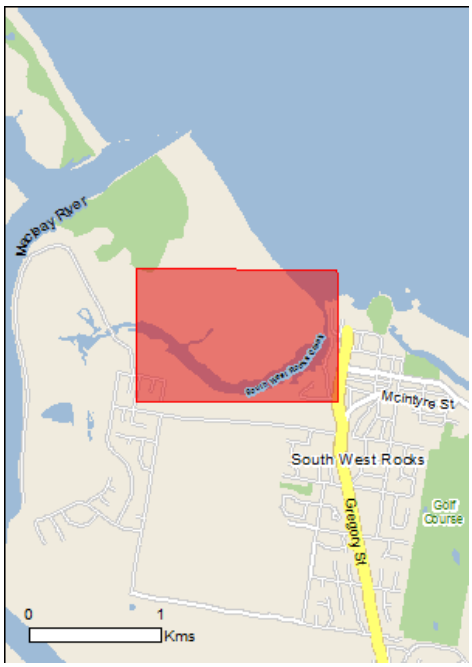
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 15/09/16 17:05:46

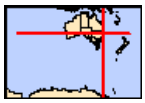
Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 0.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	56
Listed Migratory Species:	48

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	65
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	31
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pterodroma leucoptera leucoptera Gould's Petrel, Australian Gould's Petrel [26033]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fish		
Epinephelus daemelii		
Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Acronychia littoralis		
Scented Acronychia [8582]	Endangered	Species or species habitat likely to occur within area
Allocasuarina defungens		
Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Macadamia integrifolia		
Macadamia Nut, Queensland Nut, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Phaius australis		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Sharks		
Carcharias taurus (east coast population)		
Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias		
Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Rhincodon typus		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora (sensu stricto)		
Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni		
Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Macronectes giganteus		
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli		
Northern Giant Petrel [1061]	Vulnerable	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species

Name	Threatened	Type of Presence
		habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cuculus saturatus		
Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Diomedea antipodensis		
Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora (sensu stricto)		
Southern Royal Albatross [1072]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans (sensu lato)		
Wandering Albatross [1073]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni		
Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi		
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Heraldia nocturna Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Histiogamphelus briggsii Crested Pipefish, Briggs' Crested Pipefish, Briggs' Pipefish [66242]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding likely to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Breeding likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Breeding likely to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Breeding likely to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Breeding likely to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur

Name	Status	Type of Presence within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-30.88086 153.038768,-30.888477 153.038807,-30.888494 153.024957,-30.880592 153.024918,-30.880676 153.03867,-30.880676 153.03867,-30.88086 153.038768

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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

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Appendix D: BioNet Atlas of NSW Wildlife database search results

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Entities in selected area [North: -30.83 West: 152.97 East: 153.07 South: -30.93] returned a total of 5,780 records of 1,016 species.
Report generated on 15/09/2016 5:43 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3001	*Adelotus brevis*		Tusked Frog	P		2	
Animalia	Amphibia	Myobatrachidae	3131	*Crinia parinsignifera*		Eastern Sign-bearing Froglet	P		4	
Animalia	Amphibia	Myobatrachidae	3134	*Crinia signifera*		Common Eastern Froglet	P		14	
Animalia	Amphibia	Myobatrachidae	3137	*Crinia tinnula*		Wallum Froglet	V,P		12	
Animalia	Amphibia	Myobatrachidae	3058	*Limnodynastes dumerilii*		Eastern Banjo Frog	P		5	
Animalia	Amphibia	Myobatrachidae	3061	*Limnodynastes peronii*		Brown-striped Frog	P		15	
Animalia	Amphibia	Myobatrachidae	3074	*Mixophyes fasciolatus*		Great Barred Frog	P		2	
Animalia	Amphibia	Myobatrachidae	3103	*Paracrinia haswelli*		Haswell's Froglet	P		1	
Animalia	Amphibia	Myobatrachidae	3118	*Pseudophryne coriacea*		Red-backed Toadlet	P		6	
Animalia	Amphibia	Myobatrachidae	3035	*Uperoleia fusca*		Dusky Toadlet	P		4	
Animalia	Amphibia	Myobatrachidae	3158	*Uperoleia laevigata*		Smooth Toadlet	P		3	
Animalia	Amphibia	Hylidae	3171	*Litoria caerulea*		Green Tree Frog	P		11	
Animalia	Amphibia	Hylidae	3180	*Litoria dentata*		Bleating Tree Frog	P		13	
Animalia	Amphibia	Hylidae	3183	*Litoria fallax*		Eastern Dwarf Tree Frog	P		14	
Animalia	Amphibia	Hylidae	3184	*Litoria freycineti*		Freycinet's Frog	P		3	
Animalia	Amphibia	Hylidae	3187	*Litoria gracilenta*		Dainty Green Tree Frog	P		2	
Animalia	Amphibia	Hylidae	3191	*Litoria latopalmata*		Broad-palmed Frog	P		5	
Animalia	Amphibia	Hylidae	3199	*Litoria nasuta*		Rocket Frog	P		5	
Animalia	Amphibia	Hylidae	3204	*Litoria peronii*		Peron's Tree Frog	P		6	
Animalia	Amphibia	Hylidae	3214	*Litoria tyleri*		Tyler's Tree Frog	P		7	
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	2	
Animalia	Reptilia	Cheloniidae	2007	*Chelonia mydas*		Green Turtle	V,P	V	1	
Animalia	Reptilia	Dermochelyidae	2013	*Dermochelys coriacea*		Leatherback Turtle	E1,P	E	1	
Animalia	Reptilia	Chelidae	2017	*Chelodina longicollis*		Eastern Snake-necked Turtle	P		2	
Animalia	Reptilia	Scincidae	2417	*Bellatorias major*		Land Mullet	P		2	
Animalia	Reptilia	Scincidae	2375	*Ctenotus robustus*		Robust Ctenotus	P		5	
Animalia	Reptilia	Scincidae	2386	*Ctenotus taeniolatus*		Copper-tailed Skink	P		1	
Animalia	Reptilia	Scincidae	2450	*Lampropholis delicata*		Dark-flecked Garden Sunskink	P		13	
Animalia	Reptilia	Scincidae	2451	*Lampropholis guichenoti*		Pale-flecked Garden Sunskink	P		8	
Animalia	Reptilia	Scincidae	5154	*Lerista muelleri*		Wood Mulch-slider	P		1	
Animalia	Reptilia	Scincidae	2580	*Tiliqua scincoides*		Eastern Blue-tongue	P		1	
Animalia	Reptilia	Agamidae	2195	*Amphibolurus nobbi*		Nobbi	P		3	
Animalia	Reptilia	Agamidae	2252	*Intellagama lesueurii*		Eastern Water Dragon	P		2	
Animalia	Reptilia	Agamidae	2177	*Pogona barbata*		Bearded Dragon	P		2	
Animalia	Reptilia	Varanidae	2283	*Varanus varius*		Lace Monitor	P		18	
Animalia	Reptilia	Boidae	2625	*Morelia spilota*		Carpet & Diamond Pythons	P		1	
Animalia	Reptilia	Colubridae	2633	*Dendrelaphis punctulatus*		Common Tree Snake	P		3	
Animalia	Reptilia	Elapidae	5136	*Cryptophis nigrescens*		Eastern Small-eyed Snake	P		2	
Animalia	Reptilia	Elapidae	2674	*Hemiaspis signata*		Black-bellied Swamp Snake	P		1	
Animalia	Reptilia	Elapidae	2693	*Pseudechis porphyriacus*		Red-bellied Black Snake	P		8	
Animalia	Reptilia	Elapidae	2699	*Pseudonaja textilis*		Eastern Brown Snake	P		2	
Animalia	Aves	Megapodiidae	0008	*Alectura lathami*		Australian Brush-turkey	P		1	
Animalia	Aves	Phasianidae	0009	*Coturnix pectoralis*		Stubble Quail	P		1	
Animalia	Aves	Phasianidae	0011	*Coturnix ypsilophora*		Brown Quail	P		5	

Animalia	Aves	Anseranatidae	0199	*Anseranas semipalmata*	Magpie Goose	V,P		1
Animalia	Aves	Anatidae	0210	*Anas castanea*	Chestnut Teal	P		17
Animalia	Aves	Anatidae	0211	*Anas gracilis*	Grey Teal	P		6
Animalia	Aves	Anatidae	0212	*Anas rhynchotis*	Australasian Shoveler	P		3
Animalia	Aves	Anatidae	0208	*Anas superciliosa*	Pacific Black Duck	P		16
Animalia	Aves	Anatidae	0215	*Aythya australis*	Hardhead	P		1
Animalia	Aves	Anatidae	0217	*Biziura lobata*	Musk Duck	P		1
Animalia	Aves	Anatidae	0202	*Chenonetta jubata*	Australian Wood Duck	P		7
Animalia	Aves	Anatidae	0203	*Cygnus atratus*	Black Swan	P		11
Animalia	Aves	Anatidae	0213	*Malacorhynchus membranaceus*	Pink-eared Duck	P		1
Animalia	Aves	Podicipedidae	0061	*Tachybaptus novaehollandiae*	Australasian Grebe	P		2
Animalia	Aves	Columbidae	0033	*Chalcophaps indica*	Emerald Dove	P		2
Animalia	Aves	Columbidae	0028	*Columba leucomela*	White-headed Pigeon	P		18
Animalia	Aves	Columbidae	0032	*Geopelia humeralis*	Bar-shouldered Dove	P		21
Animalia	Aves	Columbidae	9931	*Geopelia striata*	Peaceful Dove	P		8
Animalia	Aves	Columbidae	0044	*Leucosarcia melanoleuca*	Wonga Pigeon	P		9
Animalia	Aves	Columbidae	0027	*Lopholaimus antarcticus*	Topknot Pigeon	P		1
Animalia	Aves	Columbidae	0029	*Macropygia amboinensis*	Brown Cuckoo-Dove	P		6
Animalia	Aves	Columbidae	0043	*Ocyphaps lophotes*	Crested Pigeon	P		15
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*	Wompoo Fruit-Dove	V,P		2
Animalia	Aves	Columbidae	0021	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P		2
Animalia	Aves	Podargidae	0313	*Podargus strigoides*	Tawny Frogmouth	P		15
Animalia	Aves	Caprimulgidae	0330	*Eurostopodus mystacalis*	White-throated Nightjar	P		1
Animalia	Aves	Aegothelidae	0317	*Aegotheles cristatus*	Australian Owlet-nightjar	P		9
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*	White-throated Needletail	P	C,J,K	3
Animalia	Aves	Procellariidae	0072	*Ardenna carneipes*	Flesh-footed Shearwater	V,P	J,K	1
Animalia	Aves	Procellariidae	0069	*Ardenna pacificus*	Wedge-tailed Shearwater	P	J	3
Animalia	Aves	Procellariidae	0071	*Ardenna tenuirostris*	Short-tailed Shearwater	P	J,K	4
Animalia	Aves	Sulidae	0104	*Morus serrator*	Australasian Gannet	P		2
Animalia	Aves	Sulidae	0105	*Sula dactylatra*	Masked Booby	V,P	J,K	1
Animalia	Aves	Sulidae	0102	*Sula leucogaster*	Brown Booby	P	C,J,K	1
Animalia	Aves	Anhingidae	8731	*Anhinga novaehollandiae*	Australasian Darter	P		8
Animalia	Aves	Phalacrocoracidae	0100	*Microcarbo melanoleucos*	Little Pied Cormorant	P		12
Animalia	Aves	Phalacrocoracidae	0096	*Phalacrocorax carbo*	Great Cormorant	P		3
Animalia	Aves	Phalacrocoracidae	0097	*Phalacrocorax sulcirostris*	Little Black Cormorant	P		16
Animalia	Aves	Phalacrocoracidae	0099	*Phalacrocorax varius*	Pied Cormorant	P		8
Animalia	Aves	Pelecanidae	0106	*Pelecanus conspicillatus*	Australian Pelican	P		17
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		42
Animalia	Aves	Ardeidae	0977	*Ardea ibis*	Cattle Egret	P	C,J	7
Animalia	Aves	Ardeidae	0186	*Ardea intermedia*	Intermediate Egret	P		3
Animalia	Aves	Ardeidae	8712	*Ardea modesta*	Eastern Great Egret	P		20
Animalia	Aves	Ardeidae	0189	*Ardea pacifica*	White-necked Heron	P		1
Animalia	Aves	Ardeidae	0193	*Butorides striatus*	Striated Heron	P		7
Animalia	Aves	Ardeidae	0185	*Egretta garzetta*	Little Egret	P		9
Animalia	Aves	Ardeidae	0188	*Egretta novaehollandiae*	White-faced Heron	P		15
Animalia	Aves	Ardeidae	0191	*Egretta sacra*	Eastern Reef Egret	P	C	3
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*	Black Bittern	V,P		1
Animalia	Aves	Ardeidae	0192	*Nycticorax caledonicus*	Nankeen Night Heron	P		5
Animalia	Aves	Threskiornithidae	0181	*Platalea regia*	Royal Spoonbill	P		8
Animalia	Aves	Threskiornithidae	0178	*Plegadis falcinellus*	Glossy Ibis	P	C	1
Animalia	Aves	Threskiornithidae	0179	*Threskiornis molucca*	Australian White Ibis	P		16
Animalia	Aves	Threskiornithidae	0180	*Threskiornis spinicollis*	Straw-necked Ibis	P		4

