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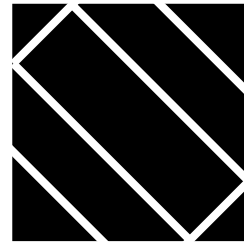
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# + REVIEW OF ENVIRONMENTAL FACTORS – PART 5 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979 (as amended)

## PROPOSED LAKE AINSWORTH FORESHORE IMPROVEMENTS

### Lennox Head NSW

• Prepared For: Ballina Shire Council | • Prepared by: DAC Planning Pty Ltd | • November 2017 |



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**REVIEW OF ENVIRONMENTAL FACTORS**  
**PROPOSED LAKE AINSWORTH FORESHORE IMPROVEMENTS**  
**AT LENNOX HEAD**

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## 1.0 INTRODUCTION

Ballina Shire Council has instructed DAC Planning Pty Ltd to prepare this Review of Environmental Factors for foreshore improvement works at Lake Ainsworth, Lennox Head within the Ballina Local Government Area.

The project has been assessed against the relevant provisions of Ballina Local Environmental Plan 1987 (BLEP1987), Ballina Local Environmental Plan 2012 (BLEP2012) and State Environmental Planning Policy (Infrastructure) 2007 (SEPP1) following which it is considered that the project can be carried out without the need for development consent, or is exempt development.

Accordingly, approval of the proposed activity under Part 5 of the Environmental Planning and Assessment Act, 1979 (as amended) (EPAA) is required. This Review of Environmental Factors (REF) is intended to enable Council to issue a Part 5 Activity Approval for the project.

## 2.0 BACKGROUND

In September 2016, Ballina Shire Council prepared a Review of Environmental Factors (REF) under Part 5 of the Environmental Planning and Assessment Act, 1979 (as amended) (the Act), Reference No. 2016/003, for Lake Ainsworth foreshore improvement works at Lennox Head, New South Wales.

Sections 1.1 and 1.2 of the REF describe the proposed work as follows:

### *1.1 Name and Location of Proposed Activity*

*Improvement works along the eastern and south eastern foreshore of Lake Ainsworth, Pacific Parade, Lennox Head, NSW.*

### *1.2 Description of Location*

*The proposed works form part of the Lake Ainsworth Recreational Precinct: Lennox Head Concept Plan by Design Team Inc. (2016) provided in Appendix D and are broken down into 3 principle areas shown in Figure 1.1 referred to as:*

- **Eastern Road** – *Rehabilitating the road by profiling the existing pavement and constructing a footpath and landscaping the area of public reserve to create passive recreation space between the eastern shore of Lake Ainsworth and Seven Mile Beach.*
- **Intersection** – *Reconstruction of the 3-way Intersection between Pacific Parade, the eastern road and the southern road adjacent to the existing Lennox Head/Alstonville Surf Life Saving Club building. The new intersection will be a 2-way intersection incorporating a turn facility and will be the termination point of the existing eastern road (open to emergency vehicle and maintenance service vehicles only)*
- **Southern Road** – *Reconstruction of the existing road way and formalising the adjoining car parking bays between Pacific Parade and Camp Drew Road. These are future works and do not form part of the Part V consent.*

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In response to the Part 5 REF, on 4 November 2016 Ballina Shire Council issued a Notice of Determination granting approval under Section 111 of the Act subject to conditions (Approval No. Part V Register No. 22.2016/14). A copy of the Approval is contained at **Annexure H**. The Approval authorises some of the work proposed in this REF, however for completeness, Council has decided to prepare a fresh REF under Part 5 of the Act for the whole of the works now proposed, including reconstruction of the southern road.

This REF and Part 5 Assessment will supersede Part 5 Approval No. 22.2016/14.

### 3.0 PROPERTY DESCRIPTION

In real property terms, the land to which this application relates is described as Lot 62 DP 755725, Lot 7016 DP 1113629, Lots 1, 2 and 3 DP 1115145, Lot 7022 DP 1052251 Pacific Parade and the Camp Drew road reserve (western road).

There are multiple lots involved with various trustees and zonings and accordingly the following table has been prepared to summarise Lot and DP numbers, ownership, trustees and zoning.

| TABLE 1 – SUMMARY OF LOTS |         |       |                                    |   |
|---------------------------|---------|-------|------------------------------------|---|
| Lot                       | DP      | Owner | Trustee                            | Zoning                                  |
| 62                        | 755725  | Crown | Part BSC                           | Part RE1 BLEP2012<br>Part 7(f) BLEP1987 |
| 62                        | 755725  | Crown | Part NSW Crown Holiday Parks Trust | Part RE1 BLEP2012<br>Part 7(f) BLEP1987 |
| 7016                      | 1113629 | Crown | N/A                                | 7(f) BLEP1987                           |
| 1                         | 1115145 | Crown | BSC (Lennox Head Surf Club)        | 7(f) BLEP1987                           |
| 2                         | 1115145 | Crown | BSC                                | 7(f) BLEP1987                           |
| 3                         | 1115145 | Crown | BSC                                | 7(f) BLEP1987                           |
| 7002                      | 1052251 | Crown | BSC                                | 7(f) BLEP1987                           |

**Annexure A** comprises an Aerial Photograph showing the topographic features of the land and improvements. **Annexure B1** comprises a Site Plan showing the location of the proposed development in relation to the various lot boundaries, zone boundaries and Reserve Trust boundaries.

### 4.0 PROJECT DESCRIPTION

The description of the proposed project is contained in Section B4, Items iv(a) to (d) of Council's Request for Quotation No. 935, at Page 11, which is reproduced as follows:

**"B4. BACKGROUND**

- iv. *The proposed works involve improvements along the eastern and south eastern foreshore of Lake Ainsworth, as discussed below and shown in **Figure 1**:*
  - a. *Eastern Road. Rehabilitating the road by profiling the existing pavement and constructing a footpath and landscaping the area of public reserve along to the overbank area of the eastern shore of Lake Ainsworth."*

Relocation of the existing 100m diameter watermain is also proposed.

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The Application Plans also show picnic settings, seating, wheelchair ramps into Lake Ainsworth and reinstatement of existing eroded embankments.

This REF and Part 5 Assessment also requests approval for the initial implementation /construction works and the ongoing maintenance required to maintain the Lake Ainsworth beach access in perpetuity. This may require ongoing sand replenishment, replacement of logs, ramps and periodically reshaping sand after heavy usage.

The nine Melaleuca trees adjacent to the eastern road were originally proposed to be removed. Following a redesign of the proposed concrete pathway, these trees will now be retained.

- b. Intersection. Reconstruction of the 3-way Intersection between Pacific Parade, the eastern road and the southern road adjacent to the existing Lennox Head/Alstonville Surf Life Saving Club building. The new intersection will be a 2-way intersection incorporating a turn facility and will be the termination point of the existing eastern road (open to emergency vehicle and maintenance service vehicles only)
- c. Southern Road and Foreshore Area. Reconstruction of the existing road way and formalising the adjoining car parking bays between Pacific Parade and Camp Drew Road. These works are along the overbank area of public reserve along the southern shore of Lake Ainsworth. It includes bank stabilization, improvement of the open spaces for passive recreation and pedestrian linkages between existing isolated open spaces.

As indicated on the Aerial Photograph at **Annexure A**, there is an existing road (open to the public) on the southern side of Lake Ainsworth.

Minor realignment of the southern road is proposed such that it ultimately defines the boundary between the Lake Ainsworth Caravan Park (NSW Crown Holiday Parks Trust) and the Lake Ainsworth Foreshore Reserve (Ballina Shire Council Trust Manager).

Following the closure of the eastern road, increased traffic will be generated on the western road (Camp Drewe Road). It is not proposed to seal Camp Drewe Road from the southern road to the Lake Ainsworth National Fitness Camp entrance as part of the proposed foreshore improvement works. However, this section of road could possibly be sealed at a later date when operational funds become available.

Traffic issues area addressed in the Engineering Services Report at **Annexure E**.

- d. Boardwalk.

As shown on the Application Plans, a low impact boardwalk linking through the pockets of vegetation is also proposed.

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Figure 1: Locality plan showing environmental extent of proposed works  
 Source: Ballina Shire Council, Review of Environmental Factors, 22 September 2016

Full details of the proposed project are contained in the Application Plans at **Annexure B**.

Background information in relation to the site and project is contained in the Engineering Report at **Annexure E**.

## 5.0 STATUTORY PLANNING CONSIDERATIONS

### 5.1 Environmental Planning and Assessment Act, 1979 (as amended)

To determine whether or not development consent for the proposed work is required under Part 4 of the EPAA, an assessment of relevant Environmental Planning Instruments (EPIs) is required. The following Sections address BLEP1987, BLEP2012 and SEPPI, being the relevant EPIs.

### 5.2 Ballina Local Environmental Plan 2012

As indicated on Drawing LHR30\_061/OP (Overall Plan) at **Annexure B1**, part of the site is zoned RE1 Public Recreation under the provisions of this Plan.

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The Lake Ainsworth Caravan Park (LACP) is located within the RE1 land as is the existing and proposed southern road. It is proposed to reconstruct part of southern road within the RE1 land, including parallel parking (turf cells) and bioretention basins.

The objectives of the RE1 zone and the Land Use Table are as follows:

**"Zone RE1 Public Recreation**

**1 Objectives of zone**

- To enable land to be used for public open space or recreational purposes.
- To provide a range of recreational settings and activities and compatible land uses.
- To protect and enhance the natural environment for recreational purposes.
- To provide for a diversity of development that meets the social and cultural needs of the community.
- To provide for public access to open space and natural recreation areas.
- To protect and conserve landscapes in environmentally sensitive areas, particularly in foreshore and visually prominent locations.
- To provide for development that is consistent with any applicable plan of management.
- To encourage development that achieves the efficient use of resources such as energy and water.

**2 Permitted without consent**

Environmental protection works; Flood mitigation works; Roads

**3 Permitted with consent**

Boat launching ramps; Boat sheds; Camping grounds; Car parks; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Community facilities; Emergency services facilities; Entertainment facilities; Environmental facilities; Extensive agriculture; Forestry; Function centres; Heliports; Information and education facilities; Jetties; Kiosks; Markets; Public administration buildings; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Respite day care centres; Restaurants or cafes; Sewerage systems; Signage; Take away food and drink premises; Water recreation structures; Water supply systems; Wharf or boating facilities

**4 Prohibited**

Any development not specified in item 2 or 3"

It is considered that the parallel car parking and bioretention basins are ancillary to the proposed southern road reconstruction work.

The proposed southern road will not be located in a public road reserve, however the road will be open to the public. The definition of "road" in BLEP2012 is as follows:

*"road means a public road or a private road within the meaning of the Roads Act 1993, and includes a classified road."*

The Land Use Table for the RE1 zone provides that development for the purposes of a "road" is permissible, **without** development consent.

Therefore, an Environmental Assessment and Approval under Part 5 of the Act will be required. A Part 5 Assessment has been completed and an Approval has been issued (see **Annexure H**) however the REF and Approval only apply to the eastern 200m length of the southern road.

For completeness, this Part 5 Assessment addresses all works described in Section 4.0.

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Based on the overall Plan at **Annexure B1**, a small component of the southern foreshore works are also within the RE1 zone. This work would be appropriately characterised as development for the purposes of a “recreation area” which is permissible in the RE1 zone, with consent. “Recreation Area” is defined as follows:

*“recreation area means a place used for outdoor recreation that is normally open to the public, and includes:*

- (a) a children’s playground, or*
  - (b) an area used for community sporting activities, or*
  - (c) a public park, reserve or garden or the like,*
- and any ancillary buildings, but does not include a recreation facility (indoor), recreation facility (major) or recreation facility (outdoor).”*

See comments below in relation to Clauses 65(2)(d) and 65(3) of SEPPI, which has the effect of permitting the foreshore works without development consent. Therefore, a Part 5 Assessment will be required rather than a Part 4 Development Application.

The remainder of the subject land is a “deferred matter” and therefore BLEP1987 continues to apply to the deferred areas.

### 5.3 Ballina Local Environmental Plan 1987

As indicated on **Figure 2**, that part of the site mapped as a “deferred matter” under BLEP2012 is zoned 7(f) Environmental Protection (Coastal Land) under BLEP1987.

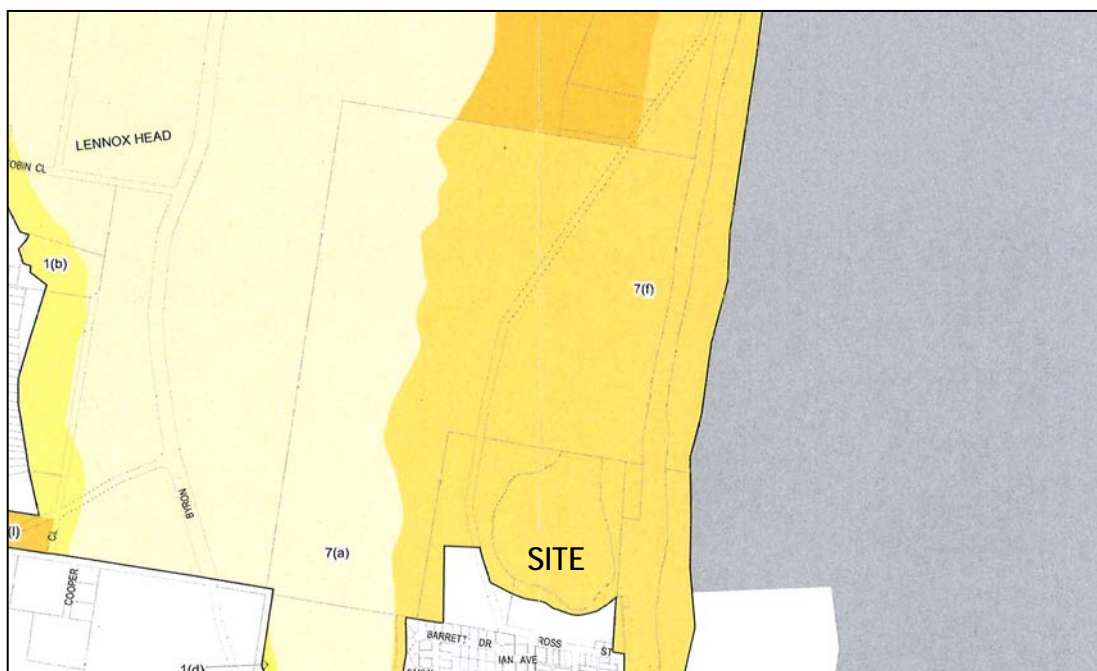


Figure 2 – Zoning Map  
Source: Ballina Local Environmental Plan 1987

Clause 9(7) of the Plan provides that:

**“9 Zone objectives and development control table**

- (7) Except as otherwise provided by this plan, the council shall not grant consent to the carrying out of development on land to which this plan applies unless the carrying out of the development is consistent with the objectives of the zone within which the development is proposed to be carried out.”*

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The objectives and Land Use Table for the 7(f) zone are as follows:

**"Zone No 7 (f) Environmental Protection (Coastal Lands) Zone**

**1 Objectives of zone**

A The primary objectives are:

- (a) to protect environmentally sensitive coastal lands, and
- (b) to prevent development which would adversely affect or be adversely affected, in both the short and long term, by the coastal processes.

B The secondary objectives is to enable the development of public works and recreation amenities where such development does not have significant detrimental effect on the habitat, landscape or scenic quality of the locality.

C The exceptions to these objectives are:

- (a) to permit the development of public works, outside the parameters outlined in the primary and secondary objectives, only in cases of demonstrated and overriding public need and subject to the impact on the coastal lands being minimised, as much as is reasonably practical, and
- (b) development of surf life saving, environmental education facilities and like facilities.

**2 Without development consent**

Nil.

**3 Only with development consent**

Agriculture; beach amenities; bed and breakfast establishments; bush fire hazard reduction; camping grounds; caravan parks; community buildings; drainage; dwelling-houses; environmental educational facilities; environmental protection works; forestry; golf courses; helipads; home industries; open space; picnic grounds; pipelines associated with aquaculture; recreation establishments; recreation facilities; refreshment rooms; roads; surf club houses; utility installations.

**4 Advertised development—only with development consent**

Nil.

**5 Prohibited development**

Any purpose other than a purpose specified in item 3."

The proposed roundabout and the eastern foreshore works are within the 7(f) zone.

Development for the purposes of "roads" is permissible, with development consent, in the 7(f) zone. Roads are not defined in BLEP1987, or the 1980 Model Provisions, which are adopted pursuant to Clause 6 of the Plan. Notwithstanding the above, Clause 94(1) of SEPP1 provides that:

**"94 Development permitted without consent—general**

- (1) Development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority without consent on any land. However, such development may be carried out without consent on land reserved under the National Parks and Wildlife Act 1974 only if the development:
  - (a) is authorised by or under the National Parks and Wildlife Act 1974, or
  - (b) is, or is the subject of, an existing interest within the meaning of section 39 of that Act, or
  - (c) is on land to which that Act applies over which an easement has been granted and is not contrary to the terms or nature of the easement."

Clause 8 of the SEPP provides that the Policy prevails over BLEP1987 to the extent of any inconsistency.

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It follows from the above that the proposed roundabout does not require development consent under Part 4 of the Act, however an Environmental Assessment and Approval under Part 5 of the Act will be required.

A Part 5 Assessment has been completed (REF 2016/003, Lake Ainsworth Foreshore Improvement Works Lennox Head NSW, BSC 22 September 2016), a copy of which is provided at **Annexure H**. The Assessment and Part 5 Approval do not apply to the southern road however they do apply to the proposed roundabout.

In relation to the proposed eastern and southern foreshore improvement works, BLEP1987 does not include a specific definition encompassing the proposed work. Development for the purposes of "open space" is permissible, with development consent, in the 7(f) zone and given the nature of the proposed works, in a generic sense, they could be characterised as development for the purposes of "open space".