Animalia	Aves	Accipitridae	0222	*Accipiter cirrocephalus*	Collared Sparrowhawk	P		2	
Animalia	Aves	Accipitridae	0221	*Accipiter fasciatus*	Brown Goshawk	P		3	
Animalia	Aves	Accipitridae	0220	*Accipiter novaehollandiae*	Grey Goshawk	P		3	
Animalia	Aves	Accipitridae	0224	*Aquila audax*	Wedge-tailed Eagle	P		3	
Animalia	Aves	Accipitridae	0234	*Aviceda subcristata*	Pacific Baza	P		4	
Animalia	Aves	Accipitridae	0219	*Circus approximans*	Swamp Harrier	P		5	
Animalia	Aves	Accipitridae	0232	*Elanus axillaris*	Black-shouldered Kite	P		4	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	P	C	19	
Animalia	Aves	Accipitridae	0227	*Haliastur indus*	Brahminy Kite	P		24	
Animalia	Aves	Accipitridae	0228	*Haliastur sphenurus*	Whistling Kite	P		22	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*	Square-tailed Kite	V,P,3		7	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*	Eastern Osprey	V,P,3		45	
Animalia	Aves	Falconidae	0239	*Falco berigora*	Brown Falcon	P		1	
Animalia	Aves	Falconidae	0240	*Falco cenchroides*	Nankeen Kestrel	P		4	
Animalia	Aves	Falconidae	0235	*Falco longipennis*	Australian Hobby	P		6	
Animalia	Aves	Falconidae	0237	*Falco peregrinus*	Peregrine Falcon	P		1	
Animalia	Aves	Rallidae	0059	*Fulica atra*	Eurasian Coot	P		2	
Animalia	Aves	Rallidae	0056	*Gallinula tenebrosa*	Dusky Moorhen	P		5	
Animalia	Aves	Rallidae	0046	*Gallirallus philippensis*	Buff-banded Rail	P		6	
Animalia	Aves	Rallidae	0045	*Lewinia pectoralis*	Lewin's Rail	P		1	
Animalia	Aves	Rallidae	0058	*Porphyrio porphyrio*	Purple Swamphen	P		8	
Animalia	Aves	Rallidae	0050	*Porzana pusilla*	Baillon's Crake	P		3	
Animalia	Aves	Rallidae	0051	*Porzana tabuensis*	Spotless Crake	P		1	
Animalia	Aves	Burhinidae	0175	*Esacus magnirostris*	Beach Stone-curlew	E4A,P		2	
Animalia	Aves	Haematopodidae	0131	*Haematopus fuliginosus*	Sooty Oystercatcher	V,P		8	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*	Pied Oystercatcher	E1,P		10	
Animalia	Aves	Recurvirostridae	0146	*Himantopus himantopus*	Black-winged Stilt	P		9	
Animalia	Aves	Charadriidae	0140	*Charadrius bicinctus*	Double-banded Plover	P		1	
Animalia	Aves	Charadriidae	0144	*Elseyornis melanops*	Black-fronted Dotterel	P		6	
Animalia	Aves	Charadriidae	0132	*Erythrogonys cinctus*	Red-kneed Dotterel	P		1	
Animalia	Aves	Charadriidae	0133	*Vanellus miles*	Masked Lapwing	P		16	
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*	Comb-crested Jacana	V,P		3	
Animalia	Aves	Scolopacidae	0157	*Actitis hypoleucos*	Common Sandpiper	P	C,J,K	3	
Animalia	Aves	Scolopacidae	0163	*Calidris acuminata*	Sharp-tailed Sandpiper	P	C,J,K	5	
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	1	
Animalia	Aves	Scolopacidae	0162	*Calidris ruficollis*	Red-necked Stint	P	C,J,K	1	
Animalia	Aves	Scolopacidae	0168	*Gallinago hardwickii*	Latham's Snipe	P	C,J,K	5	
Animalia	Aves	Scolopacidae	0153	*Limosa lapponica*	Bar-tailed Godwit	P	C,J,K	5	
Animalia	Aves	Scolopacidae	0152	*Limosa limosa*	Black-tailed Godwit	V,P	C,J,K	1	
Animalia	Aves	Scolopacidae	0149	*Numenius madagascariensis*	Eastern Curlew	P	CE,C,J,K	5	
Animalia	Aves	Scolopacidae	0150	*Numenius phaeopus*	Whimbrel	P	C,J,K	7	
Animalia	Aves	Scolopacidae	0155	*Tringa brevipes*	Grey-tailed Tattler	P	C,J,K	11	
Animalia	Aves	Scolopacidae	0158	*Tringa nebularia*	Common Greenshank	P	C,J,K	3	
Animalia	Aves	Scolopacidae	0159	*Tringa stagnatilis*	Marsh Sandpiper	P	C,J,K	8	
Animalia	Aves	Scolopacidae	0891	*Tringa totanus*	Common Redshank	P	C,K	2	
Animalia	Aves	Stercorariidae	0128	*Stercorarius parasiticus*	Arctic Jaeger	P	J,K	1	
Animalia	Aves	Laridae	0125	*Chroicocephalus novaehollandiae*	Silver Gull	P		15	
Animalia	Aves	Laridae	0112	*Hydroprogne caspia*	Caspian Tern	P	C,J	2	
Animalia	Aves	Laridae	0953	*Sterna hirundo*	Common Tern	P	C,J,K	2	
Animalia	Aves	Laridae	0117	*Sternula albifrons*	Little Tern	E1,P	C,J,K	1	
Animalia	Aves	Laridae	0115	*Thalasseus bergii*	Crested Tern	P		27	
Animalia	Aves	Cacatuidae	0269	*Cacatua galerita*	Sulphur-crested Cockatoo	P		4	
Animalia	Aves	Cacatuidae	0271	*Cacatua sanguinea*	Little Corella	P		5	
Animalia	Aves	Cacatuidae	0267	*Calyptorhynchus funereus*	Yellow-tailed Black-Cockatoo	P		16	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		39	
Animalia	Aves	Cacatuidae	0273	*Eolophus roseicapillus*	Galah	P		13	
Animalia	Aves	Psittacidae	0281	*Alisterus scapularis*	Australian King-Parrot	P		7	
Animalia	Aves	Psittacidae	0258	*Glossopsitta concinna*	Musk Lorikeet	P		4	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	Little Lorikeet	V,P		7	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*	Swift Parrot	E1,P,3	CE	23	
Animalia	Aves	Psittacidae	0288	*Platycercus eximius*	Eastern Rosella	P		20	
Animalia	Aves	Psittacidae	0256	*Trichoglossus chlorolepidotus*	Scaly-breasted Lorikeet	P		35	

Animalia	Aves	Psittacidae	9947	*Trichoglossus haematodus*	Rainbow Lorikeet	P		54	
Animalia	Aves	Centropodidae	0349	*Centropus phasianinus*	Pheasant Coucal	P		14	
Animalia	Aves	Cuculidae	0338	*Cacomantis flabelliformis*	Fan-tailed Cuckoo	P		15	
Animalia	Aves	Cuculidae	0337	*Cacomantis pallidus*	Pallid Cuckoo	P		7	
Animalia	Aves	Cuculidae	0339	*Cacomantis variolosus*	Brush Cuckoo	P		6	
Animalia	Aves	Cuculidae	0342	*Chalcites basalis*	Horsfield's Bronze-Cuckoo	P		1	
Animalia	Aves	Cuculidae	0343	*Chalcites lucidus*	Shining Bronze-Cuckoo	P		14	
Animalia	Aves	Cuculidae	0347	*Eudynamys orientalis*	Eastern Koel	P		12	
Animalia	Aves	Cuculidae	0348	*Scythrops novaehollandiae*	Channel-billed Cuckoo	P		6	
Animalia	Aves	Strigidae	0246	*^^Ninox connivens*	Barking Owl	V,P,3		1	
Animalia	Aves	Strigidae	9922	*Ninox novaeseelandiae*	Southern Boobook	P		13	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*	Powerful Owl	V,P,3		5	
Animalia	Aves	Tytonidae	9923	*Tyto javanica*	Eastern Barn Owl	P		2	
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*	Eastern Grass Owl	V,P,3		3	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*	Masked Owl	V,P,3		4	
Animalia	Aves	Alcedinidae	0319	*Ceyx azureus*	Azure Kingfisher	P		10	
Animalia	Aves	Alcedinidae	0322	*Dacelo novaeguineae*	Laughing Kookaburra	P		41	
Animalia	Aves	Alcedinidae	0324	*Todiramphus macleayii*	Forest Kingfisher	P		5	
Animalia	Aves	Alcedinidae	0326	*Todiramphus sanctus*	Sacred Kingfisher	P		25	
Animalia	Aves	Meropidae	0329	*Merops ornatus*	Rainbow Bee-eater	P	J	11	
Animalia	Aves	Coraciidae	0318	*Eurystomus orientalis*	Dollarbird	P		30	
Animalia	Aves	Pittidae	0352	*Pitta versicolor*	Noisy Pitta	P		1	
Animalia	Aves	Climacteridae	0558	*Cormobates leucophaea*	White-throated Treecreeper	P		8	
Animalia	Aves	Ptilonorhynchidae	0676	*Ailuroedus crassirostris*	Green Catbird	P		1	
Animalia	Aves	Ptilonorhynchidae	0679	*Ptilonorhynchus violaceus*	Satin Bowerbird	P		8	
Animalia	Aves	Ptilonorhynchidae	0684	*Sericulus chrysocephalus*	Regent Bowerbird	P		5	
Animalia	Aves	Maluridae	0529	*Malurus cyaneus*	Superb Fairy-wren	P		24	
Animalia	Aves	Maluridae	0536	*Malurus lamberti*	Variegated Fairy-wren	P		20	
Animalia	Aves	Maluridae	0541	*Malurus melanocephalus*	Red-backed Fairy-wren	P		3	
Animalia	Aves	Maluridae	0526	*Stipiturus malachurus*	Southern Emu-wren	P		1	
Animalia	Aves	Acanthizidae	0486	*Acanthiza chrysorrhoa*	Yellow-rumped Thornbill	P		3	
Animalia	Aves	Acanthizidae	0470	*Acanthiza lineata*	Striated Thornbill	P		5	
Animalia	Aves	Acanthizidae	0471	*Acanthiza nana*	Yellow Thornbill	P		6	
Animalia	Aves	Acanthizidae	0475	*Acanthiza pusilla*	Brown Thornbill	P		30	
Animalia	Aves	Acanthizidae	0460	*Gerygone levigaster*	Mangrove Gerygone	P		10	
Animalia	Aves	Acanthizidae	0454	*Gerygone mouki*	Brown Gerygone	P		10	
Animalia	Aves	Acanthizidae	0453	*Gerygone olivacea*	White-throated Gerygone	P		11	
Animalia	Aves	Acanthizidae	0488	*Sericornis frontalis*	White-browed Scrubwren	P		11	
Animalia	Aves	Acanthizidae	0465	*Smicrornis brevirostris*	Weebill	P		1	
Animalia	Aves	Pardalotidae	0565	*Pardalotus punctatus*	Spotted Pardalote	P		28	
Animalia	Aves	Pardalotidae	0976	*Pardalotus striatus*	Striated Pardalote	P		8	
Animalia	Aves	Meliphagidae	0640	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	P		1	
Animalia	Aves	Meliphagidae	0591	*Acanthorhynchus tenuirostris*	Eastern Spinebill	P		38	
Animalia	Aves	Meliphagidae	0638	*Anthochaera carunculata*	Red Wattlebird	P		6	
Animalia	Aves	Meliphagidae	0710	*Anthochaera chrysoptera*	Little Wattlebird	P		48	
Animalia	Aves	Meliphagidae	0614	*Caligavis chrysops*	Yellow-faced Honeyeater	P		18	
Animalia	Aves	Meliphagidae	0448	*Epthianura albifrons*	White-fronted Chat	V,P		2	
Animalia	Aves	Meliphagidae	0593	*Gliciphila melanops*	Tawny-crowned Honeyeater	P		1	
Animalia	Aves	Meliphagidae	0597	*Lichmera indistincta*	Brown Honeyeater	P		20	
Animalia	Aves	Meliphagidae	0634	*Manorina melanocephala*	Noisy Miner	P		15	
Animalia	Aves	Meliphagidae	0605	*Meliphaga lewinii*	Lewin's Honeyeater	P		36	
Animalia	Aves	Meliphagidae	0578	*Melithreptus lunatus*	White-naped Honeyeater	P		2	
Animalia	Aves	Meliphagidae	0586	*Myzomela sanguinolenta*	Scarlet Honeyeater	P		25	