Notwithstanding the above, Clauses 65(2)(d) and (3)(a), (b), (e), (f) and (h) of SEPPI provide that:

**"65 Development permitted without consent**

(2) *Development for any purpose may be carried out without consent:*

(d) *in the case of land that is a reserve within the meaning of Part 5 of the Crown Lands Act 1989, by or on behalf of the Director-General of the Department of Lands, a trustee of the reserve or (if appointed under that Act to manage the reserve) the Ministerial Corporation constituted under that Act or an administrator,*

*if the development is for the purposes of implementing a plan of management adopted for the land under the Act referred to above in relation to the land.*

(3) *Development for any of the following purposes may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council:*

(a) *roads, cycleways, single storey car parks, ticketing facilities and viewing platforms,*

(b) *outdoor recreational facilities, including playing fields, but not including grandstands,*

(e) *landscaping, including irrigation schemes (whether they use recycled or other water),*

(f) *amenity facilities,*

(h) *environmental management works."*

In relation to Clause 65(2)(d), on the basis that the Lake Ainsworth Crown Reserve and Ballina Coastal Reserve (for which BSC are Trust Managers) are reserves within the meaning of Part 5 of the Crown Lands Act, 1989 (CLA) the proposed foreshore improvements would be permissible, without development consent, if the development is for the purposes of implementing a Plan of Management.

The Ballina Coastal Reserve Plan of Management (April 2003, November 2011) (BCRPOM) was prepared by the Department of Land and Water Conservation under Sections 112 to 116 of the CLA and therefore satisfies Clause 65(2)(d).

Section 1.7 of the BCRPOM is in the following terms:

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### “1.7 LAND DESCRIPTION AND STATUS

The lands covered by the PoM comprise all vacant Crown land and coastal Crown reserves from the Richmond River at Ballina to the northern boundary of Ballina Shire on Seven Mile Beach and east of the Coast Road down to mean low water mark (MLWM). Two minor exceptions to this are Eastern Park and Pioneer Park on the western side of the Old Coast Road at Shaws Bay. The lands are in the Parish of Ballina and the Parish of Newrybar County of Rous.

The land extends along 18 kilometres of coastline and covers an area of approximately 320 hectares (Figure 1). It includes all beaches, rocky shores, headlands, dune systems within the above area, public open space adjoining Shaws Bay and Shelly Beach and the water bodies of Lake Ainsworth and Shaws Bay.

The land includes:

- existing coastal Crown reserves for which Council is the appointed Trust Manager;
- coastal Crown reserves for which there is no appointed Trust Manager;
- vacant Crown land currently administered by the Department of Land and Water Conservation.
- Crown Public Roads currently administered by DLWC as roads authority under the Roads Act 1993.

These lands are described in the following table.

| <b>Reserve Description</b>             | <b>Location</b>  | <b>Purpose</b>                        |
|--|--|---------------------------------------|
| part R.84109<br>NSW Sport & Recreation | Lake Ainsworth   | National Fitness & Physical Education |
| R.82783<br>Ballina Shire Council       | Lake Ainsworth   | Public Recreation                     |
| R.83506<br>Ballina Shire Council       | Lennox Head  | Public Recreation                     |
| R.83506<br>Ballina Shire Council       | Boulder Beach,<br>Skennars Head  | Public Recreation                     |
| R.32714<br>No Trust                    | Shelly Beach<br>(West of Village)  | Protection from Sand Drift            |
| R.82765<br>Ballina Shire Council       | Black Head,<br>Shelly Beach  | Public Recreation                     |
| R.73879                                | Shaws Bay  | For Future Public Requirements        |
| R.91507<br>Ballina Shire Council       | Shelly Beach   | Public Recreation                     |
| R.69266<br>Ballina Shire Council       | Shaws Bay  | Public Recreation                     |
| R.65048<br>Ballina Shire Council       | Lighthouse Beach,<br>Lighthouse Hill   | Public Recreation                     |
| R.90859<br>Ballina Shire Council       | Lighthouse Beach   | Parking                               |
| R.94492<br>Ballina Shire Council       | Public Recreation  | Shaws Bay                             |
| R.84107<br>Ballina Shire Council       | Public Recreation & Resting Place (includes Dedication for Public Park vide East Ballina Cemetery Act 1957)  | Shaws Bay                             |
| Vacant Crown Land                      | (various locations) - Beach to Low Water Mark<br>7 Mile Beach, Pacific Parade, Lennox Head, Shag Rock, Boulder Beach, Sharps Beach, Flat Rock, Angels Beach, Shelly Beach, Compton Drive (Shaws Bay) |                                       |

The following lands are excluded from the PoM:

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- 
- all freehold lands including land owned by Ballina Shire Council (including Flat Rock Tent Park)
  - Lake Ainsworth, Shaws Bay and Boomerang Caravan Parks (subject to separate PoMs);
  - Pop Denison Park (subject to separate PoM);
  - Lake Ainsworth National Fitness Camp managed by NSW Department of Sport and Recreation. (Department of Sport and Recreation have indicated a willingness to support addition of that part of R84109 west of the Public Road to the proposed single Coastal Reserve);
  - land held by Presbyterian Church (NSW) Property Trust at Camp Drew at Lake Ainsworth, and the Gunundi Anglican at Conference Centre at Black Head.

Two significant areas of land owned by Ballina Shire Council within the coastal strip are:

- Lennox Headland which includes Lennox Point, Pat Morton Lookout and the southern slope of Lennox Headland classified as Community Land by Council; and
- Angels Beach/Flat Rock which includes the Flat Rock Tent Park and areas to the north and south also classified as Operational Land by Council.

These areas are shown in Figure 1. (Study Plan)

Whilst these lands are subject to a different statutory framework, they are integral to the Ballina coastline. Ballina Shire Council intends to integrate the planning and management of these lands with the broad objectives and the specific recommendations for the adjoining management precincts outlined in the PoM."

In summary, the BCRPOM applies to the subject land and satisfies Clause 65(2)(d) as the Plan was prepared and adopted under the CLA.

To determine whether or not the proposal (as described in the Application Plans) is for 'the purposes of implementing the Plan of Management', it is necessary to assess the proposal against the BCRPOM.

Of particular relevance to the development proposal are the following management objectives:

**"MANAGEMENT OBJECTIVE:**

**"Manage cultural heritage places, items and landscapes."**

**STRATEGY:** Identify and preserve Aboriginal and non-Aboriginal heritage, including significant sites.

**Actions:**

- For items of non-Aboriginal heritage value, establish a register under custodianship of the local Heritage Society.
- For local Aboriginal sites, establish and maintain a register, not available to the general public and available on approval from the recognised custodians of the site register; (NPWS and/or Jali Local Aboriginal Land Council Heritage and Cultural Committee).
- Provide appropriate interpretative signage;
- Raise awareness of operational staff and managers of the sensitivity of heritage sites prior to undertaking any works.

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- 
- Ensure inputs by the local recognised Aboriginal communities prior to making decisions affecting Coastal Reserve lands.
  - Consider implications of Native Title and other relevant legislation prior to any development or activity.
  - Provide appropriate buffer areas around significant Aboriginal sites to protect against damage.
  - Raise awareness of Council and other public utility bodies (eg. electricity, roads, fire, telecommunications & emergency) of the significance of heritage sites; ensure safeguards are in place to protect sites eg. through a code of practice applied prior to any works.

**MANAGEMENT OBJECTIVES:**

- **"Recognise the rights and needs of Aboriginal people."**
- **"Recognise spiritual values in coastal planning and management."**
- **"Facilitate greater community understanding of Aboriginal values."**

**STRATEGY:** Ensure ongoing involvement of the local Aboriginal community in the planning, management and implementation of actions in the Coastal Reserve.

**STRATEGY:** Facilitate, where appropriate, cultural tourism.

**Action:**

- Establish an Aboriginal cultural centre or similar facility within or near the Ballina coastal area.

An Aboriginal cultural centre is planned for the Ballina area, providing an important link between Aboriginal culture and the wider public and promoting greater appreciation of Aboriginal culture and heritage of the local area through displays, presentations and distribution of information.

Ballina Shire Council's Aboriginal Community Development Liaison Officer facilitates communication between the local Aboriginal community and Council regarding protection of significant landscapes, sites, and relics in the Shire, including coastal areas. Jali Local Aboriginal Land Council has established a Heritage and Cultural Committee to address all matters regarding the management and protection of Aboriginal heritage in its area of concern, including the Coastal Reserve.

**STRATEGY:** Develop projects within the Coastal Reserve to promote better understanding of Aboriginal heritage.

Whilst respecting the need for protection of significant sites and artefacts, there is potential to develop projects which would raise awareness of local Aboriginal culture and of their relationship with the natural coastal landscape. Possible actions to achieve this may be:

- use of interpretive signage at key locations, explaining the significance of the landscape, traditional uses of the area, Aboriginal mythology;
- consider establishing an Aboriginal cultural trail in the Coastal area;
- consider establishing an Aboriginal cultural centre (refer above)."

Comment:

There are no heritage items listed for the site in BLEP1987 or BLEP2014. An Aboriginal Cultural Heritage Assessment has been prepared, including consultations with Aboriginal stakeholders. A copy of the Assessment Report is contained at **Annexure G**. In summary, the Report concludes that no further archaeological investigation is required.

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Based on these conclusions, it is considered that the proposal is not inconsistent with this management objective

The following table addresses compliance with the Recreation Facilities and access management objectives.

| TABLE 2 – RECREATION FACILITIES AND ACCESS   |   |
|--|---|
| REQUIREMENT  | COMMENT   |
| <p><b>MANAGEMENT OBJECTIVES:</b></p> <ul style="list-style-type: none"> <li>♦ <i>"Maintain / upgrade (designated) recreation areas to cater for a range of appropriate passive recreation activities."</i></li> </ul>  | <p>The proposal is consistent with this objective in that it will achieve upgraded recreation facilities and access, including to the lake foreshore.</p>   |
| <ul style="list-style-type: none"> <li>♦ <i>"Provide/ upgrade access to foreshores where feasible and environmentally sustainable options are available."</i></li> </ul>   | <p>As above.</p>  |
| <ul style="list-style-type: none"> <li>♦ <i>Maintain existing access and viewing amenity for the disabled and elderly where feasible.</i></li> </ul>   | <p>As above.</p>  |
| <p><b>STRATEGIES:</b></p> <ul style="list-style-type: none"> <li>♦ <i>Identify/ prioritise activities to improve and maintain recreational amenity;</i></li> </ul>   |   |
| <ul style="list-style-type: none"> <li>♦ <i>Develop short term and long term targets for each compartment/precinct in the Coastal Reserve specifying:</i> <ul style="list-style-type: none"> <li>o <i>access (pedestrian and disabled);</i></li> <li>o <i>parking areas;</i></li> <li>o <i>toilets, (consider potential for composting toilets), showers, change facilities;</i></li> <li>o <i>lighting where appropriate;</i></li> <li>o <i>picnic facilities , BBQ's, shade etc.;</i></li> <li>o <i>seek out funding opportunities to achieve above.</i></li> </ul> </li> </ul> <p><i>(Recreation facilities for high priority areas are addressed in the Precinct Management Plans)</i></p> | <p>Consistent . Improved pedestrian access to the lake and foreshore will be achieved.</p> <p>Consistent. It is proposed to formalise the existing parking along the southern road and remove parking areas that currently exist along the eastern road and offset the removed spaces with the recent carpark upgrades. The general conclusion of the traffic report is there is no net loss in overall parking numbers in the precinct.</p> <p>Consistent . The existing public toilets adjacent to the Lennox Head Surf Club will be retained and the existing facilities on the eastern foreshore will be renovated.</p> <p>Lighting upgrades are not included in the project, however existing lighting currently provided for the road and toilet facilities will be retained.</p> <p>Consistent. See Application Plans.</p> <p>Funds have been allocated.</p> |

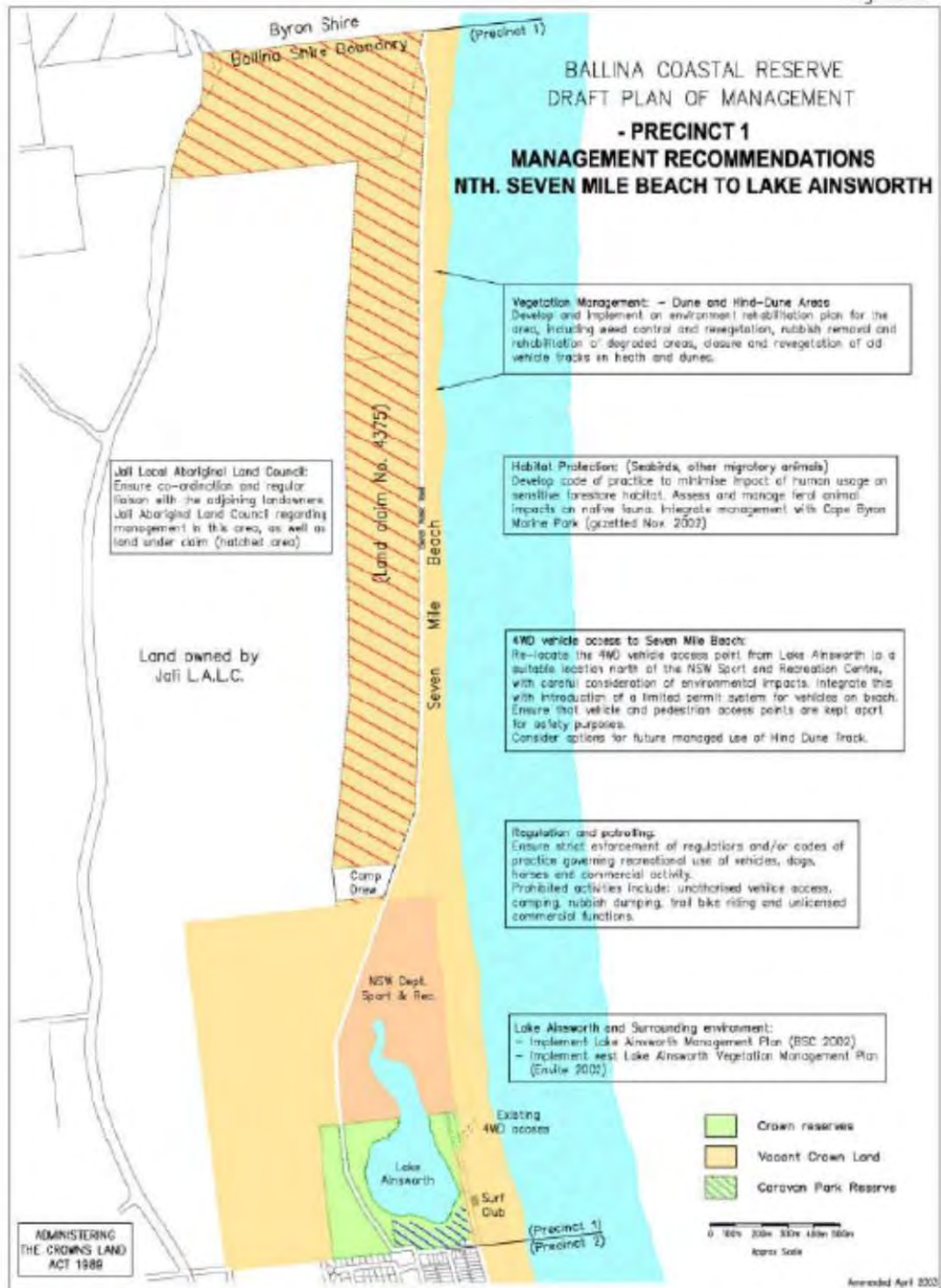
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The BCRPOM divides the study area into five local precincts. The subject land is within Precinct 1, which extends from the Ballina/Byron Shire boundary to the north of the site, to Ross Street in Lennox Head, as shown on Figure 3, Precinct 1 Plan, a copy of which is reproduced below as **Figure 3**.



**Figure 3 - Precinct 1 Plan**

**Figure 3 - Precinct 1 Plan**  
Source: Ballina Coastal Reserve Plan of Management

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The objectives for management of Precinct 1 are reproduced in the following table (Table 3) together with comments in relation to consistency between the development proposal and the key objectives.

| TABLE 3 – RECREATION FACILITIES AND ACCESS  |  |
|---|--|
| REQUIREMENT   | COMMENT  |
| <p><b>Objectives for Management of Precinct 1</b></p> <p>The wild and relatively natural and remote setting of this area should be maintained and enhanced. The area is noted as a prominent 'indigenous' landscape, and is an important remnant of coastal heath/hind-dune habitat within the region.</p> <p>However, there still exists strong demand for some uses that potentially threaten both the sensitive coastal environment and generally passive recreational values of the beach if not managed properly.</p> <p>The Plan of Management aims to achieve a balance, where possible, of recreational amenity and environmental protection. Future management of this area should aim to:</p> <ul style="list-style-type: none"> <li>– Preserve the natural features of the area by maintaining the 'low use' status of the beach. Consistent with the above objective, encourage mostly passive recreational activities that are non-intrusive, by: <ul style="list-style-type: none"> <li>(a) minimising opportunities for potentially damaging activities to impact on the beach and dune/hind dune environment, through tighter control of vehicle activity, minimum commercial activity, strict control of dogs and horses; and</li> <li>(b) providing no facilities apart from basic access to the beach at the southern end of the precinct.</li> </ul> </li> <li>– Ensure ongoing protection and rehabilitation of the natural environment and indigenous heritage values of the area through education and awareness programs, cooperative management with the Marine Park Authority and ongoing liaison with the Aboriginal community.</li> </ul> | <p>Consistent. Only the modified southern and eastern lake foreshores are proposed for upgrading.</p> <p>As above.</p> <p>Consistent. As above.</p> <p>Consistent. The proposed foreshore upgrade works will provide improved facilities for residents and tourists.</p> <p>Consistent. See Plans.</p> <p>Consistent. See Aboriginal Cultural Heritage Due Diligence Assessment at <b>Annexure G</b>. The proposal will improve access to the lake foreshore and reinstate eroded embankments.</p> |
| <p><b>SPECIFIC MANAGEMENT RECOMMENDATIONS – PRECINCT 1</b></p> <p>(refer also to Figure 5 - Precinct 1 Management Recommendations)</p> <p><b>OFF-ROAD VEHICLE ACCESS IN PRECINCT 1</b></p> <p>1) <b>Limited access permit system:</b> providing for (4WD) vehicle access for a limited number of vehicles to the northern end of Seven Mile Beach, using one access point only; strict regulation and patrolling.</p>   | <p>Consistent. No new beach access points are proposed.</p>  |

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| TABLE 3 – RECREATION FACILITIES AND ACCESS  |  |
|---|--|
| REQUIREMENT   | COMMENT  |
| <p>Permits will be issued on an annual basis and maintained in strict accordance with a code of practice which will include the following initiatives:</p> <ul style="list-style-type: none"> <li>• a strong emphasis on safety and enjoyment for walkers and other passive users,</li> <li>• no damage to dune environment, minimum disturbance to wildlife,</li> <li>• exclusion of vehicles during high use periods (ie. daylight hours of weekends, public holidays and other high-use periods, eg. New Year's Eve;</li> <li>• vehicle permit system to be administered by the Reserve Trust Manager, reviewed yearly to assess the system's appropriateness, safety and impact on general beach amenity, and environmental impacts.</li> </ul> | <p>Consistent. See Plans.</p> <p>Consistent. See Plans.</p> <p>Consistent. See Plans and can be implemented by appropriate signage and enforcement.</p> <p>Consistent.</p> |
| <p>2) <b>Re-location of the 4WD beach access</b> to a site north of NSW Sport and Recreation, carefully located to minimise environmental impacts.</p>  | <p>Consistent. 4WD access has already been relocated.</p>  |
| <p>3) <b>Permanent closure of hind dune track</b>, with provision only for emergency and service vehicles and fire management, and pedestrian access.</p> <p>Prohibited activities: Commercial vehicle guided tours, trail bikes and 4wd cycles.</p>  | <p>Consistent – the track has been closed.</p> <p>Consistent.</p>  |
| <b>DOGS AND HORSES</b>  |  |
| <p><b>Dogs</b></p> <ul style="list-style-type: none"> <li>• Dogs permitted off-leash (subject to the statutory provisions of the Companion Animals Act 1998) north of Lake Ainsworth. Dogs prohibited from the remainder of the beach.</li> <li>• Provision of dog litter control facilities at designated access points.</li> <li>• Strict enforcement of dog litter and dog control regulations.</li> </ul>   | <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p>   |
| <p><b>Horses</b></p> <ul style="list-style-type: none"> <li>• Recreational horse riding permitted on Seven Mile Beach, but prohibited from the dune and hind dune area</li> <li>• Commercial horse riding permitted, with limited numbers, businesses licensed and subject to tender.</li> </ul> <p><b>Code of Practice for horses in Precinct 1:</b></p> <ul style="list-style-type: none"> <li>• Horse riding (both recreational and commercial) permitted only on weekdays, not on weekends or public holidays.</li> </ul>   | <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p>   |

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| <b>TABLE 3 – RECREATION FACILITIES AND ACCESS</b>  |   |
|--|---|
| <b>REQUIREMENT</b>   | <b>COMMENT</b>  |
| <ul style="list-style-type: none"> <li>• Thoroughbred training and trotting not permitted.</li> <li>• Horse access to be only via the designated vehicle access or other specified site/s.</li> <li>• Horses not permitted on dunes and hind dune areas, walking tracks, formal pedestrian tracks or disabled access.</li> <li>• Horses to be kept under full control at all times.</li> <li>• All horse manure to be taken away.</li> <li>• Horse wash-down not to be done near any human shower or other amenity.</li> <li>• Caution to be exercised at all times, particularly in proximity to walkers, children and dogs.</li> </ul> | <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p> <p>Consistent.</p>  |
| <p><b>COMMERCIAL ACTIVITIES</b></p> <p>Commercial activities permitted are surfing schools, kite-board schools, guided sea-kayak activity, and guided horse riding, all licensed by Council, and operating in designated areas under specified guidelines.</p>   | <p>Consistent.</p>  |
| <p><b>HABITAT MANAGEMENT</b></p> <ul style="list-style-type: none"> <li>• Implement rehabilitation works for the area, including weed control, planting, rehabilitation of old vehicle access tracks.</li> <li>• Marine Park - maintain an active level of 'Co-management' with the Marine Parks Authority and the NSW National Parks and Wildlife Service for the area of overlap between the Reserve and the Cape Byron Marine Park along Seven Mile Beach, ie. between mean high water and mean low water levels (refer Section 3.7 - Related Planning Processes : Cape Byron Marine Park)</li> </ul>                                 | <p>Consistent. See Plans.</p> <p>Consistent.</p>  |
| <p><b>AMENITIES AND FACILITIES</b></p> <p>No amenities or facilities provided in this precinct, the area to remain undeveloped, catering only for passive self reliant day-to-day visitation - access by foot and limited (permit) vehicles only, disabled access by permitted vehicles.</p>   | <p>Consistent. See Plans.</p>   |
| <p><b>LAKE AINSWORTH MANAGEMENT PLAN (BSC 2002)</b></p> <p>The Lake Ainsworth Management Plan recommends a number of actions for the lake and surrounds addressing environmental protection, lake water quality, recreation amenity, parking and traffic management, and public education. Implementation of the Lake Ainsworth Management Plan will be integrated with the Ballina Coastal Reserve Plan of Management, with planning of the Lake Ainsworth Caravan Park and with the recommendations of the Lennox Head Strategic Plan.</p>   | <p>See comments at Section 7.2 in relation to compliance with the LAMP. The LAMP was not prepared under the Crown Lands Act, and is therefore not relevant for the purposes of Clause 65(2)(d).</p> |

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| TABLE 3 – RECREATION FACILITIES AND ACCESS  |   |
|---|---|
| REQUIREMENT   | COMMENT   |
| <p><b>CAMPING AND SOCIAL FUNCTIONS</b></p> <p><i>Prohibited activities:</i> camping on the dune and hind-dune areas; large organised social functions, dance parties, fires.</p>  | Consistent.   |
| <p><b>ABORIGINAL CULTURAL HERITAGE</b></p> <p>Management of this area to be conducted in liaison with the adjoining landowner Jali Local Aboriginal Land Council, in respect of Aboriginal cultural values and any potential impacts of activities on adjoining Jali lands.</p> | Consistent. See Cultural Heritage Assessment at <b>Annexure G</b> . |

In summary, it is considered that the development proposal is not inconsistent with the BCRPOM and therefore development consent is not required for the foreshore improvement works pursuant to Clauses 65(2)(d) and 65(3)(a) and (b) of SEPPI.

In addition, some of the elements of the development proposal (roads, cycleways, outdoor recreation facilities) are consistent with Clause 65(3)(a), (b), (e), (f) and (h) of the Policy and are therefore also permissible, without development consent, pursuant to this Clause.

In particular, the reinstatement of existing eroded embankments to Lake Ainsworth would be characterised as development for the purposes of “Environmental Management Works” and therefore permissible, without consent, pursuant to Clause 65 (3)(h). “Environmental Management Works” are defined as follows:

*“environmental management works means:*

- (a) works for the purpose of avoiding, reducing, minimising or managing the environmental effects of development (including effects on water, soil, air, biodiversity, traffic or amenity), and*
- (b) environmental protection works.”*

In summary, while development consent under Part 4 is not required, a Part 5 Assessment is required.

## 6.0 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 (AS AMENDED) PART 5 ACTIVITY ASSESSMENT

Section 110 of the Act contains the following definitions:

*“activity means:*

- (a) the use of land, and*
- (b) the subdivision of land, and*
- (c) the erection of a building, and*
- (d) the carrying out of a work, and*
- (e) the demolition of a building or work, and*
- (f) any other act, matter or thing referred to in section 26 that is prescribed by the regulations for the purposes of this definition,*  
*but does not include:*
- (g) any act, matter or thing for which development consent under Part 4 is required or has been obtained, or*
- (h) any act matter or thing that is prohibited under an environmental planning instrument, or*

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- (i) exempt development, or
  - (j) development carried out in compliance with an order under Division 2A of Part 6, or
  - (k) any development of a class or description that is prescribed by the regulations for the purposes of this definition.

**approval** includes:

- (a) a consent, licence or permission or any form of authorisation, and
- (b) a provision of financial accommodation by a determining authority to another person, not being a provision of such financial accommodation, or financial accommodation of such class or description, as may be prescribed for the purposes of this definition by a determining authority so prescribed.

**determining authority** means a Minister or public authority and, in relation to any activity, means the Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out.

**nominated determining authority**, in relation to an activity, means the determining authority nominated by the Minister in accordance with section 110A in relation to the activity.

**proponent**, in relation to an activity, means the person proposing to carry out the activity, and includes any person taken to be the proponent of the activity by virtue of section 110B."

Section 111 of the Act is in the following terms:

**"111 Duty to consider environmental impact**

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

Section 112(1) of the Act is in the following terms:

**"112 Decision of determining authority in relation to certain activities**

- (1) A determining authority shall not carry out an activity, or grant an approval in relation to an activity, being an activity that is a prescribed activity, an activity of a prescribed kind or an activity that is likely to significantly affect the environment, unless:
  - (a) the determining authority has obtained or been furnished with and has examined and considered an environmental impact statement in respect of the activity:
    - (i) prepared in the prescribed form and manner by or on behalf of the proponent, and
    - (ii) except where the proponent is the determining authority, submitted to the determining authority in the prescribed manner,

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- (b) notice referred to in section 113 (1) has been duly given by the determining authority (or, where a nominated determining authority has been nominated in relation to the activity, by the nominated determining authority), the period specified in the notice has expired and the determining authority has examined and considered any representations made to it or any other determining authority in accordance with section 113 (2),
- (c) the determining authority has complied with section 113 (3),
- (c1) (Repealed)
- (d) where it receives notice from the Secretary that the Minister has requested that a review be held by the Planning Assessment Commission with respect to the activity, the review has been held and the determining authority has considered the findings and recommendations of the Planning Assessment Commission and any advice given to it by the Minister in accordance with section 114, and
- (e) where it receives notice from the Secretary that the Secretary has decided that an examination be undertaken in accordance with section 113 (5), that examination has been carried out and the determining authority has considered the report furnished to it in accordance with that subsection."

In summary, the project is an "activity" as it involves the carrying out of a work and approval is required because the project requires financial accommodation from Council.

Therefore, the activity requires a Part 5 Environmental Assessment and Approval pursuant to Section 112(1) of the Act.

In accordance with the definition of "Determining Authority, Ballina Shire Council is the determining authority as Council is a public authority by, or on whose behalf, the activity is to be carried out.

## **6.1 Environmental Planning and Assessment Regulation 2000**

Clause 228(2) of the Regulation prescribes a number of matters which must be taken into account concerning the impact of an activity on the environment. Relevant matters are addressed in the following Sections.

### **6.1.1 Any Environmental Impact on a Community**

Closure of the eastern road to vehicular traffic (other than emergency vehicles) will limit the ability of members of the public to access the eastern Lake foreshore and beach area by motor vehicle. Pedestrian and emergency vehicle access will be maintained.

This work will preclude vehicular access to the Lake Ainsworth National Fitness Camp (LANFC), other than for emergency vehicles.

Permanent vehicular access to the LANFC will be provided by the proposed realigned southern road and Camp Drewe Road. Camp Drewe Road is currently unsealed.

The objectives of closing the eastern road to traffic include:

- ♦ Discouraging vehicular access to the beach from the eastern road;
- ♦ Improving pedestrian/visitor safety and amenity;
- ♦ Reducing impacts on the Lake foreshore and passive open space area, including Lake foreshore erosion, damage to vegetation and vandalism.

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4WD access has already been relocated and access to the eastern Lake foreshore will remain available to residents and visitors (including cyclists) via the proposed concrete pathway. In addition, residents and visitors will have access to improved picnic facilities and the Lake foreshore, free of motor vehicles and their inherent noise, fumes and safety issues.

The works on the southern foreshore involve realignment of the existing road and foreshore embellishment, including parking, picnic facilities and bioretention basins. The proposed works will not substantially change the existing situation.

On balance, it is considered that the proposed works will not have a significant adverse impact on a community and is likely to have positive impacts.

#### **6.1.2 Any Transformation of a Locality**

The principal proposed change is removal of the eastern road and replacing it with a pedestrian/cycle/emergency vehicle concrete pathway. In this context and having regard to the comments at Section 6.1.1, it is considered that the change will not be radical and will not give rise to any significant transformation of the locality.

#### **6.1.3 Any Environmental Impacts on the Ecosystems of the Locality**

Minor removal of habitat and disturbance of the Lake Ainsworth foreshore is required for the proposed improvement works.

The minor disturbance proposed is temporary and the works include revegetation and rehabilitation areas which offset the minor disturbance. In the longer term the work is likely to be beneficial to ecosystems.

Bioretention swales are proposed adjacent to hardstand areas to ensure that water runoff quality is improved before it reaches Lake Ainsworth. Stormwater management measures will be implemented during the construction phase.

Removal of the sealed eastern road from adjacent to the eastern foreshore of Lake Ainsworth will reduce runoff and pollutants entering the Lake.

The Ecological Assessment at **Annexure F** concludes that the proposed work will not have a significant effect.

#### **6.1.4 Any Reduction of the Aesthetic, Recreation, Scientific or Other Environmental Quality or Value of a Locality**

The aesthetic values of Lake Ainsworth and the foreshore area will be enhanced by retaining all mature healthy trees and planting additional trees and landscaping.

Proposed picnic and recreational structures are of a modest scale and contemporary design which will be compatible with the established character of the area. The recreational values of the area will be enhanced by providing safe pedestrian and cycle access to the eastern Lake foreshore, together with modern recreational and picnic facilities (barbeque, picnic settings, seating).

Given the scale and nature of the proposed improvement work, no significant reduction in the scientific or environmental quality or value of the locality is likely to occur.

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By precluding vehicular access on the eastern foreshore, repairing the Lake Ainsworth eroded banks, embellishment of the foreshore areas and improving stormwater quality improvements in aesthetic, recreational, scientific and the environmental quality and value of the area generally will be achieved.

**6.1.5 Any Effects on a Locality, Place or Building Having Aesthetic, Anthropological, Archaeological, Architectural, Cultural, Historical, Scientific or Social Significance or Other Special Values for Present or Future Generations**

Lake Ainsworth and the surrounding areas have aesthetic, cultural and social significance for Aboriginal people and the community generally. The objective of the proposed foreshore improvement works is to preserve and improve the values of the area.

Clause 5, Schedule 1 of BLEP1987 does not identify any items of environmental heritage in, or adjacent to, the project site.

Clause 5.10, Schedule 3 of BLEP2012 does not identify any heritage items in, or adjacent to, the project site.

The Cultural Heritage Report at **Annexure G** indicates that no Aboriginal objects or places were located during the inspection. The Report was prepared following consultations with the Aboriginal community which included a site inspection.

In summary, Lake Ainsworth and the foreshore area have special value for present and future generations of residents and tourists. The objective of the proposed foreshore improvement works is to embellish, preserve and protect the foreshore and Lake Ainsworth to ensure that it remains available as a safe and sustainable recreation area for current and future generations.

**6.1.6 Any Impacts on the Habitat of Protected Animals (Within the Meaning of the Biodiversity Conservation Act 2016)**

**Annexure F** comprises an Ecological Assessment which concludes that the proposed development is unlikely to result in a significant impact and a Species Impact Statement is not required.

**6.1.7 Any Endangering of any Species of Animals, Plant or Other Form of Life, Whether Living on Land, in Water or in the Air**

See comments at Section 6.1.6.

**6.1.8 Any Long Term Effects on the Environment**

The proposed foreshore improvement works have been designed and planned to avoid and minimise impacts generally. The work will assist in avoiding long term impacts by precluding vehicular access on the eastern road, repairing the Lake Ainsworth bank erosion and improving water quality in Lake Ainsworth.

**6.1.9 Any Degradation of the Quality of the Environment**

The objective of the project is to make sustainable improvements to the existing environment by undertaking the Lake Ainsworth foreshore works, as described in Section 4 and the Annexures.

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Having regard to the scale and nature of the proposed work, degradation of the quality of the environment is unlikely to occur.

#### **6.1.10 Any Risk to the Safety of the Environment**

Safety risks may arise during the construction phase (accidents, fuel spills, traffic control and the like). However these can be managed by a Construction Management Plan (CMP).

Similarly, water quality in Lake Ainsworth can be managed by ensuring that appropriate erosion and sedimentation control measures are implemented during the construction phase.

The safety of guests at the LANFC will be maintained by providing an emergency vehicle access via the eastern road, together with access via the western road.

In summary, safety is not considered to be a significant risk.

#### **6.1.11 Any Reduction in the Range of Beneficial Uses of the Environment**

No significant reduction in the range of beneficial uses of Lake Ainsworth or the foreshore area is likely to result given that disabled access to the eastern foreshore will remain available and wheelchair ramps will be provided into Lake Ainsworth.

Recreational uses of the lake and foreshore generally will continue in a safe and more efficient environment, including contemporary picnic and recreation facilities.

#### **6.1.12 Any Pollution of the Environment**

No changes in land use are proposed as a result of the proposed works and therefore the potential for pollution will not increase. There is likely to be a neutral or beneficial outcome in relation to pollution of Lake Ainsworth as a result of the removal of motor vehicles from the eastern road. The potential for pollution during the construction phase will be managed and addressed in a CMP.