Animalia	Aves	Meliphagidae	0646	*Philemon citreogularis*	Little Friarbird	P	1	
Animalia	Aves	Meliphagidae	0645	*Philemon corniculatus*	Noisy Friarbird	P	47	
Animalia	Aves	Meliphagidae	0632	*Phylidonyris niger*	White-cheeked Honeyeater	P	44	
Animalia	Aves	Meliphagidae	0631	*Phylidonyris novaehollandiae*	New Holland Honeyeater	P	1	
Animalia	Aves	Meliphagidae	0585	*Plectorhyncha lanceolata*	Striped Honeyeater	P	12	
Animalia	Aves	Meliphagidae	0613	*Ptilotula fuscus*	Fuscous Honeyeater	P	1	
Animalia	Aves	Psophodidae	0421	*Psophodes olivaceus*	Eastern Whipbird	P	13	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*	Varied Sittella	V,P	3	
Animalia	Aves	Campephagidae	0428	*Coracina lineata*	Barred Cuckoo-shrike	V,P	2	
Animalia	Aves	Campephagidae	0424	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	P	25	
Animalia	Aves	Campephagidae	0425	*Coracina papuensis*	White-bellied Cuckoo-shrike	P	5	
Animalia	Aves	Campephagidae	0429	*Coracina tenuirostris*	Cicadabird	P	10	
Animalia	Aves	Campephagidae	0430	*Lalage sueurii*	White-winged Triller	P	3	
Animalia	Aves	Pachycephalidae	0408	*Colluricincla harmonica*	Grey Shrike-thrush	P	23	
Animalia	Aves	Pachycephalidae	0416	*Falcunculus frontatus frontatus*	Eastern Shrike-tit	P	2	
Animalia	Aves	Pachycephalidae	0398	*Pachycephala pectoralis*	Golden Whistler	P	23	
Animalia	Aves	Pachycephalidae	0401	*Pachycephala rufiventris*	Rufous Whistler	P	19	
Animalia	Aves	Oriolidae	0671	*Oriolus sagittatus*	Olive-backed Oriole	P	17	
Animalia	Aves	Oriolidae	0432	*Sphecotheres vieilloti*	Australasian Figbird	P	17	
Animalia	Aves	Artamidae	0543	*Artamus leucorynchus*	White-breasted Woodswallow	P	10	
Animalia	Aves	Artamidae	0700	*Cracticus nigrogularis*	Pied Butcherbird	P	13	
Animalia	Aves	Artamidae	0705	*Cracticus tibicen*	Australian Magpie	P	32	
Animalia	Aves	Artamidae	0702	*Cracticus torquatus*	Grey Butcherbird	P	27	
Animalia	Aves	Artamidae	0694	*Strepera graculina*	Pied Currawong	P	14	
Animalia	Aves	Dicruridae	0673	*Dicrurus bracteatus*	Spangled Drongo	P	22	
Animalia	Aves	Rhipiduridae	0361	*Rhipidura albiscapa*	Grey Fantail	P	41	
Animalia	Aves	Rhipiduridae	0364	*Rhipidura leucophrys*	Willie Wagtail	P	20	
Animalia	Aves	Rhipiduridae	0362	*Rhipidura rufifrons*	Rufous Fantail	P	10	
Animalia	Aves	Corvidae	0930	*Corvus coronoides*	Australian Raven	P	12	
Animalia	Aves	Corvidae	9902	*Corvus orru*	Torresian Crow	P	11	
Animalia	Aves	Corvidae	0868	*Corvus tasmanicus*	Forest Raven	P	14	
Animalia	Aves	Monarchidae	0415	*Grallina cyanoleuca*	Magpie-lark	P	20	
Animalia	Aves	Monarchidae	0373	*Monarcha melanopsis*	Black-faced Monarch	P	5	
Animalia	Aves	Monarchidae	9955	*Myiagra inquieta*	Restless Flycatcher	P	3	
Animalia	Aves	Monarchidae	0365	*Myiagra rubecula*	Leaden Flycatcher	P	13	
Animalia	Aves	Monarchidae	0375	*Symposiachrus trivirgatus*	Spectacled Monarch	P	4	
Animalia	Aves	Petroicidae	0392	*Eopsaltria australis*	Eastern Yellow Robin	P	22	
Animalia	Aves	Petroicidae	0377	*Microeca fascinans*	Jacky Winter	P	4	
Animalia	Aves	Petroicidae	0384	*Petroica rosea*	Rose Robin	P	2	
Animalia	Aves	Cisticolidae	0525	*Cisticola exilis*	Golden-headed Cisticola	P	8	
Animalia	Aves	Acrocephalidae	0524	*Acrocephalus australis*	Australian Reed-Warbler	P	3	
Animalia	Aves	Megaluridae	0522	*Megalurus gramineus*	Little Grassbird	P	2	
Animalia	Aves	Megaluridae	0523	*Megalurus timoriensis*	Tawny Grassbird	P	2	
Animalia	Aves	Timaliidae	0574	*Zosterops lateralis*	Silvereye	P	20	
Animalia	Aves	Hirundinidae	0358	*Cheramoeca leucosterna*	White-backed Swallow	P	1	
Animalia	Aves	Hirundinidae	0357	*Hirundo neoxena*	Welcome Swallow	P	23	
Animalia	Aves	Hirundinidae	0360	*Petrochelidon ariel*	Fairy Martin	P	1	
Animalia	Aves	Hirundinidae	0359	*Petrochelidon nigricans*	Tree Martin	P	2	
Animalia	Aves	Turdidae	0780	*Zoothera heinei*	Russet-tailed Thrush	P	2	
Animalia	Aves	Turdidae	0779	*Zoothera lunulata*	Bassian Thrush	P	1	
Animalia	Aves	Nectariniidae	0564	*Dicaeum hirundinaceum*	Mistletoebird	P	22	
Animalia	Aves	Estrildidae	0657	*Lonchura castaneothorax*	Chestnut-breasted Mannikin	P	3	
Animalia	Aves	Estrildidae	0662	*Neochmia temporalis*	Red-browed Finch	P	25	

Animalia	Aves	Estrildidae	0655	*Taeniopygia bichenovii*	Double-barred Finch	P		3	
Animalia	Aves	Motacillidae	0647	*Anthus novaeseelandiae*	Australian Pipit	P		7	
Animalia	Mammalia	Tachyglossidae	1003	*Tachyglossus aculeatus*	Short-beaked Echidna	P		10	
Animalia	Mammalia	Dasyuridae	1027	*Antechinus flavipes*	Yellow-footed Antechinus	P		18	
Animalia	Mammalia	Dasyuridae	1674	*Antechinus stuartii*	Brown Antechinus	P		7	
Animalia	Mammalia	Dasyuridae	1033	*Antechinus swainsonii*	Dusky Antechinus	P		3	
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		13	
Animalia	Mammalia	Dasyuridae	1061	*Sminthopsis murina*	Common Dunnart	P		3	
Animalia	Mammalia	Peramelidae	1093	*Isoodon macrourus*	Northern Brown Bandicoot	P		10	
Animalia	Mammalia	Peramelidae	T081	*Isoodon/Perameles sp.*	unidentified Bandicoot	P		1	
Animalia	Mammalia	Peramelidae	1097	*Perameles nasuta*	Long-nosed Bandicoot	P		7	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	V,P	V	5	
Animalia	Mammalia	Petauridae	1138	*Petaurus breviceps*	Sugar Glider	P		21	
Animalia	Mammalia	Petauridae	1751	*Petaurus breviceps breviceps*		P		1	
Animalia	Mammalia	Petauridae	T103	*Petaurus breviceps\norfolcensis*	Sugar\Squirrel Glider	P		2	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		42	
Animalia	Mammalia	Petauridae	T084	*Petaurus sp.*	Glider	P		1	
Animalia	Mammalia	Pseudocheiridae	1129	*Pseudocheirus peregrinus*	Common Ringtail Possum	P		11	
Animalia	Mammalia	Acrobatidae	1147	*Acrobates pygmaeus*	Feathertail Glider	P		2	
Animalia	Mammalia	Phalangeridae	1735	*Trichosurus caninus*	Short-eared Possum	P		1	
Animalia	Mammalia	Phalangeridae	1113	*Trichosurus vulpecula*	Common Brushtail Possum	P		16	
Animalia	Mammalia	Macropodidae	1265	*Macropus giganteus*	Eastern Grey Kangaroo	P		22	
Animalia	Mammalia	Macropodidae	1261	*Macropus rufogriseus*	Red-necked Wallaby	P		10	
Animalia	Mammalia	Macropodidae	1242	*Wallabia bicolor*	Swamp Wallaby	P		10	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	32	
Animalia	Mammalia	Pteropodidae	T087	*Pteropus sp.*	Flying-fox	P		1	
Animalia	Mammalia	Pteropodidae	1294	*Syconycteris australis*	Common Blossom-bat	V,P		1	
Animalia	Mammalia	Rhinolophidae	1303	*Rhinolophus megaphyllus*	Eastern Horseshoe-bat	P		1	
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		2	
Animalia	Mammalia	Molossidae	1324	*Austronomus australis*	White-striped Freetail-bat	P		3	
Animalia	Mammalia	Molossidae	1329	*Mormopterus norfolkensis*	Eastern Freetail-bat	V,P		10	
Animalia	Mammalia	Vespertilionidae	1349	*Chalinolobus gouldii*	Gould's Wattled Bat	P		15	
Animalia	Mammalia	Vespertilionidae	1351	*Chalinolobus morio*	Chocolate Wattled Bat	P		8	
Animalia	Mammalia	Vespertilionidae	1354	*Chalinolobus nigrogriseus*	Hoary Wattled Bat	V,P		3	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		1	
Animalia	Mammalia	Vespertilionidae	1346	*Miniopterus australis*	Little Bentwing-bat	V,P		15	
Animalia	Mammalia	Vespertilionidae	1834	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V,P		4	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		1	
Animalia	Mammalia	Vespertilionidae	1335	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	P		4	
Animalia	Mammalia	Vespertilionidae	1334	*Nyctophilus gouldi*	Gould's Long-eared Bat	P		1	
Animalia	Mammalia	Vespertilionidae	T092	*Nyctophilus sp.*	long-eared bat	P		1	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		5	