#### **6.1.13 Any Environmental Problems Associated with the Disposal of Waste**

The collection, storage and disposal of waste generated during the construction phase will be addressed in a CMP.

Wheelie bins or other appropriate bins will be strategically located within the foreshore area to provide convenient facilities for waste disposal by visitors and subsequent collection by Council's waste contractor.

In summary, no environmental problems with waste disposal are likely to arise.

#### **6.1.14 Any Increased Demands on Resources (Natural or Otherwise) that are, or are Likely to become, in Short Supply**

No significant increase in demand for resources during the construction phase is likely to occur. No change of use of the foreshore area is proposed and therefore there will be no significant increase in demand for resources.

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### 6.1.15 Any Cumulative Environmental Effect with Other Existing or Likely Future Activities

Currently, there are no other planned future activities which will result in cumulative effect.

The existing LANFC to the north and the LACP to the south are the only significant activities in close proximity which may give rise to cumulative effects.

Given the nature and scale of the existing long standing uses and the scale and nature of the proposed uses, no significant cumulative effects are likely to arise.

### 6.1.16 Any Impact on Coastal Processes and Coastal Hazards, Including Under Projected Climate Change Conditions

Illustration 2.2 – Lennox Head Erosion Hazard Zones is contained in the BSC Coastal Zone Management Plan dated August 2016. Illustration 2.2 is reproduced below at **Figure 4**.

The proposed work on the eastern foreshore of Lake Ainsworth is generally landward of the minimum 50 year hazard line and seaward of the best estimate 100 year hazard line.

It is noted that the northern part of the Lake Ainsworth eastern foreshore is protected by a seawall constructed in 1997.

It is also noted that there is a possible rock wall constructed in 1977 to 1980 south of the surf club building.

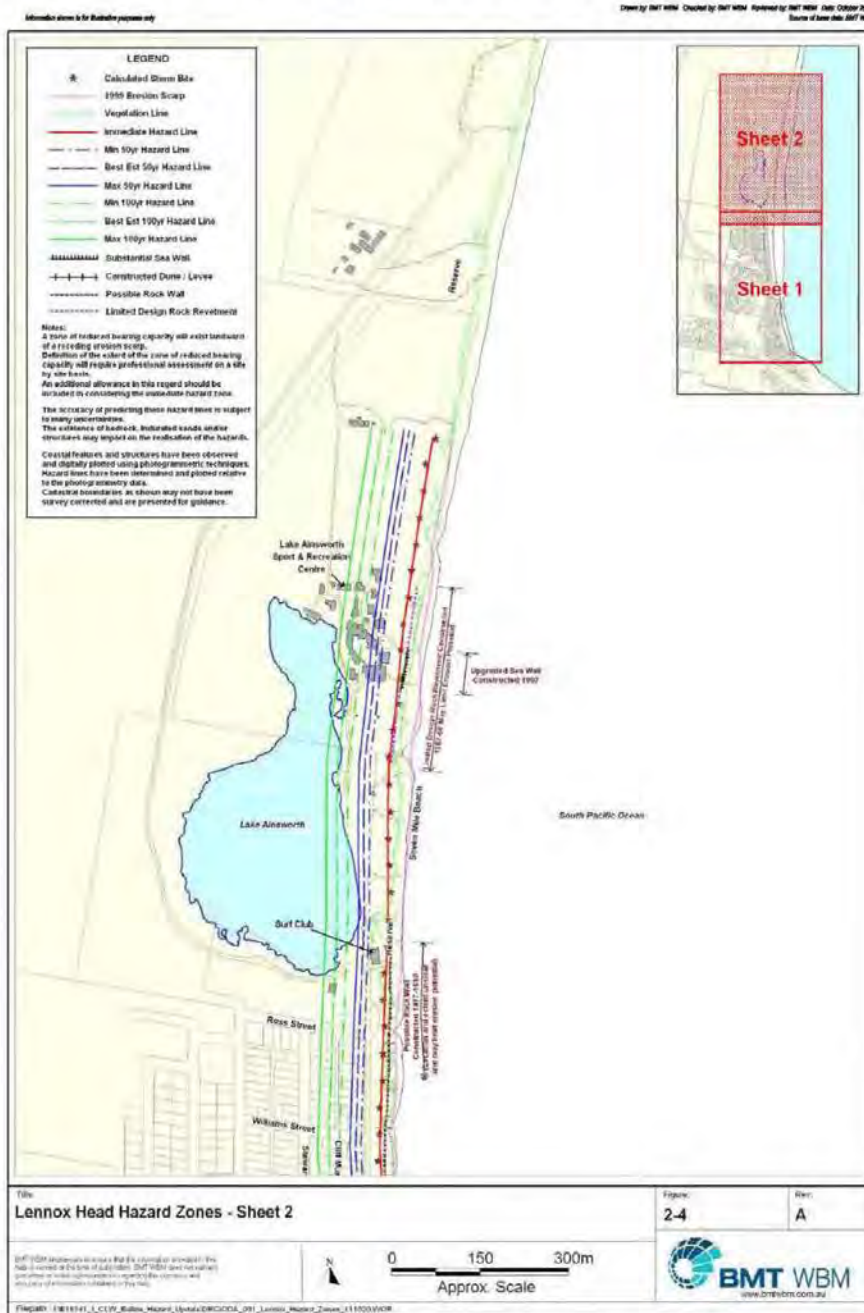
Illustration 3.2 – Lake Ainsworth Management Actions also shows a subsurface seawall (location and extent unknown) between the rock walls referred to above.

Section 3.4.1 of the Plan states that:

*“The broad management objective adopted for this beach unit is to protect development landward of the beach rather than remove development and allow erosion to proceed, i.e. protect rather than retreat.”*

In the context of the scale and nature of the proposed of the proposed works and given that they are landward of the minimum 50 year hazard line, it is considered that the proposed works are unlikely to have any significant impact on coastal processes and coastal hazards.

Illustration 2.2 - Lennox Head Erosion Hazard Zones – Sheet 2 (from BMT WBM, 2011)



Lennox Head Erosion Hazard Zones - Sheet 1 (from BMT WBM, 2011)

Figure 4 – Illustration 2.2 Lennox Head Hazard Zones  
 Source: Draft Coastal Zone Management Plan, August 2016

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## 6.2 Summary and Conclusions

Having regard to the assessment of relevant factors above and the provisions of Section 112(1) of the Act, it is considered that the proposed activity is unlikely to significantly affect the environment. It follows that an Environmental Impact Statement (EIS) is therefore not required.

## 7.0 PLANS OF MANAGEMENT

### 7.1 Ballina Coastal Reserve Plan of Management (April 2003, November 2011)

Relevant provisions of this Plan are addressed in Section 5.3 of this Report.

### 7.2 Lake Ainsworth Management Plan November 2002

The Lake Ainsworth Management Plan (2002) (LAMP) applies to the project as relatively minor works are proposed within the waterbody including:

- ♦ Maintaining existing lake access;
- ♦ Rehabilitating existing eroded embankments, installing log revetments at five locations;
- ♦ Install a wheelchair access ramp from the proposed pathway to Sandy Beach;
- ♦ Tree planting and landscaping on the lake foreshore.

The LAMP was prepared by the Department of Public Works and Services, GeoLink and Ballina Shire Council based on the framework in the NSW State Government Estuary Management Manual. It does not expressly refer to the Crown Lands Act and is therefore not a Management Plan to which Clause 65(2)(d) of SEPP1 applies. Therefore it does not enable the development to be carried out without development consent under that clause.

The LAMP, at Page vii, contains Management Actions. Relevant Actions are shown in Table 4, together with comments in relation to project compliance.

| <b>TABLE 4 – LAKE AINSWORTH MANAGEMENT PLAN ACTIONS WITH COMMENTS</b> |   |   |   |             |  |
|---|---|---|---|-------------|--|
| <b>Ref</b>  | <b>Issue</b>  | <b>Management Actions</b>   | <b>Agency</b>                             | <b>Cost</b> | <b>Comments</b>  |
| <b>Traffic Management</b>   |   |   |   |             |  |
| D1  | Safety of the visitors to the lake and problems with access to the Sports and Recreation Centre during times of floods.   | Restrict vehicular access along the eastern road alignment and discourage motorists from entering the Sport and Recreation Centre. Move the majority of the picnic tables and facilities to the western side of the road. | BSC                                       | Medium      | Complies.  |
| D2  | Traffic numbers on existing eastern road.   | Remove or relocate existing 4WD beach access.   | BSC                                       | Low-Medium  | 4WD access has already been relocated.   |
| D3  | Erosion in areas adjacent to the lake.  | Prohibit foreshore parking and provide designated parking areas.  | BSC                                       | Medium      | Complies.  |
| D4  | Visitor amenity and safety at the lake and surrounds.   | Close part of the existing road between the lake and the caravan park and create a new road from Ross Street, around the back of the caravan park to connect to the western access road.                                  | BSC                                       | Medium      | Noncompliant but proposed upgraded southern road provides a better traffic access and amenity outcome. |
| <b>Erosion</b>  |   |   |   |             |  |
| H1  | Erosion of the foreshore of the lake and accumulation of sediments in the lake.   | Implement Traffic Management Plan (See section Traffic Management Actions).   | BSC                                       | Medium-High | Complies.  |
| <b>Aboriginal Heritage</b>  |   |   |   |             |  |
| K1  | Protection of areas of Aboriginal cultural significance.  | Ensure areas of Aboriginal cultural significance remain relatively undisturbed through measures acceptable to the Local Aboriginal Land Council.  | BSC and the Local Aboriginal Land Council | Low         | Complies – see <b>Annexure G</b> .   |
| K2  | Protection of areas of Aboriginal cultural significance.  | Liaison between Ballina Shire Council and the Local Aboriginal Land Council regarding culturally significant Land Council sites.  | BSC and the Local Aboriginal Low          |             | Complies – see <b>Annexure G</b> .   |
| K3  | Protection of areas of Aboriginal cultural significance.  | Erect signage to educate the community about the presence and significance of Aboriginal cultural sites, where deemed appropriate by the Local Aboriginal Land Council.   | BSC and the Local Aboriginal Low          |             | Complies – see <b>Annexure G</b> .   |
| <b>Recreation</b>   |   |   |   |             |  |
| E1  | Potential erosion caused by sail craft.   | Provide a launching area for sailboats and sailboards   | BSC                                       | Medium      | Not applicable.  |
| E2  | Damage to vegetation by wood fires and increasing visitor enjoyment.  | Upgrade picnic and BBQ facilities.  | BSC                                       | Medium      | Complies – see plans.  |
| E3  | Erosion and damage to vegetation by visitors walking in undefined areas.  | Provide pedestrian access paths and walking tracks.   | BSC                                       | Medium      | Complies – see plans.  |
| <b>Water Level and Flooding</b>                                       |   |   |   |             |  |
| J2  | The need to mitigate the effects of the natural variation of the lake's water level rather than implement a system to control and regulate the water level in the lake. | Placement of new and/or replacement of existing recreational facilities (BBQs, walking paths, etc) beyond levels likely to be inundated for prolonged periods.  | BSC                                       | Low         | Complies – see plans.  |

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### 7.3 Coastal Zone Management Plan August 2016

Relevant provisions of this Plan are addressed at Section 6.1.16.

### 7.4 Lake Ainsworth Crown Reserve Master Plan, Connell Wagner, October 2005 (LACRMP2005)

#### **"1.1 Background**

*The project team of Connell Wagner and HASSELL has prepared the Lake Ainsworth Crown Reserve Master Plan and the following study report. The Master Plan is a guide for planning action only and is not intended to provide the detail commonly associated with the design phase work.*

*The Lake Ainsworth Crown Reserve Master Plan which is the subject of this report is part of the continuation of planning and strategy development for Lake Ainsworth. The study has built on existing information and action, and has also considered the issues raised by the community to further shape the future of the lake and its surrounds.*

#### **1.2 Site Description**

*Lake Ainsworth is a major freshwater lake at the northern end of Lennox Head. The catchment for Lake Ainsworth falls within the responsibility of Ballina Shire Council. The lake has an area of 12.4 hectares and is covered by two Crown Reserves namely:*

- Crown Reserve 82783 for Public Recreation. This Reserve was notified on 9 September 1960 and is described as Lot 62 DP 755725, Lots 7001 and 7002 DP 1052251 and Lot 7006 DP 1062252 Parish Newrybar, County Rous comprising area of 15.66 hectares. This Reserve accounts for the southern part of Lake Ainsworth including the Lake Ainsworth Caravan Park and other recreational land uses.*
- Crown Reserve 84109 for National Fitness and Physical Education. This Reserve was notified on 14 December 1962 and is described as Lot 140 DP 755725 Parish Newrybar, County Rous. The Reserve accounts for the northern portion of the lake including Lake Ainsworth Sport and Recreation Centre ("Sport and Recreation Centre") as it is locally known and Camp Drewe.*

#### **1.3**

#### **Geographic Scope of Study**

*In early 2005 Council commissioned Connell Wagner and HASSELL to undertake the master planning process for the Lake Ainsworth Crown Reserve (Reserve No. 82783). This Crown Reserve covers the southern part of Lake Ainsworth to the Ross Street road reserve. The Lake Ainsworth Caravan Park currently operates within this Crown Reserve. Council is the Trustee for the Lake Ainsworth Crown Reserve.*

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**Map 1: Lake Ainsworth Crown Reserve**

*The Crown Reserve (Reserve No. 84109) that covers the northern section of the lake and the Lake Ainsworth Sport and Recreation Centre is not included in the scope of the master planning process for the reason that this area is not under the administration of Ballina Shire Council. There is no Trust established to manage this Reserve. The Sport and Recreation Centre is administered by the New South Wales Department of Tourism, Sport and Recreation.*

The Master Plan divides the site into four precincts comprising:

- ♦ Eastern Foreshore Dune Precinct;
- ♦ Southern Foreshore Community Park Precinct;
- ♦ Caravan Park Precinct; and
- ♦ Coastal Heath Precinct.

The project site is within the Eastern Foreshore Dune Precinct, Southern Foreshore Community Park Precinct, Caravan Park Precinct and Coastal Health Precinct.

Relevant provisions of the Master Plan for each Precinct are addressed in the following Sections.

#### **7.4.1 Eastern Foreshore Dune Precinct**

The Eastern Foreshore Dune Precinct covers the area north of Pacific Parade to the road closure just beyond Lennox Head Alstonville Surf Life Saving Club and the entrance of the Sport and Recreation Centre. It also takes in the coastal dunal system to the Seven Mile Beach.

The Surf Club and the open space/public amenities block immediately to the north of the Surf Club are not in the Lake Ainsworth Crown Reserve area but have been illustrated in the Master Plan to capitalise on integrating public spaces.

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**Figure 5: Eastern Foreshore Dune Precinct**

## 5.2 Master Planning Initiatives

The following table identifies the major Master Planning initiatives for the Eastern Foreshore Dune Precinct:

**Table 5.1 Eastern Foreshore Dune Precinct Planning Initiatives**

| Eastern Foreshore Dune Precinct |   |  |          |
|---------------------------------|---|--|----------|
| Initiatives                     |   | Drivers  | Comments |
| A1                              | <p>Eastern Road to be closed to all vehicular traffic (aside from emergency and maintenance vehicles).</p> <p>Note: The closure of Eastern Road is contingent on the establishment of new western access road through or around Lake Ainsworth Caravan Park</p> | <p>Improve water quality;</p> <p>Improve foreshore and dunal protection;</p> <p>Enhanced recreational opportunities;</p> <p>Enhanced mobility and safety benefits.</p> | Complies |

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| Eastern Foreshore Dune Precinct |  |   |             |
|---------------------------------|--|---|-------------|
| Initiatives                     |  | Drivers   | Comments    |
| A2                              | New access to Sport and Recreation Centre and Seven Mile Beach via Camp Drewe Road   | Improve water quality;<br>Improve foreshore and dunal protection;<br>Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits. | Complies    |
| A3                              | Recreation and open space areas to be established along eastern foreshore  | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits.  | Complies    |
| A4                              | Car parking to be removed from eastern foreshore   | Improve water quality;<br>Improve foreshore and dunal protection;<br>Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits. | Complies    |
| A5                              | Upgrading of recreational furniture and vegetation fencing   | Improve foreshore and dunal protection;<br>Enhanced recreational opportunities;   | Complies    |
| A6                              | Pedestrian and cycle access with possible design and construction of contoured cycleway to complement open space areas and enhance public safety | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits   | Complies    |
| A7                              | Aquatic planting in shallow water on eastern foreshore to protect bank and reduce nutrient level   | Improve water quality;<br>Foreshore and dunal protection;   | Complies    |
| A8                              | Provision for disabled access to lake's edge   | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits.  | Complies    |
| A9                              | Educational signage to be erected to promote qualities and sensitivities of the lake   | Improve water quality;<br>Improve community education.  | Will Comply |
| A10                             | Provision of emergency access along foreshore in conjunction with initiative A6 above.   | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits.  | Complies    |

The major advantages that the above initiatives will have on the Lake Ainsworth Crown Reserve include:

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- significant potential to enhance the lake's water quality and foreshore and protect the adjacent dunal system through the closure of the Eastern Rd to motor vehicles; and
- the recreational opportunities of this area of the Crown Reserve will be enhanced through the creation of a vehicle free foreshore open space area including better recreation furniture and infrastructure that will encourage pedestrian, cycling and other passive recreation use.

## 7.4.2 Southern Foreshore Community Park Precinct

### 6.1.1 Key Features

The Southern Foreshore Community Park Precinct covers the area from Pacific Parade to that part of the caravan park immediately to the west of the first amenities block and also all area between the lake and Southern Road and the start of the contiguous heath on the western side of the lake.

The land between the lake and the Southern Road is currently used for recreational purpose and accessing the lake for swimming. Picnic facilities including a BBQ area are provided in open space opposite the Surf Club.