Animalia	Mammalia	Vespertilionidae	1365	*Scotorepens orion*	Eastern Broad-nosed Bat	P		9	
Animalia	Mammalia	Vespertilionidae	T089	*Scotorepens sp.*	Unidentified broad-nosed bat	P		3	
Animalia	Mammalia	Vespertilionidae	1022	*Vespadelus darlingtoni*	Large Forest Bat	P		3	
Animalia	Mammalia	Vespertilionidae	1377	*Vespadelus pumilus*	Eastern Forest Bat	P		9	
Animalia	Mammalia	Vespertilionidae	1378	*Vespadelus regulus*	Southern Forest Bat	P		1	
Animalia	Mammalia	Vespertilionidae	1025	*Vespadelus troughtoni*	Eastern Cave Bat	V,P		5	
Animalia	Mammalia	Vespertilionidae	1379	*Vespadelus vulturnus*	Little Forest Bat	P		37	
Animalia	Mammalia	Muridae	1395	*Rattus fuscipes*	Bush Rat	P		21	
Animalia	Mammalia	Muridae	1398	*Rattus lutreolus*	Swamp Rat	P		10	
Animalia	Mammalia	Otariidae	1882	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V,P		1	
Animalia	Mammalia	Phocidae	1549	*Hydrurga leptonyx*	Leopard Seal	P		1	
Animalia	Mammalia	Balaenopteridae	1575	*Megaptera novaeangliae*	Humpback Whale	V,P	V	1	
Animalia	Mammalia	Balaenopteridae	9041	*Whale sp.*	Unidentified Whale	P		1	
Animalia	Mammalia	Delphinidae	1609	*Grampus griseus*	Risso's Dolphin	P		1	
Animalia	Mammalia	Delphinidae	1900	*Tursiops truncatus*	Bottlenose Dolphin	P		3	
Plantae	Flora	Adiantaceae	8000	*Adiantum hispidulum*	Rough Maidenhair	P		1	
Plantae	Flora	Apiaceae	1094	*Actinotus helianthi*	Flannel Flower	P		1	
Plantae	Flora	Apocynaceae	1226	*Cynanchum elegans*	White-flowered Wax Plant	E1,P	E	1	
Plantae	Flora	Arecaceae	6458	*Archontophoenix cunninghamiana*	Bangalow Palm	P		9	
Plantae	Flora	Arecaceae	1218	*Howea forsteriana*	Kentia Palm	P		1	
Plantae	Flora	Arecaceae	1221	*Livistona australis*	Cabbage Palm	P		16	
Plantae	Flora	Aspleniaceae	8031	*Asplenium australasicum*	Bird's Nest Fern	P		4	
Plantae	Flora	Asteliaceae	1018	*Cordyline stricta*	Narrow-leaved Palm Lily	P		11	
Plantae	Flora	Blandfordiaceae	3528	*Blandfordia grandiflora*	Christmas Bells	P		5	
Plantae	Flora	Casuarinaceae	8980	*Allocasuarina defungens*	Dwarf Heath Casuarina	E1,P	E	1	
Plantae	Flora	Cunoniaceae	2272	*Ceratopetalum gummiferum*	Christmas Bush	P		1	
Plantae	Flora	Cyatheaceae	8074	*Cyathea australis*	Rough Treefern	P		4	
Plantae	Flora	Cyatheaceae	8076	*Cyathea cooperi*	Straw Treefern	P		2	
Plantae	Flora	Cyperaceae	11001	*Caustis blakei subsp. blakei*		P		2	
Plantae	Flora	Cyperaceae	2343	*Caustis recurvata*		P		14	
Plantae	Flora	Cyperaceae	9315	*Caustis recurvata var. recurvata*		P		1	
Plantae	Flora	Cyperaceae	2442	*Gahnia sieberiana*	Red-fruit Saw-sedge	P		3	
Plantae	Flora	Dicksoniaceae	8082	*Dicksonia antarctica*	Soft Treefern	P		1	
Plantae	Flora	Euphorbiaceae	9851	*Chamaesyce psammogeton*	Sand Spurge	E1,P		1	
Plantae	Flora	Gleicheniaceae	11175	*Sticherus flabellatus var. flabellatus*	Umbrella Fern	P		1	
Plantae	Flora	Myrtaceae	4207	*Kunzea capitata*		P		1	
Plantae	Flora	Orchidaceae	4353	*Acianthus fornicatus*	Pixie Caps	P		1	
Plantae	Flora	Orchidaceae	9014	*Arthrochilus prolixus*		P		1	
Plantae	Flora	Orchidaceae	4388	*Calanthe triplicata*	Christmas Orchid	P		2	
Plantae	Flora	Orchidaceae	4394	*Calochilus paludosus*	Red Beard Orchid	P		1	
Plantae	Flora	Orchidaceae	4396	*Cheirostylis ovata*		P		2	
Plantae	Flora	Orchidaceae	4411	*Corybas undulatus*	Tailed Helmet Orchid	P		1	
Plantae	Flora	Orchidaceae	4414	*Cryptostylis erecta*	Tartan Tongue Orchid	P		2	
Plantae	Flora	Orchidaceae	4417	*Cryptostylis subulata*	Large Tongue Orchid	P		2	
Plantae	Flora	Orchidaceae	4419	*Cymbidium suave*	Snake Orchid	P		5	
Plantae	Flora	Orchidaceae	4424	*Dendrobium gracilicaule*		P		1	
Plantae	Flora	Orchidaceae	4466	*Glossodia minor*	Small Waxlip Orchid	P		1	
Plantae	Flora	Orchidaceae	4480	*^Phaius australis*	Southern Swamp Orchid	E1,P,2	E	1	
Plantae	Flora	Orchidaceae	4556	*Pterostylis hildae*	Rainforest Greenhood	P		2	
Plantae	Flora	Orchidaceae	11877	*Spiranthes australis*	Ladies' Tresses	P		1	
Plantae	Flora	Orchidaceae	7037	*Thelymitra malvina*	Mauve-tuft Sun Orchid	P		1	

Plantae	Flora	Orchidaceae	THEL	*Thelymitra spp.*		P		1	
Plantae	Flora	Polypodiaceae	8159	*Platycerium bifurcatum*	Elkhorn Fern	P		6	
Plantae	Flora	Proteaceae	5349	*Banksia spinulosa*	Hairpin Banksia	P		1	
Plantae	Flora	Proteaceae	5433	*Isopogon anemonifolius*	Broad-leaf Drumsticks	P		1	
Plantae	Flora	Proteaceae	5445	*Lomatia silaifolia*	Crinkle Bush	P		5	
Plantae	Flora	Proteaceae	8597	*Persoonia conjuncta*		P		8	
Plantae	Flora	Proteaceae	5460	*Persoonia lanceolata*	Lance Leaf Geebung	P		3	
Plantae	Flora	Proteaceae	5462	*Persoonia levis*	Broad-leaved Geebung	P		7	
Plantae	Flora	Proteaceae	5463	*Persoonia linearis*	Narrow-leaved Geebung	P		2	
Plantae	Flora	Proteaceae	5472	*Persoonia sericea*		P		1	
Plantae	Flora	Proteaceae	PERS	*Persoonia spp.*		P		3	
Plantae	Flora	Proteaceae	8596	*Persoonia stradbrokensis*		P		5	
Plantae	Flora	Proteaceae	5476	*Persoonia virgata*		P		12	
Plantae	Flora	Proteaceae	5477	*Petrophile canescens*	Conesticks	P		1	
Plantae	Flora	Rutaceae	6457	*Acronychia littoralis*	Scented Acronychia	E1,P	E	3	
Plantae	Flora	Rutaceae	5739	*Boronia falcifolia*	Wallum Boronia	P		2	
Plantae	Flora	Rutaceae	5749	*Boronia parviflora*	Swamp Boronia	P		2	
Plantae	Flora	Rutaceae	5750	*Boronia pinnata*		P		5	
Plantae	Flora	Rutaceae	5758	*Boronia safrolifera*		P		3	
Plantae	Flora	Rutaceae	5776	*Eriostemon australasius*		P		4	
Plantae	Flora	Xanthorrhoeaceae	8771	*Xanthorrhoea fulva*		P		3	
Plantae	Flora	Xanthorrhoeaceae	8750	*Xanthorrhoea glauca*		P		3	
Plantae	Flora	Xanthorrhoeaceae	8751	*Xanthorrhoea glauca subsp. glauca*		P		12	
Plantae	Flora	Xanthorrhoeaceae	6317	*Xanthorrhoea johnsonii*	Johnson's Grass Tree	P		1	
Plantae	Flora	Xanthorrhoeaceae	6318	*Xanthorrhoea macronema*		P		10	
Plantae	Flora	Xanthorrhoeaceae	8843	*Xanthorrhoea malacophylla*		P		1	
Plantae	Flora	Xanthorrhoeaceae	XANT	*Xanthorrhoea spp.*		P		3	

Appendix E: Back Creek Public/Pedestrian Access Study

(CURRENTLY UNDER CLIENT REVIEW)

REPORT

Back Creek South West Rocks

Access Study

Client: RMS

Reference: PA1311-101-103 MN-15

Revision: 01/Draft

Date: 17 November 2016

Royal HaskoningDHV

Enhancing Society Together

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Date / initials:	17/11/16
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Open

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Table of Contents

1 Study Background 4

1.1 Scope and Study Area 4

1.2 Boating Infrastructure Options 5

1.3 Existing Access 5

1.4 Foreshore Reserve Character and Use 9

2 Local Context 13

2.1 Tenure and Zoning 13

2.2 Relevant Plans 14

2.2.1 Kempsey Development Control Plan 14

2.2.2 Town Centre Master Plan 16

2.2.3 Horseshoe Bay Plan of Management 17

2.2.4 Pedestrian Access and Mobility Plan 17

3 Opportunities and Constraints 20

3.1 Opportunities 20

3.2 Constraints 20

4 Access Improvements 21

5 References 23

Table of Tables

Plate 1 Boardwalk at Point Briner 7

Plate 2 O'Keefe Road and Entrance Access 7

Plate 3 Pedestrian bridge near wharf 7

Plate 4 Wharf with Humpty Back Bridge in background 7

Plate 5 Humpty Back Bridge leading to Back Beach 7

Plate 6 Ocean Road and O'Keefe Road intersection 7

Plate 7 Ocean Road and private road in background 8

Plate 8 Overgrown access from Gregory Street 8

Plate 9 Private Road off Gregory Street 8

Plate 10 Informal parking at southern end of Buchanan Road 8

Plate 11 Informal foreshore access east of boat ramp 8

Plate 12 Boat ramp (left) and informal parking 8

Table of Figures

Figure 1 Study Area 4
Figure 2 Artist's Impression of new fishing platform currently being constructed by DPI-Lands 6
Figure 3 Study Area Vegetation 10
Figure 4 Study Area Features and Contours (northern section) 11
Figure 5 Study Area Features and Contours (southern section) 12
Figure 6 Tenure, SEPP 14 Wetlands and Heritage 13
Figure 7 Zoning 14
Figure 8 South West Rocks Precincts 15
Figure 9 South West Rocks Master Plan 1999 16
Figure 10 Horseshoe Bay Master Plan 2014 17
Figure 11 Existing and Proposed Pedestrian/ Cycleway Routes 18
Figure 12 Proposed Back Creek Cycleway 19

Appendix A – Concept Plans

Map A1 – Foreshore Access – South

Map A2 – Foreshore Access – East

1 Study Background

1.1 Scope and Study Area

Royal HaskoningDHV (RHDHV) has been engaged by Roads and Maritime Services (RMS) on behalf of Kempsey Shire Council (Council) to investigate recreational boating needs at Back Creek, South West Rocks. The scope of work for these investigations included *a study into pedestrian/ public access connections to the town for each of the options identified to determine how the boating infrastructure options at Back Creek integrate with the surrounding area and would be accessed, utilised and capitalised by the community from South West Rocks and surrounding areas.*

This access study comprises:

- description of the study area and existing access;
- review of surrounding land tenure and zoning;
- review of management plans, master plans, other strategic plans and planning instruments;
- identification of opportunities and constraints to improve access to boating and foreshore facilities, as well as links from the foreshore to the South West Rocks Town Centre;
- development of an access concept plan, taking into account:
    - desire lines (e.g. existing informal tracks, where appropriate);
    - circulation (e.g. pedestrian loop access paths connecting street footpaths and reserves, boating facilities and the town centre, and access to parking areas and turning areas for vehicles with trailers);
    - safety (e.g. separation of vehicle and pedestrian/ cycle traffic); and,
    - use by non-boating public, e.g. incorporation/ integration of viewing points, foreshore walking and cycling routes and parking for cars as part of access to boating facilities.

The study area is shown in **Figure 1**. It includes the foreshores along both sides of Back Creek. This study focuses on linkages along the eastern ("wharf foreshore reserve") and southern foreshores of Back Creek where recreational boating facilities are located and improvements are proposed.



Figure 1 Study area

1.2 Boating Infrastructure Options

Three (3) boating infrastructure improvement options are proposed as follows:

1. Upgrading of the existing boat ramp within Back Creek, including formalised parking and improved amenities.
2. Development of a dinghy skid immediately upstream of Humpty Back Bridge to facilitate launching of passive recreation watercraft.
3. Development of the existing wharf along Buchanan Drive, including provision of a floating pontoon and gangway to facilitate vessel tie-up.

These options are investigated in a separate RHDHV report entitled *Mid-North Coast Boating Investigations Package – MN-15 Back Creek Boating Access Improvements Investigation* (RHDHV, currently in draft) and are indicated on **Maps A1** and **A2** (**Appendix A**).

1.3 Existing Access

Existing foreshore access points are shown in **Maps A1** and **A2** (**Appendix A**). This includes vehicle access, paths and informal tracks as described below and shown in **Plates 1** to **12**.

Existing vehicle access to the foreshore is as follows:

- maintenance access track off O'Keefe Road to the seaward section of the entrance (currently used for entrance clearing works);
- public sealed access via O'Keefe Road (fronting Horseshoe Bay Holiday Park) to Point Briner with informal parking around a cul-de-sac;
- public sealed access via Ocean Drive on the eastern side of the wharf foreshore reserve, terminating to the north of a private road to the foreshore reserve café;
- private concrete road from Gregory Street to the foreshore reserve café;
- public sealed access via Buchanan Drive along the wharf foreshore reserve, with informal parking along the roadway; and,
- public access via the sealed road off Gordon Young Drive to the public boat ramp and informal parking, at the western end of the South West Rocks Tourist Park.

Existing pedestrian access along the foreshore is as follows:

- concrete footpath from Horseshoe Bay connecting to a new boardwalk around Point Briner and onto O'Keefe Road;
- concrete footpath from O'Keefe Road to a pedestrian bridge fronting an old concrete structure, then a short section of concrete path connecting to the wharf and Buchanan Drive;
- a footbridge across a small tributary of Back Creek, connecting to Mayta Moran Close via a concrete footpath between two houses; and,
- from the intersection of Mayta Moran Close and Fig Tree Lane, informal access through the grassed foreshore reserve fronting South West Rocks Tourist Park, to the boat ramp access road.