Figure 6: Southern Foreshore Community Park Precinct

## 6.2 Master Planning Initiatives

The following planning initiatives are proposed for the Southern Foreshore Community Park Precinct:

Table 6.1 Southern Foreshore Community Park Precinct Planning Initiatives

| Southern Foreshore Community Park Precinct |   |   |  |
|--|---|---|--|
| Initiatives                                |   | Drivers   | Comments   |
| B1   | Eastern side of caravan park adjacent to amenities block to Pacific Parade to be excised from caravan park (according to the applicable road access option adopted) | Improve water quality; Improve traffic and parking;<br>Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits. | Complies. This car park has been constructed and forms part of the offset parking referred to in the engineering report. |
| B2   | Excised land to be primarily converted into open space and some parking   | Improve traffic and parking;<br>Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits.                        | Complies   |

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| Southern Foreshore Community Park Precinct |  |   |   |
|--|--|---|---|
| Initiatives                                |  | Drivers   | Comments  |
| B3   | Southern Road currently linking to Camp Drewe Road to the west at Pacific Parade and intersection will be closed to vehicular traffic (see also Caravan Park Precinct) | Improve water quality; Improve traffic and parking;<br>Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits. | Noncompliant but proposed upgraded southern road provides a better traffic, access and amenity outcome.   |
| B4   | Turning circle at end of Pacific Parade at northern end of SLSC including disabled access drop off point.  | Improve traffic and parking;<br>Enhanced mobility and safety benefits.  | Complies (roundabout) see plans.  |
| B5   | Hardstand/landscaped car parking areas for blocks of 16-20 cars to be provided on western side of Pacific Parade adjacent to SLSC                                      | Improve traffic and parking;<br>Enhanced mobility and safety benefits.  | Complies  |
| B6   | Additional nose in car parking to be provided on eastern side of Pacific Parade  | Improve traffic and parking;<br>Enhanced mobility and safety benefits.  | Noncompliant, no parking proposed in this location.   |
| B7   | Formalised parking controls to be considered   | Improve traffic and parking;<br>Enhanced mobility and safety benefits.  | Appropriate regulatory signage will be installed.   |
| B8   | Southern Road to be converted to cycle/pedestrian way as part of circular network around Lake  | Improve water quality;<br>Enhanced recreational opportunities; Enhanced mobility and safety benefits.                                 | See comments at B3 above.   |
| B9   | Access road from Pacific Parade (near Norfolk Pines) to provide new entrance to Caravan Park   | Improve traffic and parking;<br>Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits.                        | Access is currently off Ross Street. It is not proposed to change the existing access, however the proposed works do not prevent this from being implemented at a later date. |
| B10  | Enhanced open space and recreation areas on southern foreshores linking to open space area immediately north of SLSC   | Improve water quality;<br>Enhanced recreational opportunities; Enhanced mobility and safety benefits.                                 | Complies  |
| B11  | Children's playground facilities to be installed   | Enhanced recreational opportunities.  | Playground facilities are not proposed as part of the works. During the preparation of the concept plan, Council decided to not include a playground.                         |
| B12  | Education signage to be erected regarding qualities and sensitivities of Lake Ainsworth  | Improve water quality;<br>Improve community education   | Will comply.  |

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### 7.4.3 Caravan Park Precinct

#### Current Situation

##### 7.1.1 Key Features

The Lake Ainsworth Caravan Park is located on the southern section of the Lake Ainsworth Crown Reserve 82783 and is fully in scope of the Master Plan. Key data associated with the caravan park includes:

|                     |  |     |
|---------------------|--|-----|
| <b>Land Status</b>  | Lake Ainsworth Crown Reserve R82783                          |     |
| <b>Zoning</b>       | 7(f) Environmental Protection Coastal Land under Ballina LEP |     |
| <b>Area</b>         | 5.4 hectares   |     |
| <b>Sites/Cabins</b> | Long term sites  | 4   |
|                     | Short term sites   | 167 |
|                     | Camp sites   | 122 |
|                     | Cabins   | 13  |
|                     | Total  | 306 |

The study brief requires that the Master Plan address the following:

- The optimum mixture of land to be allocated as a caravan park and as open space and the nature and use of the open space;
- Preferred caravan park boundaries for Lake Ainsworth Caravan Park with regard to the consideration of long term closure of the caravan park and the financial viability of the caravan park; and
- Principles such as water sensitive urban designs that are applied in the implementation of future improvements to the Lake Ainsworth Caravan Park.



Figure 7: Caravan Park Precinct

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**Table 7.1 Caravan Park Precinct Planning Initiatives**

| Caravan Park Precinct |   |  |  |
|-----------------------|---|--|--|
| Initiatives           |   | Drivers  | Comments   |
| C1                    | North eastern side of caravan park adjacent to the amenities block to Pacific Parade to be excised from caravan park and converted to open space, parking and a new caravan park entrance.  | Improve traffic and parking;<br>Enhanced recreational opportunities;<br><br>Enhanced mobility and safety benefits.   | This has been partly implemented. Access is currently off Ross Street. A new caravan park entrance has not been provided because that is a matter for the NSW Crown Holiday Parks Trust.         |
| Caravan Park Precinct |   |  |  |
| Initiatives           |   | Drivers  | Comments   |
| C2                    | New caravan park entrance via access road from Pacific Parade.  | Improve traffic and parking;<br>Enhanced recreational opportunities;<br><br>Enhanced mobility and safety benefits.   | As above.  |
| C3(i)                 | Road Access Option 1 (Behind Barrett Drive): <ul style="list-style-type: none"> <li>Utilises existing road reserve that extends west of Ross St to caravan park southern boundary;</li> <li>A new road reserve would need to be established immediately behind Barrett Drive residences extending west to existing fire trail then heading due north to northern boundary of caravan park where new road would rejoin Camp Drewe (Western) Rd;</li> <li>Around 15 unpowered sites would be lost but the remainder of caravan park would remain intact;</li> </ul> | Improve water quality;<br>Improve traffic and parking;<br>Enhanced recreational opportunities;<br><br>Enhanced mobility and safety benefits through reduction in traffic in Eastern Road and Pacific Parade. | This is not proposed. Road access is to be maintained along the Southern Road. A new caravan park entrance has not been provided because that is a matter for the NSW Crown Holiday Parks Trust. |
| C3(ii)                | Road Access Option 2 (Middle of Caravan Park): <ul style="list-style-type: none"> <li>Utilises an existing road reserve from the west of Ross St through the middle of caravan park linking to the existing Camp Drewe (Western) Rd. This road reserve was intended to be the primary link to the Camp Drewe (Western) Rd at its initial gazettal;</li> <li>Approximately 14 unpowered sites would be lost.</li> </ul>  | Improve water quality;<br>Improve traffic and parking;<br>Enhanced recreational opportunities;<br><br>Enhanced mobility and safety benefits through reduction in traffic in Eastern Road and Pacific Parade. | As above   |

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| Caravan Park Precinct |  |   |  |
|-----------------------|--|---|--|
| Initiatives           | Drivers  | Comments  |  |
| C3(iii)               | Road Access Option 3 (New Southern Rd Alignment): <ul style="list-style-type: none"> <li>• new access road from Pacific Parade as the new caravan park entrance but then linking the existing Southern Rd just to the west of the eastern-most amenities block;</li> <li>• The Southern Rd then extends along a similar alignment to that at present to the Camp Drewe (Western) Rd with bollards defining appropriate parking along this road.</li> </ul> | <p>Improve water quality;</p> <p>Improve traffic and parking;</p> <p>Enhanced recreational opportunities;</p> <p>Enhanced mobility and safety benefits.</p> | Substantially complies   |
| C4                    | Provision of overflow parking areas for caravan park users within the caravan park   | <p>Improve traffic and parking;</p> <p>Enhanced mobility and safety benefits</p>  | As above.  |
| C6                    | Adoption of Master Plan water quality guidelines to steer cost effective capital and maintenance treatments in the reserve.  | <p>Improve water quality;</p> <p>Enhanced recreational opportunities;</p>   | Council is no longer trust manager of the caravan park and it is the responsibility of the Holiday Park Trust to implement water quality treatment within the park trust. However the proposed works include water quality treatment along the southern road which complies with Ballina Shire Council policy for stormwater Management. |

#### 7.4.4 Coastal Heath Precinct

##### 8.1 Current Situation

The Coastal Heath Precinct covers the area of the Lake Ainsworth Crown Reserve from the south western corner of the lake to the western and northern boundaries of the Crown Reserve.

The precinct has extensive contiguous areas of low lying heath dominated by coastal banksia. There is evidence of irregular walking trails through the heath on the western side of the lake. However the area is not noticeably used for accessing the lake for swimming and/or watercraft activities. The southern foreshore and eastern foreshore totally dominate user access to the lake because of proximity to caravan park, picnic facilities and parking.

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**Figure 8: Coastal Heath Precinct**

**Table 8.1 Coastal Heath Planning Initiatives**

| Coastal Heath Precinct |  |   |   |
|------------------------|--|---|---|
| Initiatives            |  | Drivers   | Comments  |
| D1                     | Investigate the possibility of new east-west access road from Ballina Byron Rd to Camp Drewe (Western) Rd.   | See also initiatives A1; Improve water quality;<br>Improve traffic and parking;<br>Enhanced mobility and safety benefits. | Beyond the scope of this proposal.  |
| D2                     | The above investigation should also include the possibility of long term siting the main entrance to the caravan park on the north western side of the caravan park with access from east west connector road and then south along Camp Drewe Rd. This would alleviate congestion in the Pacific Parade/Ross St area resulting from caravan park specific traffic. | Improve traffic and parking;<br>Enhanced mobility and safety benefits.  | As above.   |
| D3                     | Camp Drewe (Western) Rd to be upgraded (sealed) to provide access to Sport and Recreation Centre, Camp Drewe and Seven Mile Beach when and if the Eastern Rd is closed to vehicular traffic.   | Improve traffic and parking;<br>Enhanced mobility and safety benefits.  | Camp Drewe Road could possibly be sealed at a later date when operational funds become available. |

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| Coastal Heath Precinct |   |   |   |
|------------------------|---|---|---|
| Initiatives            |   | Drivers   | Comments  |
| D4                     | Establishment of a cycleway on upgraded Camp Drewe (Western) Rd as part of a possible circular cycleway around the lake.  | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits         | Beyond the scope of this proposal.  |
| D5                     | Consideration of establishing car/trailer parking for watercrafts accessing the Lake under all Road Access Options. The appropriate siting of this activity may lessen impacts on caravan park and recreation congestion around the southern foreshore of the lake in peak times but may have some environmental impacts on the existing heath. | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits         | Complies – 3 x long parking spaces for trailers are proposed along the southern road. |
| D6                     | Possible boardwalk and viewing platforms forming the western segment of a possible pedestrian pathway around the lake.  | Enhanced recreational opportunities;<br>Enhanced mobility and safety benefits         | Beyond the scope of this proposal.  |
| D7                     | Fencing of sensitive vegetation.  | Improve water quality;<br>Foreshore and heath protection.                             | Beyond the scope of this proposal.  |
| D8                     | Educational signage to promote the environmental and cultural heritage aspects of the lake.   | Improve water quality;<br>Improve community education;<br>Enhance cultural awareness. | Will be complied with.  |

## 7.5 Provision for Design of the Lennox Head Surf Club and Surrounding Precinct, Complete Urban, October 2014

The Stage 1 – Review and Consultation Report (October 2014) contains the following key objectives:

- “ • Review the Lake Ainsworth Crown Reserve Master Plan and prepare concept designs for the works detailed in the master plan for the area on the eastern side of Lake Ainsworth and the how the refurbished or new building will be integrated into the development.
- Review the Building Condition Report by Ardill Payne & Partners (2009) and undertake further investigations as necessary on the existing building.
- Meet with stakeholders to determine current and future, including spatial, requirements for the surf club building.
- Provide options for the proposed works within the precinct including options and recommendations for the refurbished or new building.”

The Report addresses three options for a new road network to improve the amenity of the area identified in the LACMP (14 January 2005). Each Option involves the closure of the eastern road.

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Road Option 1 involves :

*“New road between the rear of the Barrett Drive residences to the caravan park. This option is not acceptable due to the impact on residences.”*



Figure 01 Lake Ainsworth Crown Masterplan - Road Option 1  
(image courtesy of Google)

Road Option 2 involves:

*“New road through the middle of the caravan park.*

*Option 2 proposed the removal of the northern end of Pacific Parade east of the lake and proposed that access to the Department of Sport and Recreation facilities be provided around the northwest side of the lake.*

*As part of this solution, it was also proposed to remove the existing road on the south side of the lake and provide vehicular connection through the caravan park to Ross Street. With Option 2, permanent removal of the road east of Lake Ainsworth is dependent on establishing a new road network south of the lake and providing a suitable alternative access to the Department of Sport and Recreation along the western and northern side of the lake. There is an existing road in this area but it is currently unsealed.*

*This option was not supported by the Crown when they took over the management of the caravan park.”*

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Figure 02 Lake Ainsworth Crown Masterplan - Road Option 2  
(image courtesy of Google)

Road Option 3 involves:

*"New southern road alignment."*

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Figure 03 Lake Ainsworth Crown Masterplan - Road Option 3  
(image courtesy of Google)

The Report concludes that the three previous Master Plan Road Options are unsuitable and proposes a further Option 4 as follows:

*"New Southern Road alignment with Eastern Road maintained.*

*Due to the current unsuitability of the 3 previous masterplan road options, COMPLETE have proposed for Council's consideration an alternative solution that retains the Eastern Road.*

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*This option proposes to retain the Eastern Road in lieu of providing alternative access to the Department of Sport and Recreation via the Western Road.*

*With this option it is still important to alleviate the issues of health of the lake and dunes, road safety, amenity and caravan park operations and so it is suggested that the Eastern Road be used predominantly for the Department of Sport and Recreation with no public parking. A turnaround north of the existing surf club would limit the majority of vehicles to the south eastern corner of the lake. This will reduce the number of parking spaces east of the lake but this loss can be offset by additional parking south of the lake (refer to Section 2.3)."*



**Figure 04** Lake Ainsworth - Supplementary Road Option 4  
(image courtesy of Google)

The Lake Ainsworth foreshore works assessed in this Report do not adopt Option 4 because it does not achieve the objectives of improving safety, amenity and water quality on the eastern Lake foreshore.

Rather, this project substantially adopts Option 3 because it achieves the most appropriate balance between the competing objectives relating to access, amenity and safety for foreshore users.

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The Report also addresses two options for the Lennox Head Surf Club building. Option A involves a refurbishment and extension of the existing building and Option B involves a new building.

In summary, the proposed roundabout at the intersection of Pacific Parade and the southern road will provide improved and flexible access to the Surf Club site to facilitate the implementation of either Options A or B.

## 8.0 KEY ISSUES

### 8.1 Engineering Services Report – Ballina Shire Council, 3 November 2017

This Report addresses traffic/parking; stormwater management, construction plans and sediment and erosion control. A copy of the Report is contained at **Annexure E**. In summary, the Report concludes as follows:

*“Ballina Shire Council has prepared this Engineering Services Report to support the Part V assessment of the Lake Ainsworth Foreshore Improvement Works. The summary of our conclusions is as follows:*

- *The closure of the Eastern Road will redirect traffic along the Southern Road and Camp Drewe Road. The existing road network has adequate capacity for the increase traffic volume.*
- *The car park extension and Ross Street road side parking upgrades compensates in quantity for the loss in road side car parking spaces resulting from the closure of the Eastern Road.*
- *The proposed foreshore works maintains linkage along the eastern foreshore for emergency vehicles.*
- *Off street pathways improve pedestrian accessibility and pedestrian safety in and around the lake foreshore area and provide improved connectivity to the Lennox Head pathway network.*
- *The proposed works will not increase stormwater quantity generated by the proposed foreshore improvement works. Water sensitive design measures integrated in the landscape design provide stormwater treatment to meet the criteria in Ballina Shire Council DCP (2012)”*

### 8.2 Ecological Assessment

**Annexure F** comprises an Ecological Report prepared by Blackwood Ecological Services. In summary, the Report concludes as follows:

*“Blackwood Ecological Services have been engaged by Ballina Shire Council (BSC) to complete a Flora and Fauna Assessment for proposed foreshore improvement works at Lake Ainsworth, Pacific Parade, Lennox Head, NSW. The Flora and Fauna Assessment report is to be assessed under Part V of the Environmental Planning and Assessment Act 1979 (the EP&A Act). The works are on Crown Land for which the Council is the trust manager.  
The area is also subject to the Lake Ainsworth Management Plan (2002).*

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The proposed works involve improvements along the eastern and-south eastern foreshore of Lake Ainsworth and adjacent recreational spaces. The eastern road rehabilitation involves profiling the existing road pavement and removing concrete footpaths and kerb and gutter. The roadway will be closed to public vehicles and the road way will be replaced with a concrete footpath which will provide a wearing surface for pedestrians and emergency vehicles.

The surrounding landscaping of the eastern road rehabilitation will be an extension of the existing passive recreational area comprising of seating, turfed areas, tree planting and embellishment of existing riparian vegetation. The proposed works also include undertaking measures to manage foot traffic accessing the lake and protect the banks against ongoing erosion. Three short sections of boardwalk are proposed to be located within clumps of lakeside paperbark forest on the southern bank of the lake. The purpose is to allow for pedestrian access round the southern bank without requiring visitors to use the roadway. Boardwalks are to be located so as to avoid loss of established paperbark trees and will be constructed of composite mesh to minimise impacts on groundcover and aquatic vegetation.