Pedestrian links to the foreshore/ foreshore parks are as follows:

- informal access to O'Keefe Road from the north-western end of Horseshoe Bay Holiday Park;
- concrete footpath from Gregory Street beside South West Rocks Community Hall with a flight of steps down to Ocean Drive;
- overgrown track from Gregory Street to Buchanan Drive, adjacent to the private concrete road;
- access to the western side of the entrance via Humpty Back Bridge, with a walking track to the northern side of Back Creek entrance;
- walking track behind Back Beach to the Macleay River entrance;
- informal tracks behind residences in Mayta Moran Close; and,
- clearing in the foreshore vegetation with bank protection providing direct water access, approximately half way between Fig Tree Lane and the boat ramp.

In addition to the foreshore access points described above, Department of Primary Industries (DPI) - Lands commenced construction of a new 25 m long fishing platform off Humpty Back Bridge in October 2016. The fishing platform will be located between the creek channel and sandflat which is exposed at low tide. An artist's impression of the structure is shown in **Figure 2**.



Figure 2 Artist's Impression of new fishing platform currently being constructed by DPI-Lands



Plate 1 Boardwalk at Point Briner



Plate 2 O'Keefe Road and entrance access



Plate 3 Pedestrian bridge near wharf



Plate 4 Wharf with Humpty Back Bridge in background



Plate 5 Humpty Back Bridge leading to Back Beach



Plate 6 Ocean Road and O'Keefe Road intersection



Plate 7 Ocean Road and private road in background



Plate 8 Overgrown access from Gregory Street



Plate 9 Private Road off Gregory Street



Plate 10 Informal parking at southern end of Buchanan Road



Plate 11 Informal foreshore access east of boat ramp



Plate 12 Boat ramp (left) and informal parking

1.4 Foreshore Reserve Character and Use

As noted in **Section 1.1**, this study focuses on the eastern and southern foreshore of Back Creek, including Point Briner which separates the Back Creek entrance from Horseshoe Bay. The wharf reserve foreshore is distinctly separate from the Horseshoe Bay area, in both a physical and recreational sense. In contrast to the expansive views from Point Briner, areas of the creek foreshore provide more enclosed views. These areas are of equal natural scenic beauty, with significant vantage points including the foot bridges and more open foreshore areas (KSC 2014).

As the wharf reserve is bounded by the creek, a steep vegetated embankment and the Point Briner Headland it is virtually unseen from the nearby town centre, residential areas and the main Horseshoe Bay foreshore. For this reason past visitation by tourists and day users has not been as high, however, traditionally it has been an important base for recreational anglers and provides the main pedestrian link to Back Beach via the Humpty Back Bridge (KSC 2014).

As an indication of peak pedestrian usage, Council undertook pedestrian counts for the footbridge near the wharf from 13 to 19 April 2016 (school holidays). This indicated about 800 crossings per day (400 crossings each way). Note that this was prior to completion of the boardwalk around Point Briner, which would be expected to increase visitation to Back Creek. During the same period, there were around 200 crossings per day over Humpty Back Bridge.

The Back Creek foreshores retain a number of Aboriginal sites and historical items relating to the reserve's maritime past (KSC 2014). In addition to the Pilot Station Group of Buildings and the Flagstaff and Signal Station, heritage items/ sites in the vicinity of Back Creek include the following.

- Concrete steps and a concrete slab (located in the bush behind the Pilot's House near the existing wharf) which are the remains of the boatshed which housed the Pilot boat. The shed and stepped access was built around 1902 in conjunction with the Pilot's House.
- The original timber footbridge across Back Creek was also built around 1902. This was replaced with the existing high footbridge in the early 1980s (KSC 2014). The mooring jetty (demolished in 2015) which was attached to the footbridge was originally constructed to support the commercial fishing fleet that used to operate out of South West Rocks (DPI 2016).

The foreshore to the west of the town centre consists of mangrove/ saltmarsh flats (see **Figure 3**); then low lying, open parkland fronting the South West Rocks Tourist Park (**Figure 4** and **Figure 5** provide an indication of slopes and elevations along the northern and southern foreshores, respectively). The level of use of this section of the foreshore would be expected to vary considerably between holiday and non-peak periods. For the tourist park visitors, the foreshore provides an informal link to the town centre, and the foreshore clearing in this location provides access to the water for swimming and other recreational uses. The boat ramp would be used by both visitors and locals.

As an indication of peak usage, Council also undertook vehicle counts at the boat ramp access road over one week of the April school holidays (9 to 16 April). This indicated an average daily traffic count (two-way) of 159 cars, with the highest daily count (217 vehicles) on Sunday 10 April. Car and trailer counts indicated an average of seven per day (two-way), with a peak on Sunday 10 April of 17 cars with trailers.

West of the Tourist Park and boat ramp the foreshore is densely vegetated with mangroves (as indicated in **Figure 3**). Therefore, recreational use of this section of foreshore would be expected to be limited.



Figure 3 Study Area Vegetation

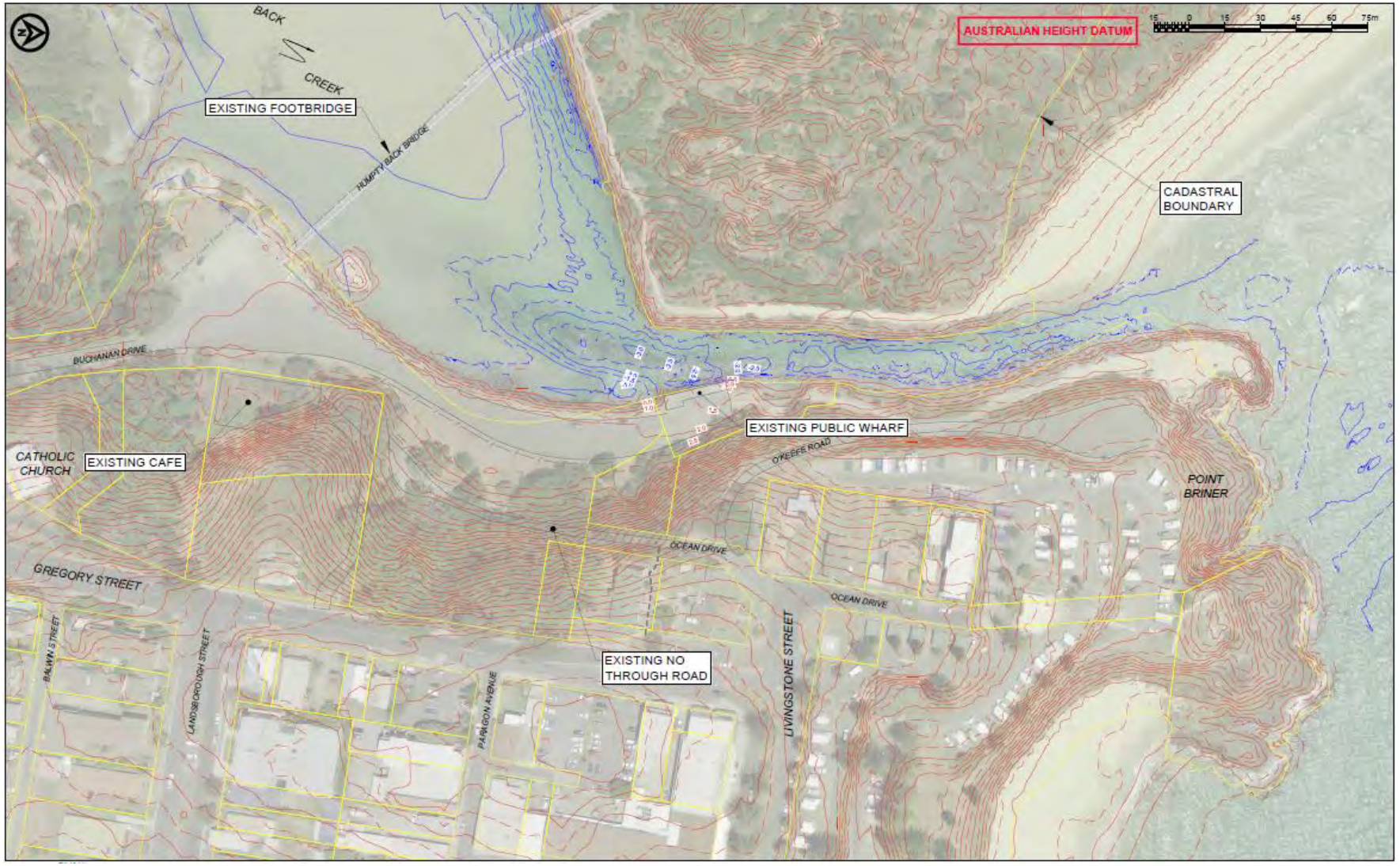


Figure 4 Study Area Features and Contours (northern section)

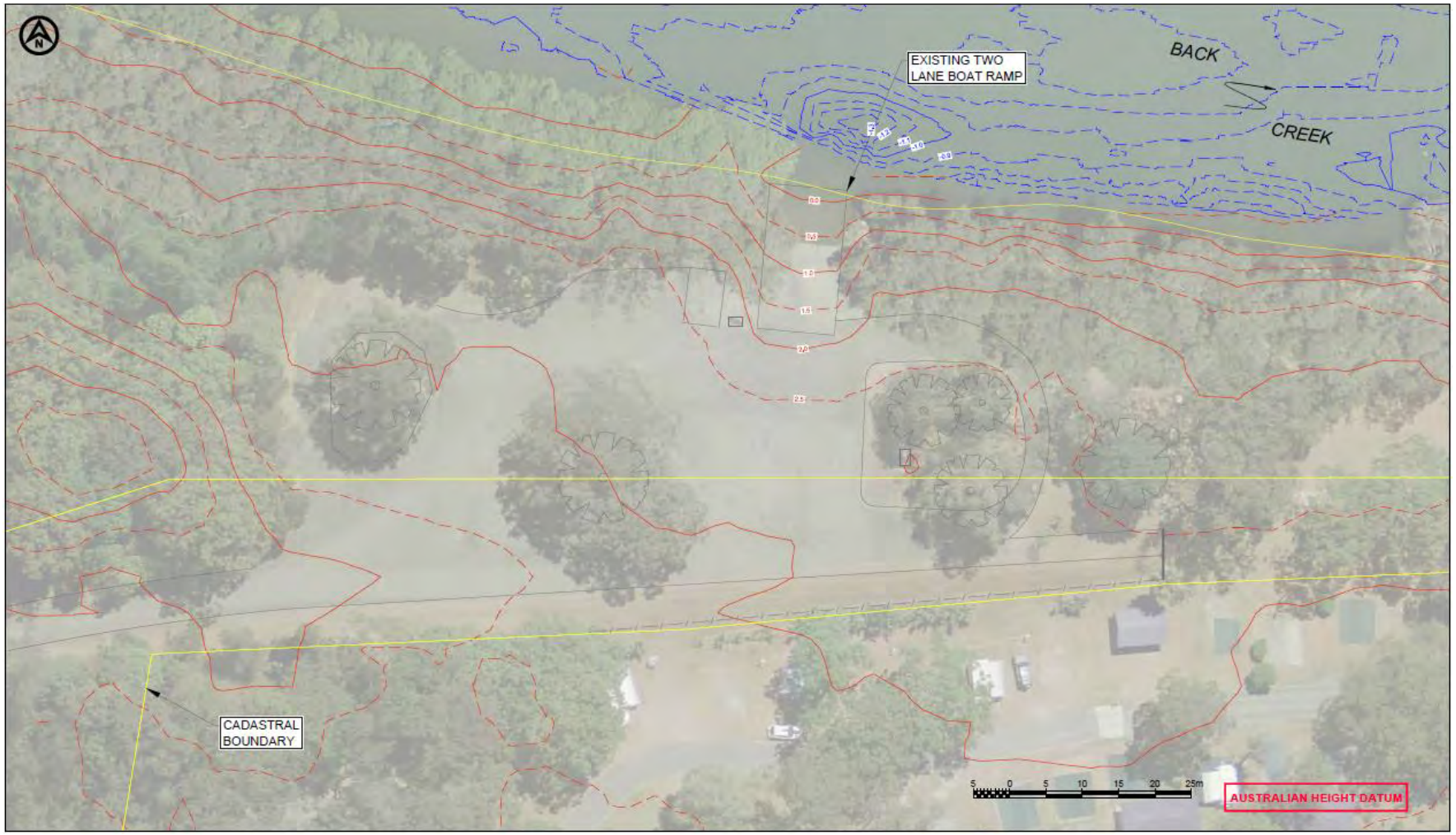


Figure 5 Study Area Features and Contours (southern section)

2 Local Context

2.1 Tenure and Zoning

The majority of foreshore land along Back Creek is Crown Reserve apart from land around New Entrance Road Bridge and an area of unreserved Crown land behind the Mayta Moran Close properties. It is understood that the Mayta Moran Close area is a former Aboriginal mission. The majority of the creek is also unreserved Crown land as shown in **Figure 6**. The creek foreshores are either zoned E2 Environmental Conservation or RE1 Public Recreation as shown in **Figure 7**. The creek waterway is zoned W1 Natural Waterways.