Surveys of site vegetation were undertaken on the 2nd May and 9th of August 2017. A total of 67 flora species were recorded during the surveys including 19 (28% of the total) exotic species. Five vegetation communities were identified within the Subject site. Areas of Broad-leaved paperbark forest generally meet the description of the EEC Swamp sclerophyll forest on coastal floodplains which is listed under the TSC Act 1995 for the North Coast bioregion. High quality areas of this EEC occur around the perimeter of the lake and to the north along the drainage channel. These areas have an intact canopy dominated by Broad-leaved paperbark and a native understorey typically dominated by ferns and rushes. Moderate value areas of this EEC also occur along the eastern and southern shores in unfenced areas and typically contain an intact canopy of paperbark but limited understorey due to pedestrian traffic and erosion. Scattered paperbark trees within grassland and carparking areas are also included in this EEC but are considered to be a highly degraded form. These areas have little to no natural regeneration occurring and no structured vegetation surrounding the paperbark trees.

No Threatened (TSC Act 1995, Commonwealth EPBC Act 1999) or ROTAP flora species were recorded during the site surveys.

The Lake Ainsworth area provides a variety of fauna habitat types, including aquatic habitats, swamp sclerophyll forest, developing littoral rainforest and areas of Coast banksia. Movement opportunities for fauna through the Study area are limited to the south and east as a result of the ocean and urban development. Vegetation along the dune system provides a partially intact north- south wildlife corridor although the lack of vegetation along much of the Lennox Head beachfront restricts movement for all but the more mobile fauna groups. Extensive areas of vegetation occur north and west of the lake and a partially intact corridor extends south-west to the Ballina Nature Reserve.

The various activities associated with the foreshore improvement and road rehabilitation works have the potential to result in some impacts on site vegetation. The proposed works will require the removal of one small Tuckeroo and one small Swamp she-oak on the eastern side of the lake. The removal of these trees is required so that the new pathway can be aligned further to the east than the existing roadway.

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Locating the proposed pathway further east of the existing road will allow for the widening of existing areas of riparian vegetation and an additional area of 300 square metres will be available for regeneration of fully structured vegetation communities along the lake banks (BSC 2016). Construction of the boardwalk along three sections of the southern lake shore will require the removal of some small trees and understorey vegetation. The exact locations of boardwalks have been designed so as to minimise any vegetation removal required. No mature trees would be removed and the boardwalk is to be constructed of composite mesh to minimise impacts on groundcover and aquatic vegetation.

There is potential for some increase in traffic along Camp Drewe Road once the eastern road is closed, primarily vehicles and coaches accessing the Sport & Recreation Centre and dog walkers accessing the off leash section of Seven Mile Beach. There is some potential that increased traffic may lead to an increase in road kill along this section of road. It is anticipated that the majority of traffic accessing the Sport and Recreation Centre would be during daylight hours and likewise for dog walkers accessing Seven Mile Beach. As such this increase in daytime traffic along Camp Drewe Road is unlikely to affect the majority of local wildlife species that are active after dark.

Freshwater turtles known from Lake Ainsworth may occasionally cross Camp Drewe Road, including to access inundated areas within heathland and Swamp sclerophyll forest to the west and may occasionally be struck by vehicles. This is highly unlikely to impact these turtles on a population scale.

There would be a long-term gain in fauna habitat values as a result of proposed rehabilitation works including the expansion and improvement of riparian vegetation through compensatory plantings and weed control works. The removal of vehicles from the eastern road will further enhance opportunities for fauna movement between dune vegetation and the lake. The Ballina Shire Development Control Plan (2012) notes that where development is unable to be sited, designed and managed to avoid potential adverse impacts on natural areas, a proposal to remove habitat may be considered. The loss of the two trees east of the Lake and some vegetation within southern boardwalk sections should be compensated for by the planting of 93 native species typical of Swamp Sclerophyll Forest (i.e. a ratio of 3:1).

The Subject site does not occur within or adjacent to any areas of SEPP 14 Coastal wetlands or SEPP 26 Littoral Rainforests and the proposed development will not have any impact on any of these areas in the locality.

Assessments of significance (7 part tests) were completed for a number of species of Threatened fauna recorded on the site or considered possible occurrences on the site over time. The proposed development is unlikely to result in a significant impact on any Threatened (TSC Act 1995) species, population or ecological community. A Species Impact Statement is not required. The proposed development is unlikely to result in a significant impact on any matters of National Environmental Significance as defined under the Commonwealth EPBC Act 1999."

### **8.3 Aboriginal Cultural Heritage Assessment**

**Annexure G** comprises an Aboriginal Cultural Heritage Assessment prepared by Remnant Archaeology. The Executive Summary and Recommendations contained in the Report are reproduced as follows:

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*"In July 2017 Ballina Shire Council engaged Remnant Archaeology to carry out an Aboriginal cultural heritage assessment (ACHA) for their proposed upgrades of Pacific Parade and Camp Drew Road at Lake Ainsworth, Lennox Head in northern New South Wales. Although the project had been approved under Part V of the EP&A Act 1979, Council were keen to take into consideration concerns by members of the community and as such although the project (as approved under Part V of the EP&A Act) does not require a cultural heritage assessment (CHA) to be carried out unless an EIS is required, Council were still keen to take into consideration concerns expressed by members of the community and so commissioned REMNANT Archaeology to complete a CHA regardless.*

*Survey and inspection of Pacific Parade and Camp Drew Road was completed on 12 July 2017 and was carried out by members of the local Aboriginal Community that had registered as Aboriginal parties (RAPs) to the project (Ms Lois Cook, Mr Mik Smith and Mr Marcus Ferguson), along with Remnant Archaeology's field archaeologist (Graham Knuckey) and Mr Ian Fox, who assisted the archaeologist. No Aboriginal objects or places were located during the site inspection; a small collection of oyster shells were found however they were identified as being too young to have originated from an Aboriginal shell midden or to have any connection with Aboriginal cultural activity from the past. Despite impacts from the recent past however, including military, mining and recreational activities, potential for Aboriginal cultural heritage resources to exist within the barrier dune that separates Lake Ainsworth from Seven Mile Beach still exists.*

*As a result of the investigation, outcomes and assessment contained in this cultural heritage assessment report it is recommended that:*

- 1. No further archaeological investigation is required along the sections of Pacific Parade and Camp Drew Road designated for upgrade works.*
- 2. The barrier dune and paperbark trees along Pacific Parade can be avoided.*
- 3. Monitoring by representatives of the RAPs should take place during initial ground disturbance activity along the eastern verge of Pacific Parade.*
- 4. It is recommended here that Council staff and contractors who have not previously (or recently) participated in Ballina Shire Council CH Induction Programs be required to do so. The CH induction program should be developed in collaboration with the local Aboriginal Community and should include a maintained record, including timing, of all personnel and contractors involved for the duration of the project.*

*In conjunction with induction training developed in collaboration with the local Aboriginal Community, Council is encouraged to include a program of cultural awareness. A cultural awareness program would provide an opportunity for explanation of the cultural significance to Aboriginal people of the Lake Ainsworth area and strengthen the relationships Council is seeking to build.*

- 5. It is recommended that Ballina Shire Council maintain consultation with the RAPs. Ongoing consultation should be for the duration of the upgrade works.*
- 6. It is recommended a Stop Work Procedure (SWP) is to be installed in recognition of the potential for discovery of unexpected or incidental finds. Note that any works that may reveal or disturb cultural heritage objects or sites will require an AHIP from OEHL in order for the find(s) to be mitigated (if avoidance is not an option). The SWP procedure is outlined in the table below and has been adapted from earlier reports completed in the region (Fox 2014a; 2014b; 2014c; Knuckey 2016).*

*Council must ensure every on-site contractor/worker is provided with a copy of the SWP process and that all on-site workers are made aware if/when the SWP is brought into action.*

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Should the work being undertaken include the use of large earth working equipment (large-scale excavators, for example), it may be possible in some instances to isolate the cultural object and continue working without further disturbance. Advice from a heritage consultant or cultural monitors (if present) should be sought, but a nominal buffer of up to 5m may be required, with high-visibility barrier fencing/mesh surrounding the find location.

**The proposed stop work procedure (SWP).**

|                   |   |
|-------------------|---|
| <b>STOP WORK</b>  | Immediately, upon becoming aware of a potential cultural heritage object or archaeological resource   |
| <b>CONTACT</b>    | A qualified cultural heritage professional as soon as possible  |
| <b>NOTIFY</b>     | <p>The Ballina Shire Council's Heritage (or Senior Project) Officer, Jali LALC, the RAPs (if they are not already present), and advise OEH as soon as practicable.</p> <p>If bones or potential human remains are discovered, Police must be notified immediately. Police must provide written notification to proceed. If human remains are identified as Aboriginal, OEH will provide written notification of required actions.</p> <p>The cultural heritage professional in conjunction with OEH and the registered Aboriginal parties should assess the significance of the resource and recommend a course of action e.g.:</p> |
| <b>ASSESS</b>     | <p>Protect and avoid; or</p> <p>Investigate, in accordance with the Code of Practice for Archaeological Investigations; or</p> <p>Develop management strategies to inform an AHIP to regulate the unavoidable harm to Aboriginal objects</p>  |
| <b>ACTION</b>     | Identification of a previously unrecorded cultural heritage object will require registration as an Aboriginal site on the OEH AHIMS database. Registration is required as soon as practicable   |
| <b>APPLY</b>      | To OEH for an AHIP if necessary   |
| <b>RECOMMENCE</b> | Only when OEH has approved a course of action and/or provided conditions of approval for an AHIP  |

7. In the event that skeletal remains are uncovered, work must cease immediately in the area surrounding the find and the area cordoned off. The NSW Police Department is to be contacted and no further action taken until written advice is received from the Police allowing work to recommence. If the remains are determined to be of Aboriginal origin, the Office of Environment and Heritage must be notified along with the RAPs to the project and the Jali Local Aboriginal Land Council. A plan of management for the preservation of the remains must be put in place prior to works recommencing and it must be developed in consultation with the RAPs.

**14 RECOMMENDATIONS**

Subsequent to the consideration of:

- o The relevant legislative requirements (set out in Section 2),
- o The results of the current cultural heritage assessment process,

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- 
- o The concerns and interests of the Aboriginal Community, represented by the RAPs, and,
  - o The proposed impacts of the upgrade works. It has been found that:
  - o The proposed upgrade works will occur in a landscape that is of high cultural importance to the Aboriginal Community.
  - o The occurrence of tangible Aboriginal objects and/or sites within the study areas along Pacific Parade and Camp Drew Road (south) is zero; the shells found (See Figs. 15, 17) are not cultural.
  - o The proposed upgrade works will have a direct impact upon the cultural landscape, however, potential physical impact upon particular landforms (the barrier dune along Pacific Parade) and individual sites (the paperbark trees along Pacific Parade) can be avoided.

As a result of these findings it is recommended that:

1. No further archaeological investigation is required along the sections of Pacific Parade and Camp Drew Road designated for upgrade works.
2. The barrier dune and paperbark trees along Pacific Parade can be avoided.
3. Monitoring by representatives of the RAPs should take place during initial ground disturbance activity along the eastern verge of Pacific Parade.
4. It is recommended here that Council staff and contractors who have not previously (or recently) participated in Ballina Shire Council CH Induction Programs be required to do so. The CH induction program should be developed in collaboration with the local Aboriginal Community and should include a maintained record, including timing, of all personnel and contractors involved for the duration of the project.

In conjunction with induction training developed in collaboration with the local Aboriginal Community, Council is encouraged to include a program of cultural awareness. A cultural awareness program would provide an opportunity for explanation of the cultural significance to Aboriginal people of the Lake Ainsworth area and strengthen the relationships Council is seeking to build.

5. It is recommended that Ballina Shire Council maintain consultation with the RAPs. Ongoing consultation should be for the duration of the upgrade works.
6. It is recommended a Stop Work Procedure (SWP) is to be installed in recognition of the potential for discovery of unexpected or incidental finds. Note that any works that may reveal or disturb cultural heritage objects or sites will require an AHIP from OEH in order for the find(s) to be mitigated (if avoidance is not an option). The SWP procedure is outlined in the table below and has been adapted from earlier reports completed in the region (Fox 2014a; 2014b; 2014c; Knuckey 2016).

Council must ensure every on-site contractor/worker is provided with a copy of the SWP process and that all on-site workers are made aware if/when the SWP is brought into action.

Should the work being undertaken include the use of large earth working equipment (large-scale excavators, for example), it may be possible in some instances to isolate the cultural object and continue working without further disturbance. Advice from a heritage consultant or cultural monitors (if present) should be sought, but a nominal buffer of up to 5m may be required, with high-visibility barrier fencing/mesh surrounding the find location.

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**Table 9 - The proposed stop work procedure (SWP).**

|                   |   |
|-------------------|---|
| <b>STOP WORK</b>  | <i>Immediately, upon becoming aware of a potential cultural heritage object or archaeological resource</i>  |
| <b>CONTACT</b>    | <i>A qualified cultural heritage professional as soon as possible</i>   |
| <b>NOTIFY</b>     | <i>The Ballina Shire Council's Heritage (or Senior Project) Officer, Jali LALC, the RAPs (if they are not already present), and advise OEH as soon as practicable.<br/><br/>If bones or potential human remains are discovered, Police must be notified immediately. Police must provide written notification to proceed. If human remains are identified as Aboriginal, OEH will provide written notification of required actions.<br/><br/>The cultural heritage professional in conjunction with OEH and the registered Aboriginal parties should assess the significance of the resource and recommend a course of action e.g.:</i> |
| <b>ASSESS</b>     | <i>Protect and avoid; or<br/><br/>Investigate, in accordance with the Code of Practice for Archaeological Investigations; or<br/><br/>Develop management strategies to inform an AHIP to regulate the unavoidable harm to Aboriginal objects</i>  |
| <b>ACTION</b>     | <i>Identification of a previously unrecorded cultural heritage object will require registration as an Aboriginal site on the OEH AHIMS database. Registration is required as soon as practicable</i>  |
| <b>APPLY</b>      | <i>To OEH for an AHIP if necessary</i>  |
| <b>RECOMMENCE</b> | <i>Only when OEH has approved a course of action and/or provided conditions of approval for an AHIP</i>   |

7. *In the event that skeletal remains are uncovered, work must cease immediately in the area surrounding the find and the area cordoned off. The NSW Police Department is to be contacted and no further action taken until written advice is received from the Police allowing work to recommence. If the remains are determined to be of Aboriginal origin, the Office of Environment and Heritage must be notified along with the RAPs to the project and the Jali Local Aboriginal Land Council. A plan of management for the preservation of the remains must be put in place prior to works recommencing and it must be developed in consultation with the RAPs."*

#### **8.4 Acid Sulphate Soils**

That part of the site to which BLEP2012 applies is mapped as Class 5 as indicated on **Figure 9**. Clause 7.1 of BLEP2012 requires an Acid Sulphate Soil Management Plan for works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

That part of the site to which BLEP1987 applies is mapped as Class 5 and the same provisions in Clause 7.1 of BLEP 2012 apply under Clause 36 of BLEP 1987.

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It is highly unlikely that the proposed works (minimal excavation required) within the Class 5 land would trigger the need for an Acid Sulphate Soil Management Plan.

BLEP 1987 also indicates that the Lake Ainsworth water body is mapped as Class 1. In accordance with the provisions of Clause 36 of BLEP 1987, an Acid Sulphate Soil Management Plan is required for any works on Class 1 land. As minor excavation is proposed in and adjacent to Lake Ainsworth to remediate bank erosion and provide for disabled access, it is recommended that an Acid Sulphate Soil Management Plan be prepared prior to work commencing.



Figure 9 – Acid Sulphate Soils Map  
Source: BLEP2012 and BLEP 1987

## 9.0 CONCLUSION

Improvements to the Lake Ainsworth foreshore are foreshadowed in the Plans of Management identified in Section 7.0 of this Report. The proposed Lake Ainsworth foreshore works shown on the Application Plans at **Annexure B** and described in this Report are generally consistent with the Management Plans and Master Plan.

The design and siting of the key elements of foreshore works will avoid or mitigate significant adverse impacts, including tree removal, Lake foreshore erosion and disturbance of the dunal system.

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Significant public benefit will flow from the proposed work, including improved amenity and safety for residents and tourists, improved water quality, bank erosion repairs and improved stormwater management measures.

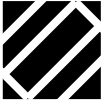
Subject to compliance with the recommendations contained in the Specialist Reports at **Annexures E to G**, it is concluded that the proposed activity will not significantly affect the environment and therefore an Environmental Impact Statement is not required. It is further concluded that the proposed foreshore works will deliver significant public benefit and therefore approval of the activity would be in the public interest.