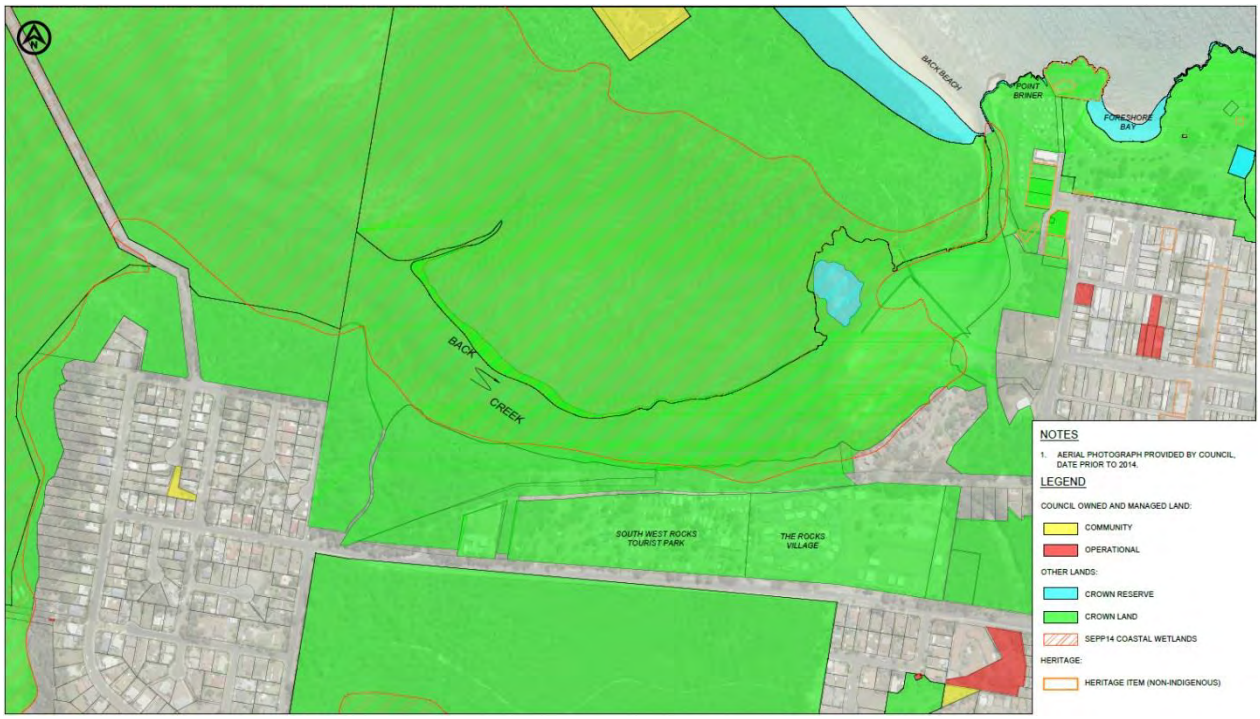


Figure 6 Tenure, SEPP 14 Wetlands and Heritage

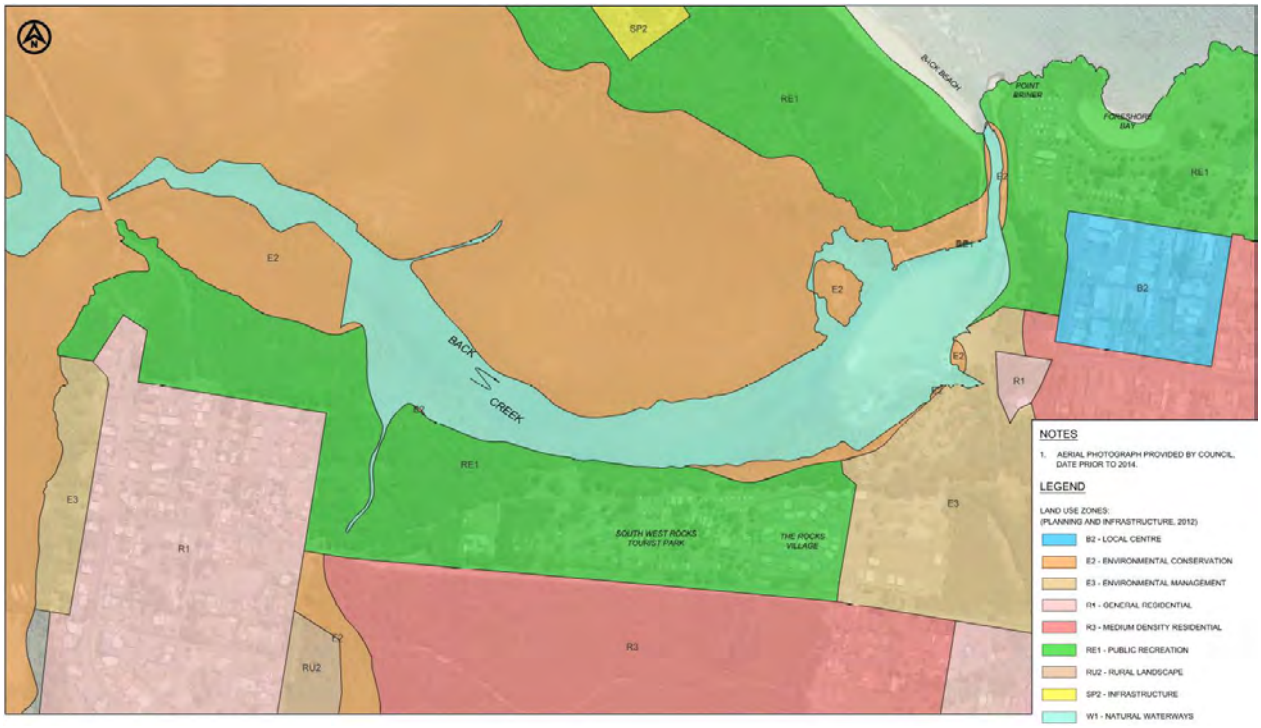


Figure 7 Zoning

2.2 Relevant Plans

2.2.1 Kempsey Development Control Plan

The town centre precincts and desired outcomes described in the *Kempsey Development Control Plan (DCP) 2013* are based on the *South West Rocks Urban Design Study and Town Centre Master Plan* (Rupert G.H. Milne Home 1999) and the *Horseshoe Bay Plan of Management* and associated master plan. The original plan of management was prepared by Kempsey Shire Council (KSC) in 2005, revised in 2006 and updated in 2014, see **Section 2.2.3**. This plan supersedes the Town Centre Master Plan for the northern portion of Precinct 1 (see **Figure 8**). The DCP states that, in order to achieve a cohesive and attractive theme throughout the town centre, all work affecting public land, recreation reserves, sidewalks, streets, road reserves and the like is to be designed and undertaken in a manner consistent with the aims and intent of the South West Rocks Town Centre Master Plan.

The DCP divides the town centre into four precincts, as shown in **Figure 8**: Precinct P1 Public and Recreation Areas; Precinct P2 Village Commercial; Precinct P3 Tourist Accommodation Area; and Precinct P4 Village Character and Heritage.



Figure 8 South West Rocks Precincts

Precinct 1 is further broken down into the following sub-precincts:

- Back Creek Foreshore Linear Park and Special Uses Area
- Maritime Heritage Grouping
- Horseshoe Bay Caravan Park
- Remaining open space areas including: Flagstaff Point, Horseshoe Bay Foreshore Park, Point Briner Headland and Trial Bay Park area.

The desired outcomes for the Back Creek Foreshore Linear Park and Special Uses Area are:

- retention of substantial areas of dense vegetation and large trees
- large building setbacks and low level built forms
- the relationship with nearby Maritime Heritage buildings and the Arts Hall (community hall)
- minimal vehicle access points and informal entry ways.

2.2.2 Town Centre Master Plan

Master Plan recommendations (see **Figure 9**) for the Back Creek Foreshore Linear Park Precinct included:

- enhance the water focused natural area for informal/ passive recreation
- retain the dense natural vegetation separation from town
- provide a pedestrian path/ cycleway along the foreshore linking to the town
- rationalise carparking at the southern end of Buchanan Drive (reducing sealed area and creating parkland fronting Humpty Back Bridge) and formalising parking at the end of O'Keefe Road (also shown on the Horseshoe Bay Master Plan, see **Figure 10**).

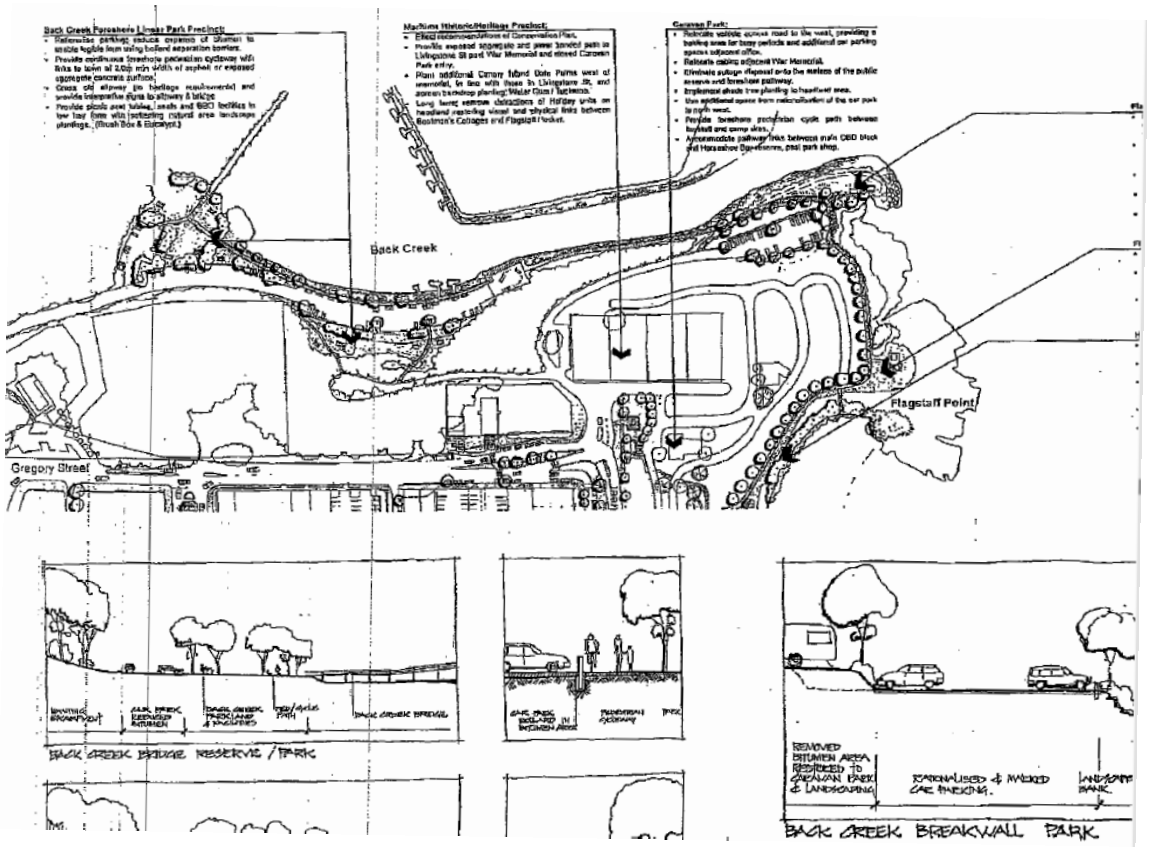


Figure 9 South West Rocks Master Plan 1999

2.2.3 Horseshoe Bay Plan of Management

The Horseshoe Bay Plan of Management and associated master plan included extension of the pedestrian access around the headland (now completed) connecting to formalised car parking at the end of O'Keefe Road as shown in **Figure 10**. Management objectives for the Back Creek foreshore included greater pedestrian accessibility, improved and additional infrastructure, and enhancement and improvement of the visual amenity of the area.