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**ANNEXURE A      Aerial Photograph of Site – Source: Six Maps, Printed July 2017**

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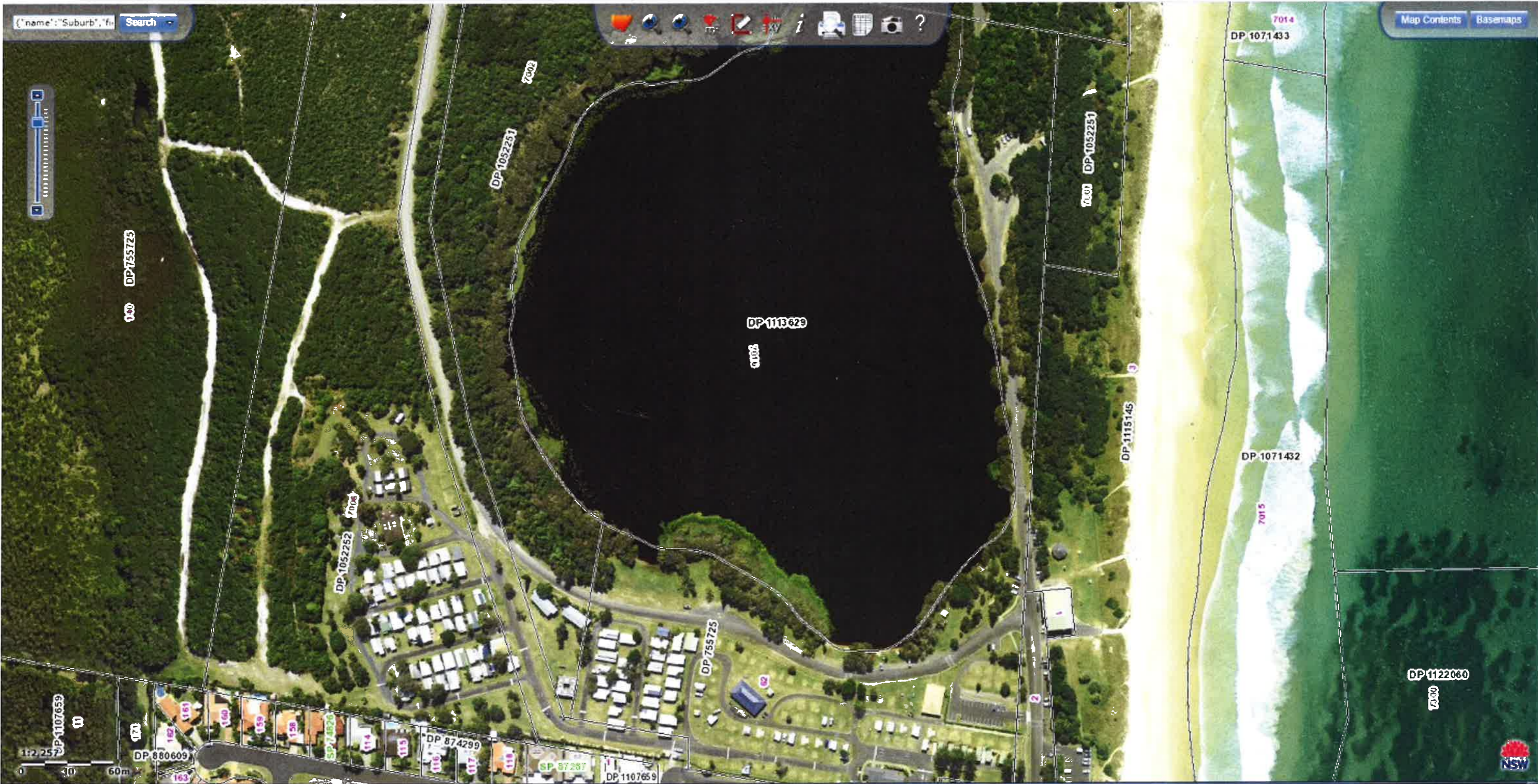
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Map Contents Basemaps







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| <b>ANNEXURE B</b> | <b>Application Plans (13 Sheets), Rev B – Ballina Shire Council, 3 November 2017</b>                   |
| Annexure B1       | Cover Sheet/Locality, Plan No. LHR30.061   |
| Annexure B2       | Overall Plan No. LHR30.061/OP  |
| Annexure B3       | Southern Foreshore General Works, Plan No. LHR 30.061/WP (CH0 to CH105)                                |
| Annexure B4       | Southern Foreshore General Works, Plan No. LHR 30.061/WP (CH105 to CH255)                              |
| Annexure B5       | Southern Foreshore General Works, Plan No. LHR 30.061/WP (CH255 to CH380)                              |
| Annexure B6       | Intersection General Works, Plan No. LHR 30.061/WP   |
| Annexure B7       | Eastern Foreshore General Works Plan and Longitudinal Section, Plan No. LHR 30.061/WP (CH0 to CH120)   |
| Annexure B8       | Eastern Foreshore General Works Plan and Longitudinal Section, Plan No. LHR 30.061/WP (CH120 to CH240) |
| Annexure B9       | Eastern Foreshore General Works Plan and Longitudinal Section, Plan No. LHR 30.061/WP (CH240 to CH360) |
| Annexure B10      | Eastern Foreshore General Works Plan and Longitudinal Section, Plan No. LHR 30.061/WP (CH360 to CH440) |
| Annexure B11      | Southern Road Alignment Plan and Longitudinal Section, Plan No. LHR 30.061/LS (CH0 to CH300)           |
| Annexure B12      | Southern Road Alignment Plan and Longitudinal Section, Plan No. LHR 30.061/LS (CH300 to CH380)         |
| Annexure B13      | Log Revetment and Beach Access Ramp Typical Detail, Plan No. LHR 30.061/DT                             |

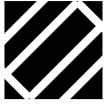
**SUPERSEDED**

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**ANNEXURE C**      **Ballina Local Environmental Plan 2012 Land Zoning Map, Sheet 005C – Source:  
NSW Legislation Website**

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**Ballina Local Environmental Plan 2012**

**Land Zoning Map - Sheet LZN\_005C**

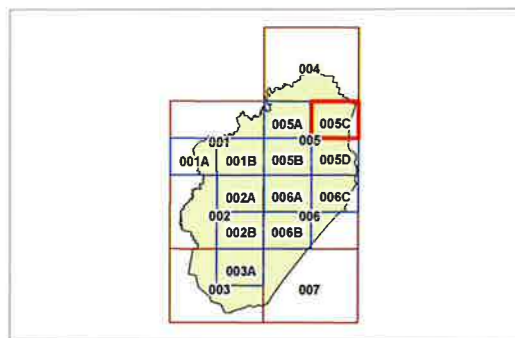
**Legend**

**Zone**

- B1 Neighbourhood Centre
- B2 Local Centre
- B3 Commercial Core
- B4 Mixed Use
- B5 Business Development
- B6 Enterprise Corridor
- E1 National Parks and Nature Reserves
- IN1 General Industrial
- R2 Low Density Residential
- R3 Medium Density Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU2 Rural Landscape
- SP2 Infrastructure
- W1 Natural Waterways
- W2 Recreational Waterways
- DM Deferred Matter

**Cadastral**

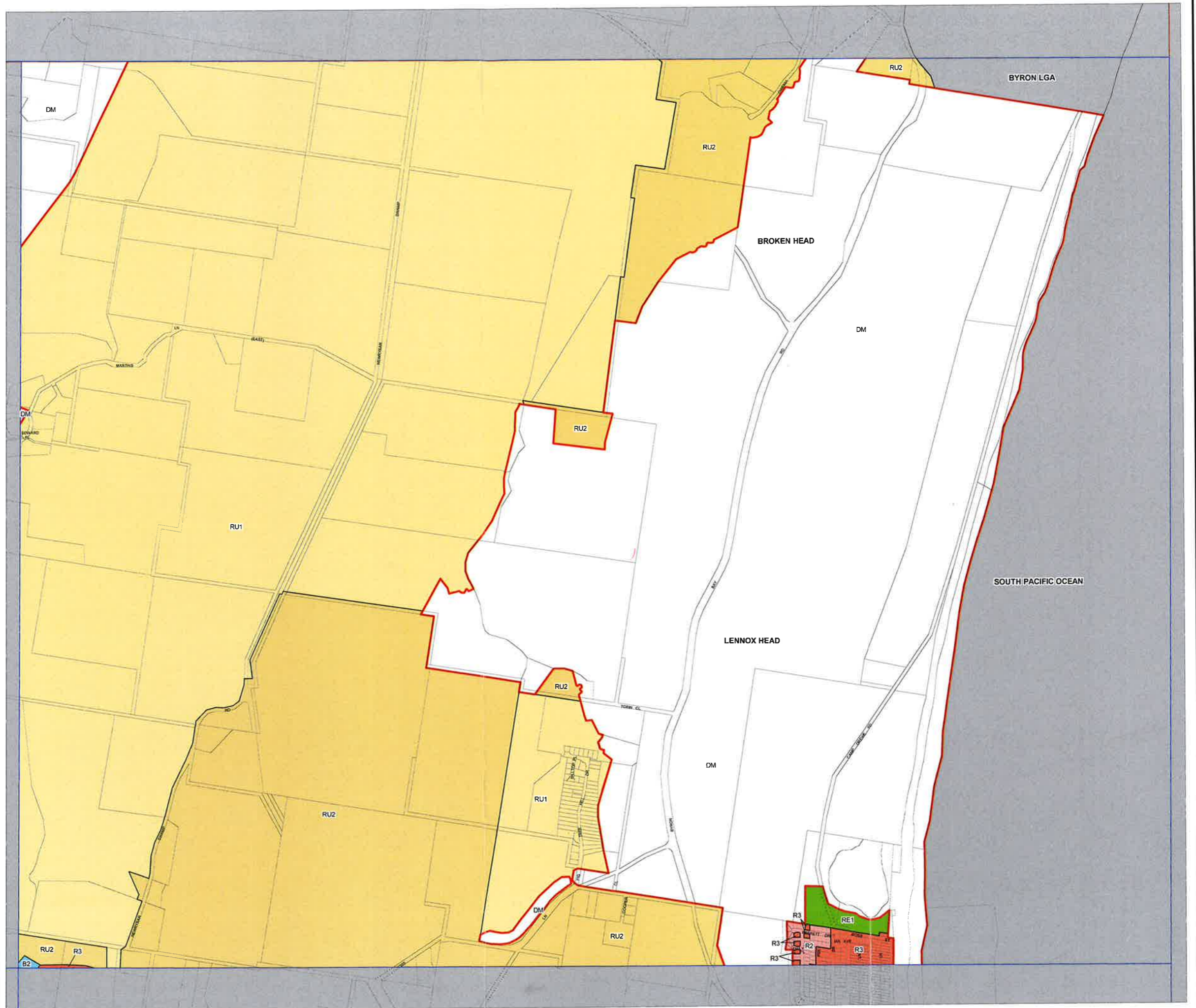
Cadastral 29/01/14 © Land and Property Information (LPI)

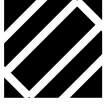


0 200 400 600 800 Metres

Scale 1:20,000 @ A3

Projection: GDA 1984  
MGA Zone 56





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**ANNEXURE D**      **Ballina Local Environmental Plan 1987 Land Zoning Map, Sheet 005C – Source:  
Ballina Shire Council**

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# Ballina Local Environmental Plan 1987

## Land Zoning Map - Sheet 1987\_LEP\_005C

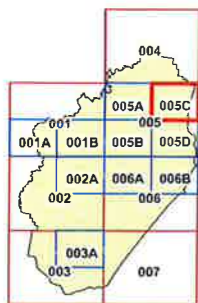
### Legend

#### Zone

- 1(a1) Rural - Plateau Lands Agriculture
- 1(a2) Rural - Coastal Lands Agriculture
- 1(b) Rural - Secondary Agricultural Land
- 1(d) Rural - Urban Investigation
- 1(e) Rural - Extractive & Mineral Resources
- 2(a) Living Area
- 2(b) Village Area
- 2(t) Tourist Area
- 3 Business
- 4 Industrial
- 6(a) Open Space
- 7(a) Environmental Protection - Wetlands
- 7(c) Environmental Protection - Water Catchment
- 7(d) Environmental Protection - Scenic/Escarpment
- 7(f) Environmental Protection - Coastal Lands
- 7(i) Environmental Protection - Urban Buffer
- 7(j) Environmental Protection - Habitat
- 8(a) National Parks & Nature Reserves
- 9(a) Road - Main Road Proposed
- 9(b) Road - Local Road Proposed
- Unzoned
- Land to which the Ballina Local Environmental Plan 2012 applies

#### Cadastre

Cadastre 09/01/15  
© Land and Property Information (LPI)



0 200 400 600 800 Metres

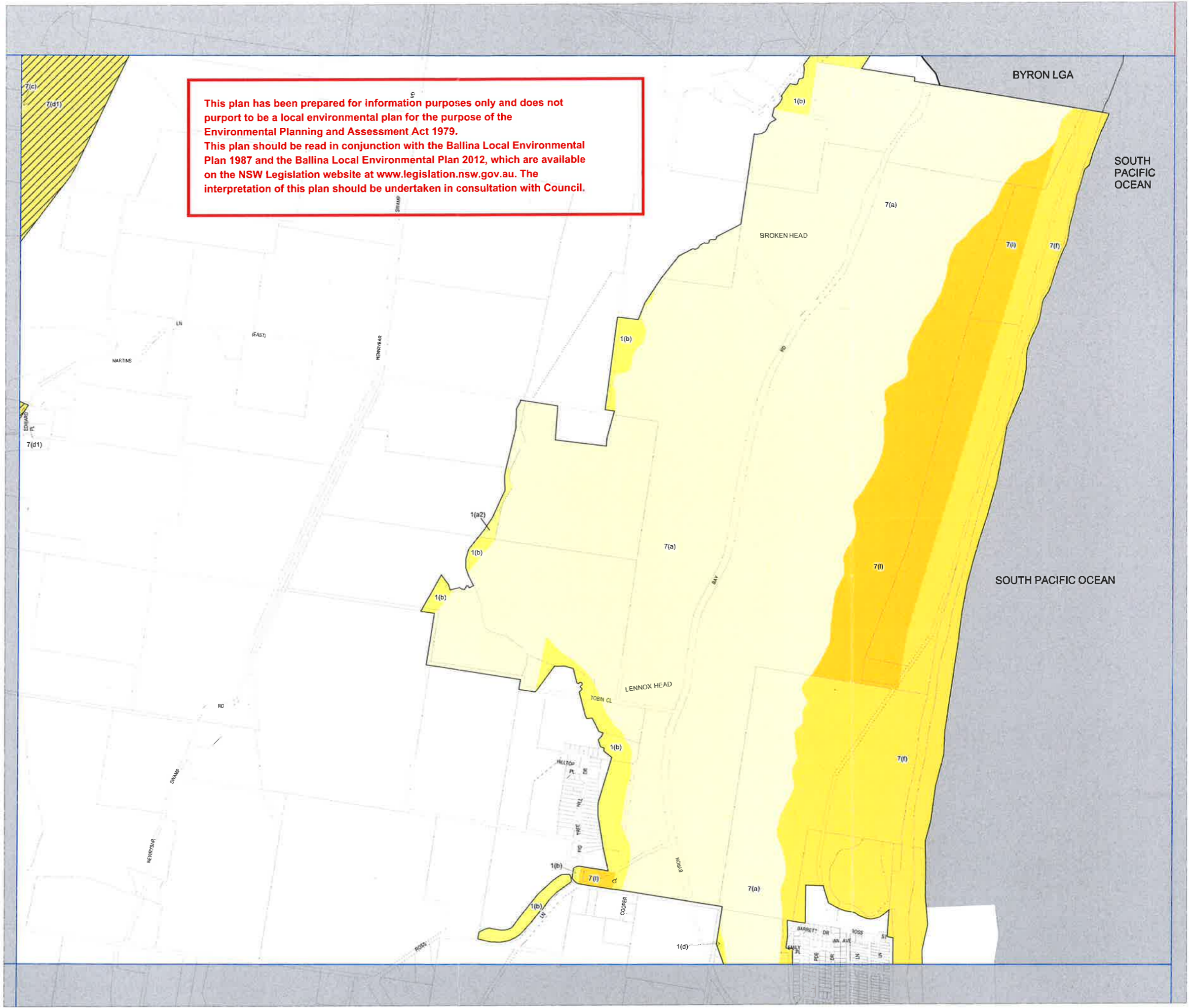
Scale 1:20,000 @ A3

Projection GDA 1994  
Zone 55

Map identification number:

0250\_COM\_1987\_LEP\_005C\_020\_20150109

This plan has been prepared for information purposes only and does not purport to be a local environmental plan for the purpose of the Environmental Planning and Assessment Act 1979. This plan should be read in conjunction with the Ballina Local Environmental Plan 1987 and the Ballina Local Environmental Plan 2012, which are available on the NSW Legislation website at [www.legislation.nsw.gov.au](http://www.legislation.nsw.gov.au). The interpretation of this plan should be undertaken in consultation with Council.