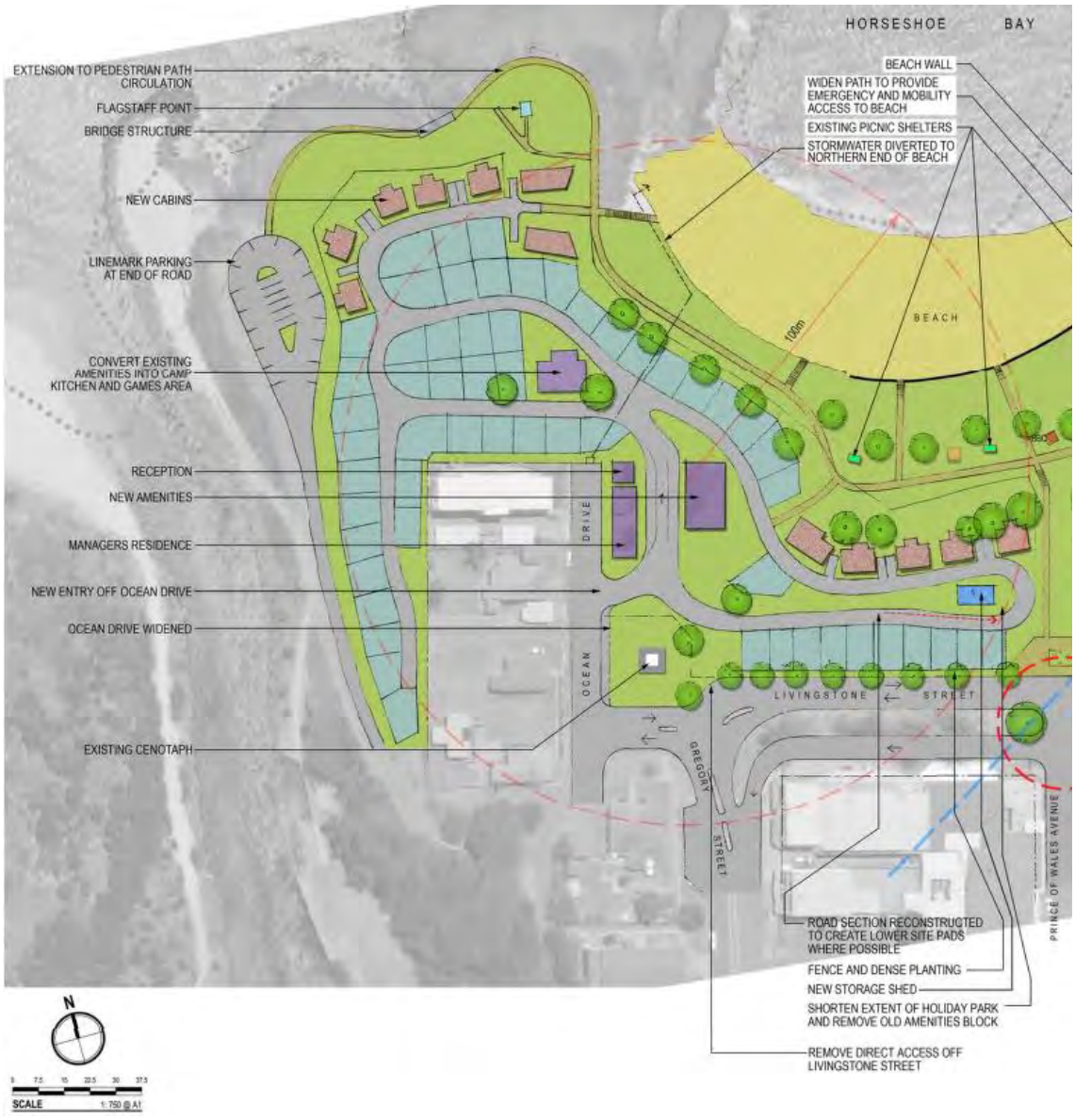


Figure 10 Horseshoe Bay Master Plan 2014

2.2.4 Pedestrian Access and Mobility Plan

Existing and proposed access routes for South West Rocks, as described in the Pedestrian Access and Mobility Plan (KSC 2016), are shown in **Figure 11**. A shared pedestrian/ cycleway is proposed, linking the Back Creek entrance with the boat ramp and Gordon Young Drive, as shown in **Figure 12**.

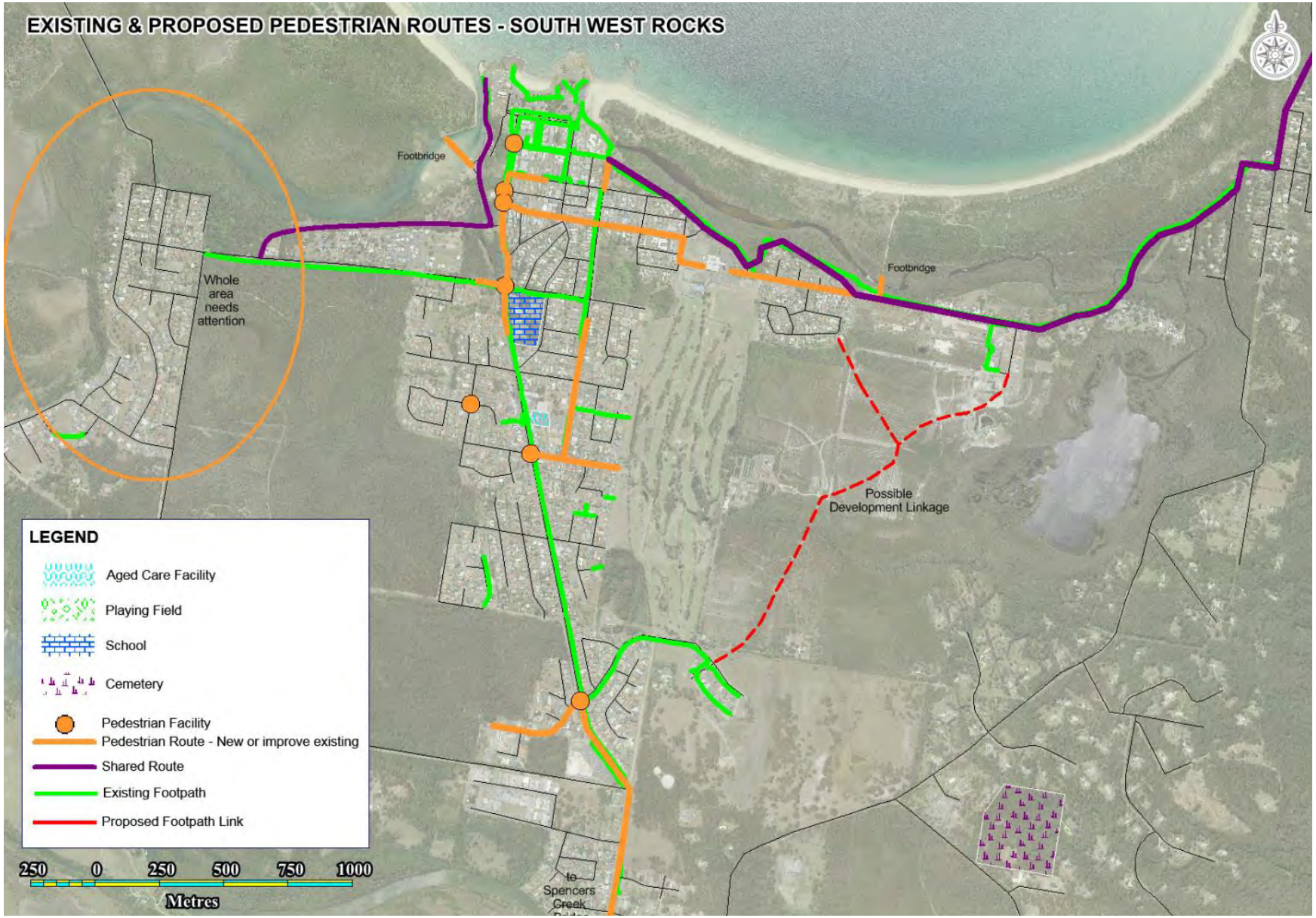


Figure 11 Existing and Proposed Pedestrian/ Cycleway Routes

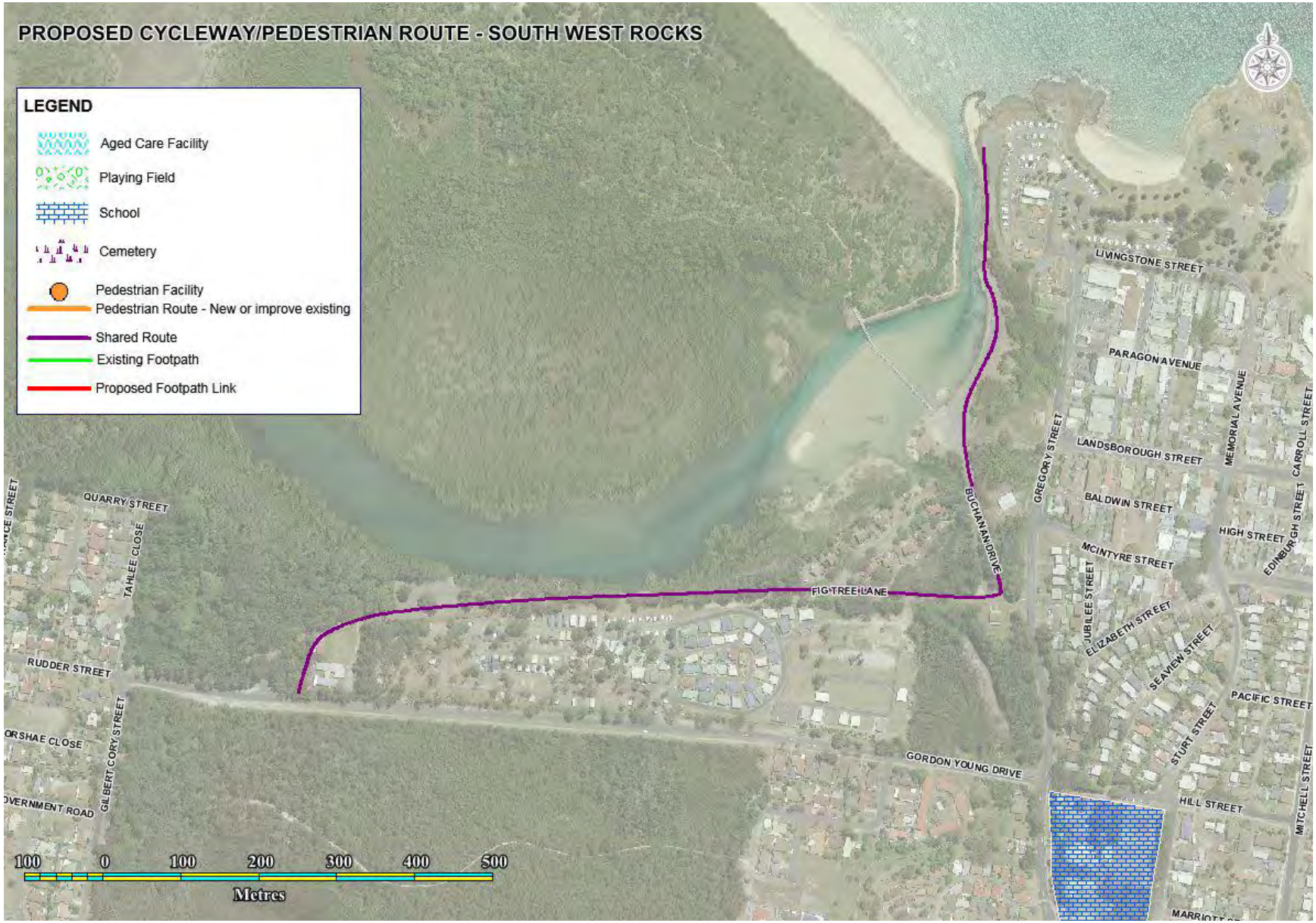


Figure 12 Proposed Back Creek Cycleway

3 Opportunities and Constraints

3.1 Opportunities

As shown in **Figure 6**, the foreshores are in public ownership and a large part of the southern and eastern foreshore is zoned RE1 (see **Figure 7**). Provision of public access for recreational uses is consistent with the RE1 zone objectives, and the W1 zone objectives provide support for access for recreational fishing. In addition, existing plans, as discussed in **Section 2.2**, support improved pedestrian and cycle access along the foreshore.

The existing formal and informal pedestrian and vehicle access routes and parking, as described in **Section 1.3**, provide opportunities for additional linkages. Existing and proposed structures, e.g. wharf (**Plate 4**) and fishing platform (**Figure 2**) also provide direct access to the water's edge and are vantage points to enjoy views of the creek upstream and downstream.

In addition, the proposed wharf upgrade (boating improvement Option 3, refer **Section 1.2**) would provide commercial opportunities for the local region by allowing passenger loading/unloading for a variety of commercial operations (e.g. fishing charters, dive charters, cruise line tenders).

The natural and cultural heritage values of the area provide opportunities for interpretation (see **Figure 3** and **Figure 6**).

3.2 Constraints

Sections of the foreshore are zoned E2 where the mapped SEPP 14 wetland (see **Figure 8**) extends landward of the creek waterway. The E2 zoned area at the entrance has been modified by entrance works and access tracks, reducing its environmental value.

However, the E2 zoned area to the southwest contains saltmarsh which is listed as an Endangered Ecological Community (EEC) under the *Threatened Species Conservation Act 1995*, as well as mangroves which are protected under the *Fisheries Management Act 1994*. Relevant legislation and the various environmental planning instruments place restrictions on development and activities and, as such, access through this area should be avoided. As noted in **Section 1.4**, dense mangroves stands cover the foreshore to the west of the boat ramp, see **Figure 3**.

There are a number of recorded Aboriginal sites within the mangrove stands. There is also an Aboriginal site located between the overgrown access track (**Plate 8**) and private road (**Plate 9**). Aboriginal sites are protected under the *National Parks and Wildlife Act 1974*.

As indicated in **Figure 4**, there is a steep embankment between the Buchanan Drive foreshore and the town centre which makes provision of access difficult for people with restricted mobility.

4 Access Improvements

In view of the significant ecological, visual, heritage and recreational values of the Back Creek foreshore, it is recommended that a Landscape Plan be developed, consistent with the principles contained in the plans referred to in **Section 2.2**, and incorporating interpretation of heritage and ecological values.

With regard to foreshore access and links, the recommendations set out below are made. Conceptual plans indicating the proposed new access routes and parking arrangements are shown in **Maps A1** and **A2** (**Appendix A**).

- Separate pedestrian and vehicle access between the new boardwalk around Point Briner to the path connecting to the footbridge and wharf. For example, installation of bollards along the western side of the roadway, access across the entrance access road, and construction of a concrete path adjacent to the training wall leading to the existing concrete path.
- Formalise parking at the northern end of O'Keefe Road, i.e. line marked carparks as per **Figure 10**, excluding spaces on northern side (proposed location of shared path).
- Consider relocating part of Buchanan Drive to the east of the grassed parkland between the wharf and Humpty Back Bridge to create more green space directly adjoining the waterway with formal carparks at each end, i.e. adjacent to the wharf, and adjacent to the café/ Humpty Back Bridge.
- Provide all-tide access for commercial and private vessels to utilise the existing public wharf through the provision of floating pontoons and a gangway (i.e. Option 3 of the boating infrastructure improvement options). This option would be supported by pedestrian and vehicle connections that provide direct access to the town centre.
- A passenger pickup/drop-off bay could also be included in the carpark adjacent to the wharf to facilitate the movement of large groups of people associated with any commercial boating operations. The drop-off bay could also be utilised by the public as a convenient spot to unload people and equipment for fishing etc.
- Part of the existing asphalt roadway adjacent to the creek could become a shared pathway that provides direct pedestrian access to the town centre.
- Close the Ocean Drive access at the community hall and construct a footpath along the existing vehicle track alignment to connect with the new green space adjacent to creek.
- Implement the shared pathway alignment proposed in the *Pedestrian Access and Mobility Plan* (**Figure 12**). This pathway would provide a connection between the boat ramp foreshore in the south and the wharf foreshore reserve to the north.
- Provide kayak/ canoe access immediately upstream of Humpty Back Bridge (i.e. Option 2 of the boating infrastructure improvement options).
- Create a grassed area fronting Humpty Back Bridge, consistent with the objectives of the *Town Centre Master Plan 1999*.
- Reduce the width of Buchanan Drive or use the road shoulder for continuation of the shared pathway to the existing footbridge over the small tributary to Back Creek.
- Construct a new footpath immediately south of the church (opposite the end of McIntyre Street) to connect with the existing footbridge and new shared path.
- Formalise parking at the boat ramp, i.e. provision of separate car and car with trailer parking (i.e. Option 1 of the boating infrastructure improvement options).

- All carpark designs to consider provision for overflow parking during peak periods.
- Consider naming the boat ramp access road, reserves and paths to reflect the local maritime history.
- Where possible, pedestrian access should avoid steps and grades should be suitable for mobility scooters (1V:8H maximum slope). Disabled spaces to be designated at all carparks.
- Additional park facilities should also be considered, e.g. picnic tables and amenities blocks.

5 References

Department of Primary Industries [DPI] (2016), *Review of Environmental Factors Proposed Construction of Fishing Platform Back Creek, South West Rocks*

Kempsey Shire Council [KSC] (2016), *Pedestrian Access and Mobility Plan Kempsey Local Government Area*

Kempsey Shire Council [KSC] (2014), *Plan of Management Horseshoe Bay Reserve South West Rocks*

King + Campbell (2014), Master Plan for *Plan of Management Horseshoe Bay Reserve South West Rocks*

Kempsey Shire Council [KSC] (2013), *Kempsey Development Control Plan*

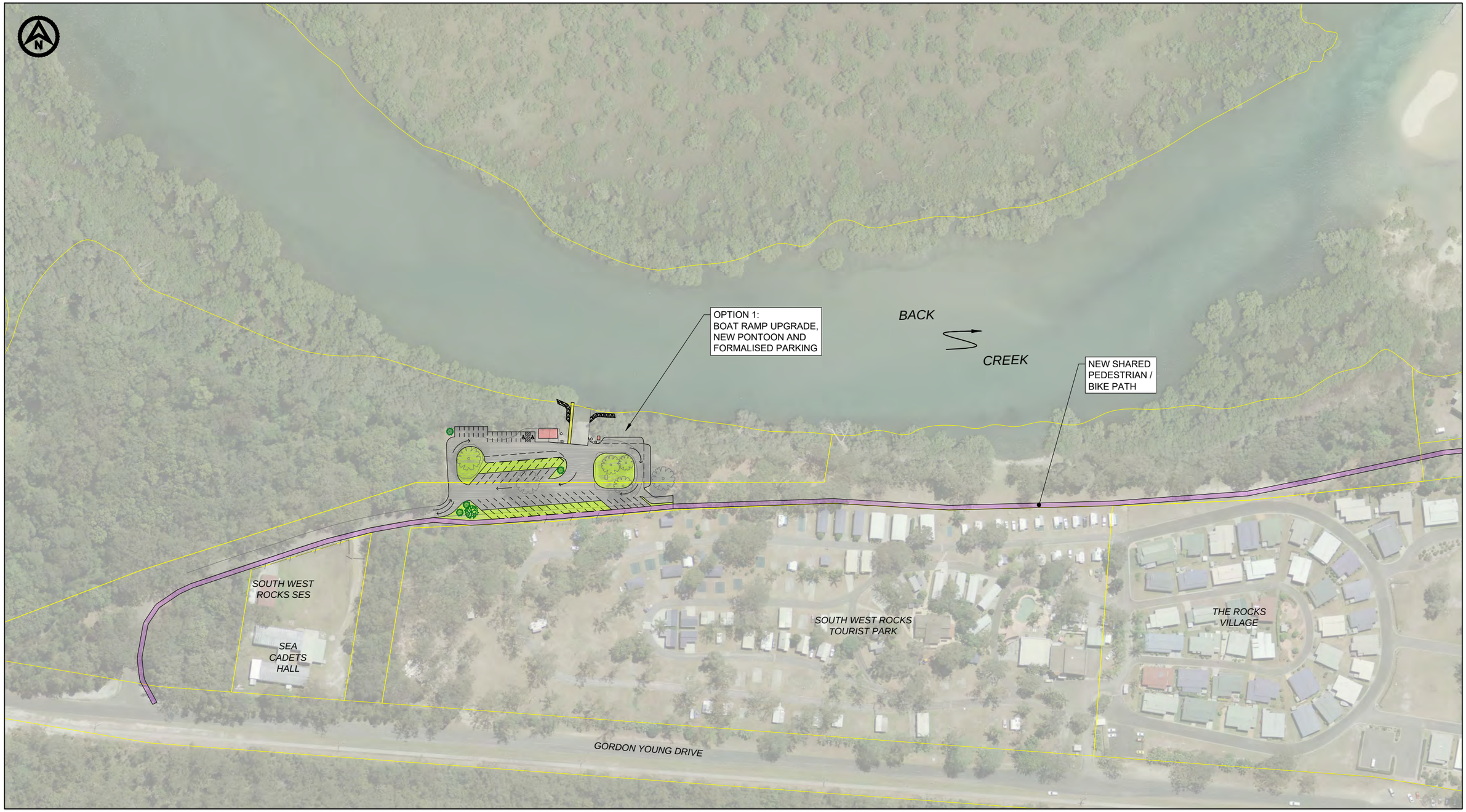
Rupert G.H. Milne Home Landscape Consulting (1999), *South West Rocks Urban Design Study and Town Centre Master Plan*, July

Appendix – Concept Plans

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MN-15 - BACK CREEK FORESHORE ACCESS

SOUTH
MAP A1



20 0 20 40 60 80 100m
1:1000 (A1) 1:2000 (A3)

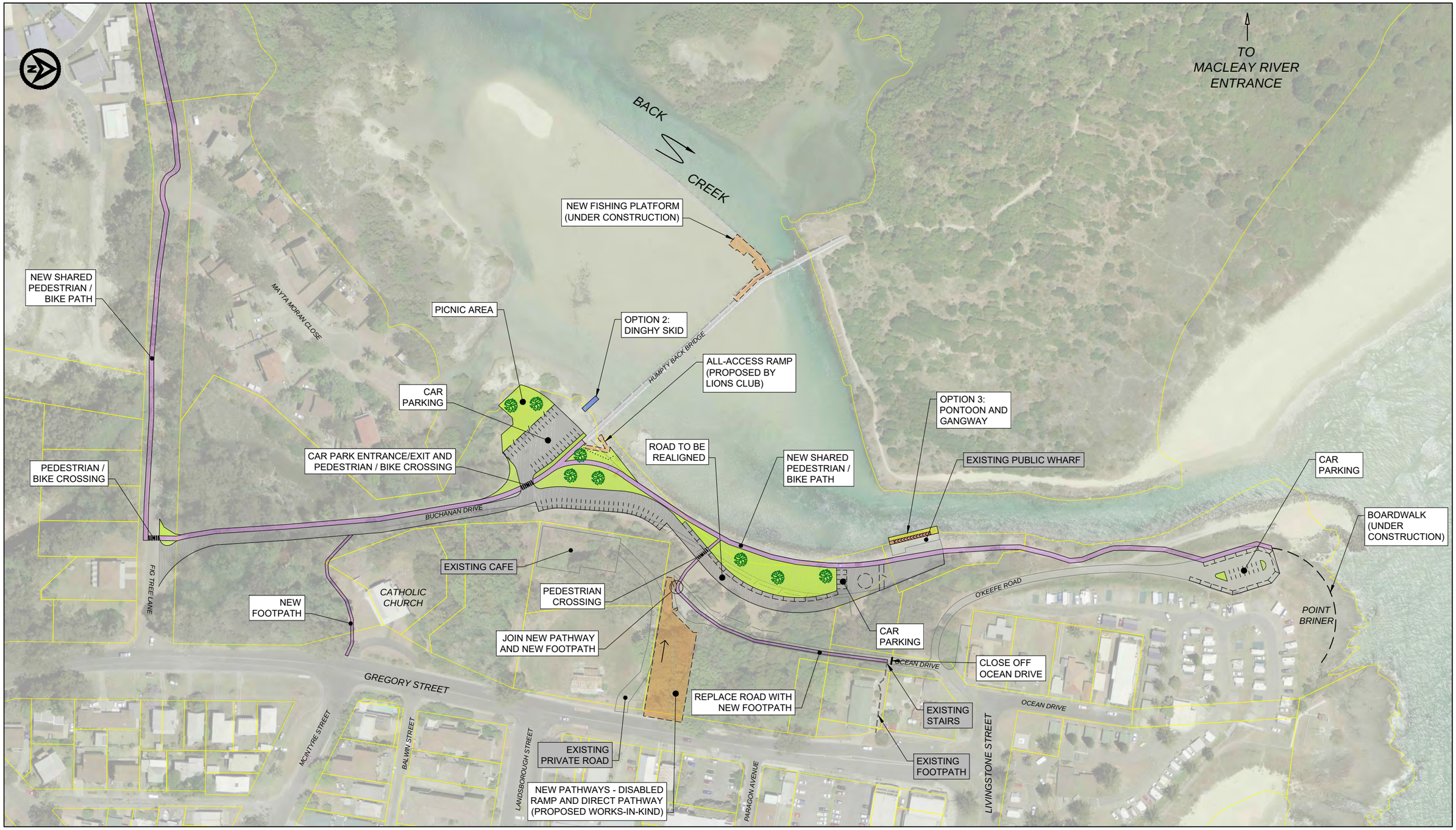
NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.

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MN-15 - BACK CREEK FORESHORE ACCESS

EAST
MAP A2



20 0 20 40 60 80 100m
1:1000 (A1) 1:2000 (A3)

NOTES

1. AERIAL PHOTOGRAPH PROVIDED BY COUNCIL, DATE PRIOR TO 2014.