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## *Lake Ainsworth Foreshore Improvement Works*

# » *Engineering Services Report*

*By Ballina Shire Council*

Document Number: BSC/LAFIW001

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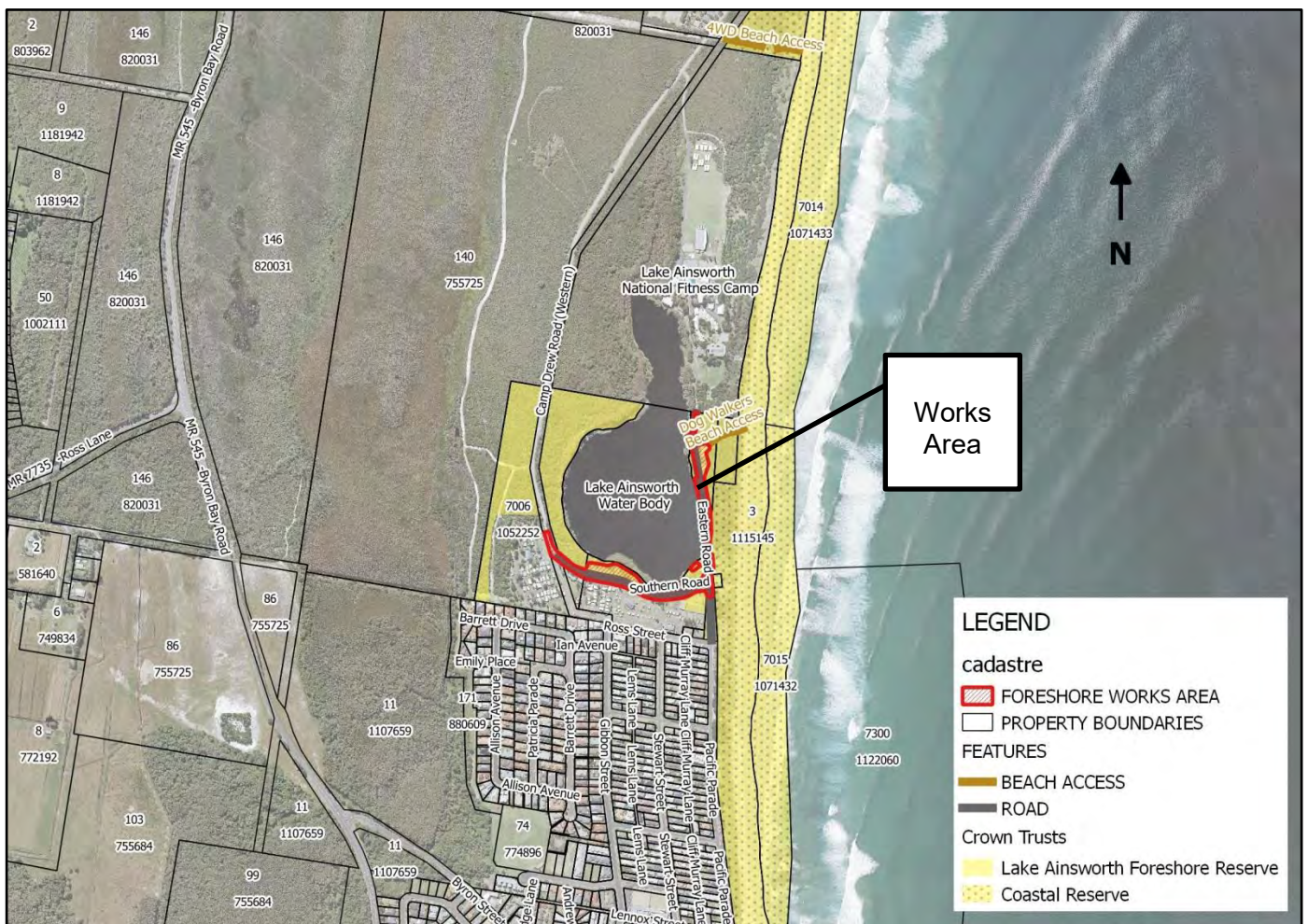
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Document Control for BSC/LAFIW001

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| A              | 27/10/2017 | DRAFT for review | PJB |          |   |
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# 1 Introduction

Ballina Shire Council Engineering Design and Survey services team has prepared this Engineering Services Report to accompany a Part V assessment for the foreshore improvement works at Lake Ainsworth, Lennox Head NSW within the Ballina Local Government Area. The proposed works lie within land parcels described as Lot 62 DP 755725, Lot 7016 DP 1113629, Lots 1, 2 and 3 DP 1115145, Lot 7022 DP 1052251 and the Camp Drew road reserve (western road). Figure 1 below shows the locality of the foreshore improvement works.



**Figure 1: Lake Ainsworth Foreshore Improvement locality plan**

This report relates to the engineering design, traffic and stormwater requirements of the foreshore improvement works. The scope of the project is for works within the public recreational park land around the Lake Ainsworth foreshore. These works include extending the existing parkland, installation of new additional seating and picnic/BBQ facilities and bank stabilisation. The objectives of this report are to demonstrate the proposed new engineering modifications meet the appropriate level of engineering service.

## 2 Background

Lake Ainsworth is a freshwater coastal lake at Lennox Head, NSW. It is a unique natural water body and provides educational and recreational opportunities for local residents and visitors, especially during the warmer months of the year. It is valued highly by the wider community and the management of the lake and surrounding foreshore has been challenging in maintaining the balance in the preservation of the environmental value of the lake and its recreational usage. There have been numerous studies undertaken and management plans prepared in recent years to help guide the decisions regarding the management of the lake.

*The Lake Ainsworth Lake Processes Study (LALPS)* was completed in 1996 by Australian Water and Coastal Studies et al. (AWACS, 1996) which was commissioned support the preparation of the subsequent management plan. The process study is considered to be the most comprehensive scientific study undertaken for Lake Ainsworth and looked to quantifying and understanding the complex environmental processes including bathymetric survey of the lake bed, sediment sampling, water quality sampling and monitoring, flora and fauna survey, groundwater quantity and level monitoring and core hole drilling for interpretation of local stratigraphy.

*Lake Ainsworth Management Plan (LAMP)* was subsequently prepared in 2002 as the plan of management applicable to Lake Ainsworth and its immediate surrounds. The LAMP seeks to implement and regulate actions within the Lake Ainsworth area to ensure that competing uses and processes are managed so the quality of the lake is ultimately improved. The LAMP was adopted by Council, however does not expressly refer to the Crown Lands Act.

The *Ballina Coastal Reserve Plan of Management (BCR PoM)* was first prepared in 2003, and then revised in 2011 with the primary objective of rationalising all vacant Crown lands and existing Crown Reserves into a single coastal reserve for the notified purpose of Public Recreation and Coastal Environmental Protection with the appointment of Ballina Shire Council as Reserve Trust Manager. The *BCR PoM (2012)* makes reference to implementation of the *LAMP (2002)*.

Since the *LAMP (2002)* was adopted by Council, the *Lake Ainsworth Crown Reserve Master Plan (LACRMP)* was prepared in 2005 by Connell Wagner for the foreshore improvement of Lake Ainsworth. This master plan document was the first iteration of plans to close the eastern road to public vehicular access and varied from the *LAMP (2002)* whereby it:

- a) Supports the closure of the eastern road (apart from emergency/maintenance provisions)
- b) Rehabilitates the existing eastern road with a shared path suitable for emergency access provisions to the NSW Sport and Recreational Centre and maintenance access from Council
- c) Provides for a new road through the middle of the caravan park (through the existing road reserve) connecting Ross Street to Camp Drewe Road (the western road).

Since the preparation of LACRMP, there has been considerable debate and divided views in the community regarding the most appropriate strategy regarding vehicular access and closure/ realignment of roads in the Lake Ainsworth precinct and the LACRMP has not been implemented.

In 2014, Complete Urban Pty Ltd was engaged by Ballina Shire Council to prepare a master plan of the *Provision for Design of the Lennox Head Surf Club and Surrounding Precinct*. It incorporated redevelopment of the surf club building and the surrounding Lake Ainsworth precinct. The options provided by Complete Urban Pty Ltd was publicly exhibited and community consultation was undertaken for three broad options:

1. Eastern road closure (except to emergency vehicles) with through traffic to the western road (Camp Drew Road) via the southern road;
2. Eastern road reconstruction to allow public vehicle access to the Lake Ainsworth Sport and Recreation Centre only (no parking provisions) along the eastern road with through traffic to the western road (Camp Drew Road) maintained via the southern road; and
3. Eastern road closure (except to emergency vehicles) with through traffic to the western road (Camp Drew Road) from Ross Street through the Lake Ainsworth Caravan Park. The southern road is then turned into a no through road (parking provisions only)

Following the completion of the community consultation, at the 18 December 2014 Ordinary meeting Council then resolved (Item 11.1 Lake Ainsworth – South Eastern Precinct - consultation):

*That the eastern road be closed and the area be converted to public open space to improve the amenity of the area and to reduce erosion and stormwater runoff entering the Lake.*

In response to the Council resolution, Council engaged Design Team Inc. to prepare a *Concept plan of the Lake Ainsworth Recreation Precinct Works*. The preparation of the plan was undertaken with Council's engineering design team *and* in direct consultation with elected Councillors during two briefing sessions. The Concept Plan was adopted by Council resolution at the 24 March 2016 general meeting (Item 11.1 Lake Ainsworth South Eastern Precinct Upgrade – Concept Plan). The details within the concept plan included the future surf club redevelopment to ensure that surrounding landscape works is conducive to what will be an "ultimate state".

A Part V assessment of stage 1 of the concept plan was undertaken by Council in 2016. Stage 1 included the eastern road closure and eastern foreshore works and an intersection upgrade. Council have not undertaken any works under this assessment and have now extended the scope of stage 1 to include the Southern Road and foreshore works and have undertaken further studies to accompany this Part V which will supersede the previous Part V assessment undertaken in 2016.

# 3 Traffic Assessment

## 3.1 Traffic Generation

Existing traffic generators in the Lake Ainsworth precinct are identified in this study as being:

- Recreation use of Lake Ainsworth and patrolled section of Seven Mile Beach
- Alstonville and Lennox Head Surf Lifesaving Club
- Lake Ainsworth Sport and Recreation Centre
- Camp Drewe
- 4WD vehicles accessing Seven Mile Beach
- Pegasus Park Equestrian Centre Beach Riding
- Lake Ainsworth Holiday Park – Overflow traffic generated during periods of high patronage

The Eastern Road, north of the intersection with the Southern Road currently provides public vehicular and emergency access on a 5-6m wide bitumen seal road to the Lake Ainsworth Sport and Recreation Centre and provides road side parking to the eastern side of Lake Ainsworth. The Sport and Recreation Centre also has a secondary driveway access off Camp Drewe Road, however the primary public access is currently off the Eastern Road. The secondary access in the past has been used when the Eastern Road has been inundated and cut off by flooding from Lake Ainsworth.

The proposed foreshore improvement works including the closure of the Eastern Road will not directly generate additional traffic, however the works will result in redirection of existing traffic. The redirection of traffic will include:

- Through traffic to the Lake Ainsworth Sport and Recreation Centre currently along the Southern Road and Camp Drewe Road to the existing secondary driveway access;
- Local recreational traffic looking to park lake side to alternative parking along the Southern Road or alternative car parks; and
- Local dog walkers accessing seven mile beach 'off leash' area to alternative parking.

Access to the Lake Ainsworth Sport and Recreation Centre will be impacted by the Eastern Road closure as the existing main entrance will no longer facilitate access for public vehicles. The secondary entrance to the Camp Drewe Road is a legal access to Council's road network, however adds approximately 1.2km journey to the Sport and Recreation Centre, part of which will be via an unsealed section of road. This is an acceptable level of service, however would generally be seen as a reduced level of service for the Lake Ainsworth Sport and Recreation Centre when compared to that currently available via the Eastern Road.

A portion of the vehicles accessing the Lake Ainsworth Sport and Recreation Centre are heavy vehicles which will require a left/right turn manoeuvre at the intersection between Pacific Parade and the Southern Road and the secondary driveway access to the Sport and Recreation Centre (off the Camp Drewe Road). Turn path analysis has been undertaken to confirm adequate clearances and provisions have been made for heavy vehicles performing left/right manoeuvres at the new intersection and existing secondary driveway. Refer to drawings in Appendix A.

Emergency vehicle access is being maintained to the Sport and Recreation Centre via the eastern corridor. The landscape and engineering design of the eastern corridor involves removing the road pavement and replacing with a 3m wide reinforced concrete pathway designed to accommodate heavy vehicle loading. The pathway follows a 6m wide clear corridor for emergency access linking Pacific Parade and the Lake Ainsworth Sport and Recreation Centre. This allows passage of persons and vehicles with adequate width clear of obstructions to allow two vehicles to pass safely.

The redirection of traffic generated by dog walkers that currently access the off leash section of Seven Mile Beach park is uncertain, as it is subject to Council's policy relating to where dogs are permitted in the crown reserve areas. Two alternatives are currently available to dog walkers:

- Alternative parking in the south eastern Lake Ainsworth precinct (in and around the surf club). Access to Seven Mile Beach via existing access to the north of the surf club;
- Driving up the Western Road to the north side of the lake and parking near the 4WD beach access.

Both possible scenarios are considered in this study.

### 3.2 Traffic Volume Counts

The main traffic generator in the Lake Ainsworth precinct is local recreational users of the Lake, surf club and surf beaches. Local traffic is highly variable depending on the recreational demand for the lake and beaches which coincides with a pronounced peak during school holidays and long weekends, especially in the summer months. Through traffic along the Eastern Road to the Lake Ainsworth Sport and Recreation Centre and through traffic along Camp Drewe Road is less variable and is a small proportion of the volume during peak periods.

Metrocount Traffic Classifiers were set for a period of 5.5 weeks covering the 2017 Easter Qld and NSW school holidays and a period of 1-2 weeks before and after the school holiday period to establish baseline Average Daily Traffic (ADT) volumes for the Lake Ainsworth precinct. The objective of undertaking the traffic count was to quantify existing traffic volumes and assess the anticipated effect of the redirection of traffic will have on the existing road network.

The school holiday period including the Easter and ANZAC day long week end has historically been one of the busiest periods for Lake Ainsworth precinct and is considered to be an appropriate representation of a “peak” period. Extending the traffic count period into the school term either side of the holiday period was done to quantify comparison volumes during an “off peak” period.

The three classifier locations were used to segregate through traffic along the Eastern Road and Camp Drewe Road from the local recreational traffic volume. The location of the counters is shown in Figure 2 and described as follows:

1. **Pacific Parade** (between Ross Street and Southern Road Intersections) – This is a ‘total’ count of the combined traffic load of through traffic to Sport and Rec, Camp Drewe Road, and local traffic accessing the lake and beach. The only movements not captured by this counter are the traffic exiting the beach side car park, however this traffic would not be redirected by the eastern road closure.
2. **Eastern Road** north of the existing turn area – This is the ‘through’ traffic to the Sport and Recreation Centre. It is likely to overestimate the through traffic as a proportion of this traffic turns around at the gate entrance; however for the purposes of the traffic study is considered an appropriate conservative count of traffic volume that will be redirected along Camp Drewe Road with the Eastern Road closure.
3. **Camp Drewe Road** – Counts ‘through’ traffic along the Camp Drewe Road (Western Road).

The local recreational traffic for beach/lake users was calculated by subtracting counts 2 and 3 from count 1 for each day in the period. Similarly, the traffic volumes along Camp Drewe Road with the redirection of traffic resulting from the closure of the Eastern Road was estimated by adding count 2 and 3 for each day in the period.



Due to regional flooding leading up to Easter, the traffic volumes during the first week of Qld school holidays was substantially less than would be expected. Historically, occupancy rates at Lake Ainsworth Holiday Park have been a good indicator of holiday visitors to Lennox Head and consultation with the park managers showed occupancy rates were low and there were a number of cancellations of booked sites resulting from the flooding event. Therefore the week (from 1/4/2017 – 7/4/2017) was discarded from the calculated averages in the table below. As such for the purposes of the study, the logged “Peak” period includes only the two weeks of NSW school holiday period including the Easter long weekend. The results of the daily log are presented in Figure 3 and Table 1 summarises the existing and estimated proposed traffic volumes based on those counts.

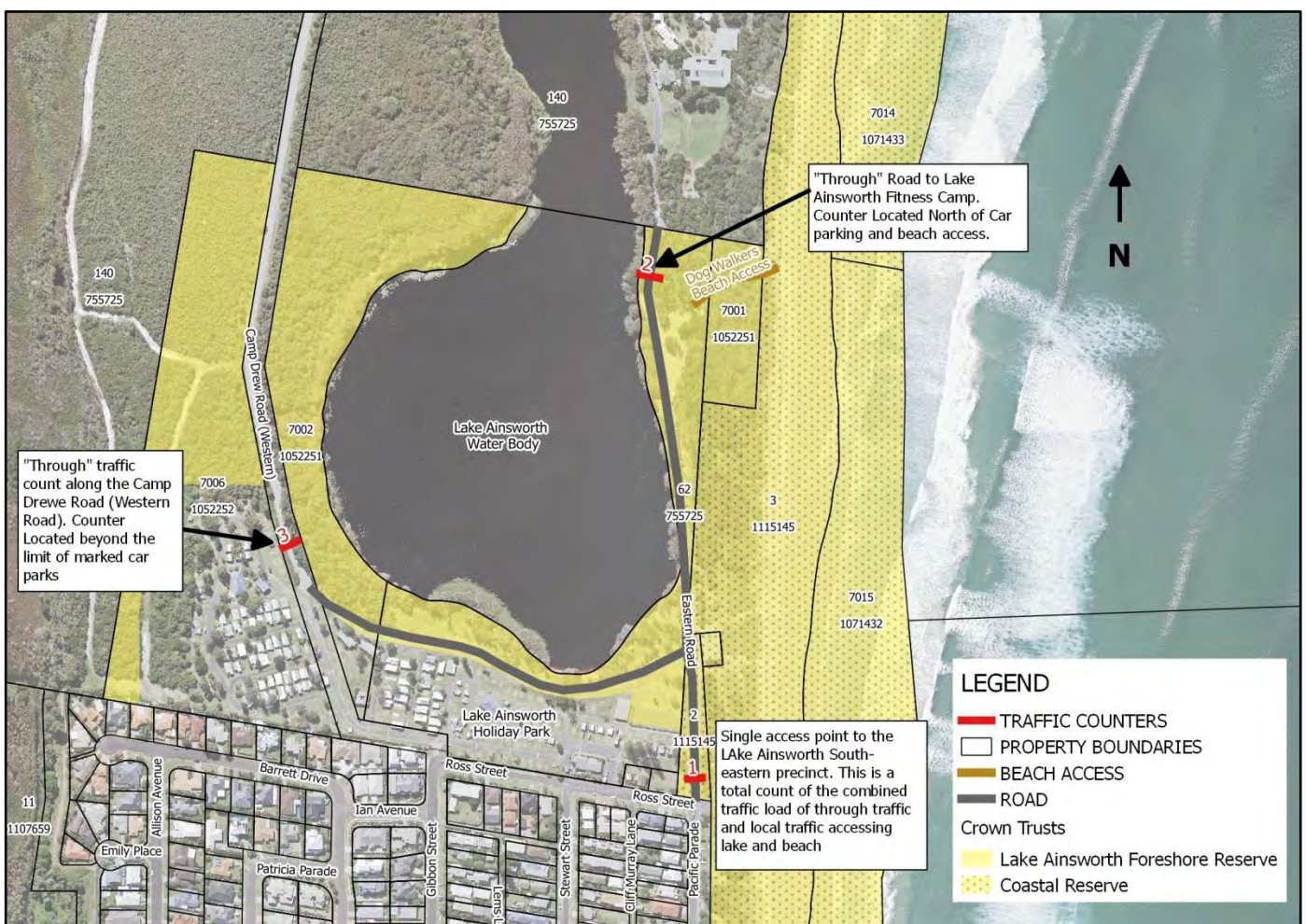


Figure 2: Location of Traffic Counters

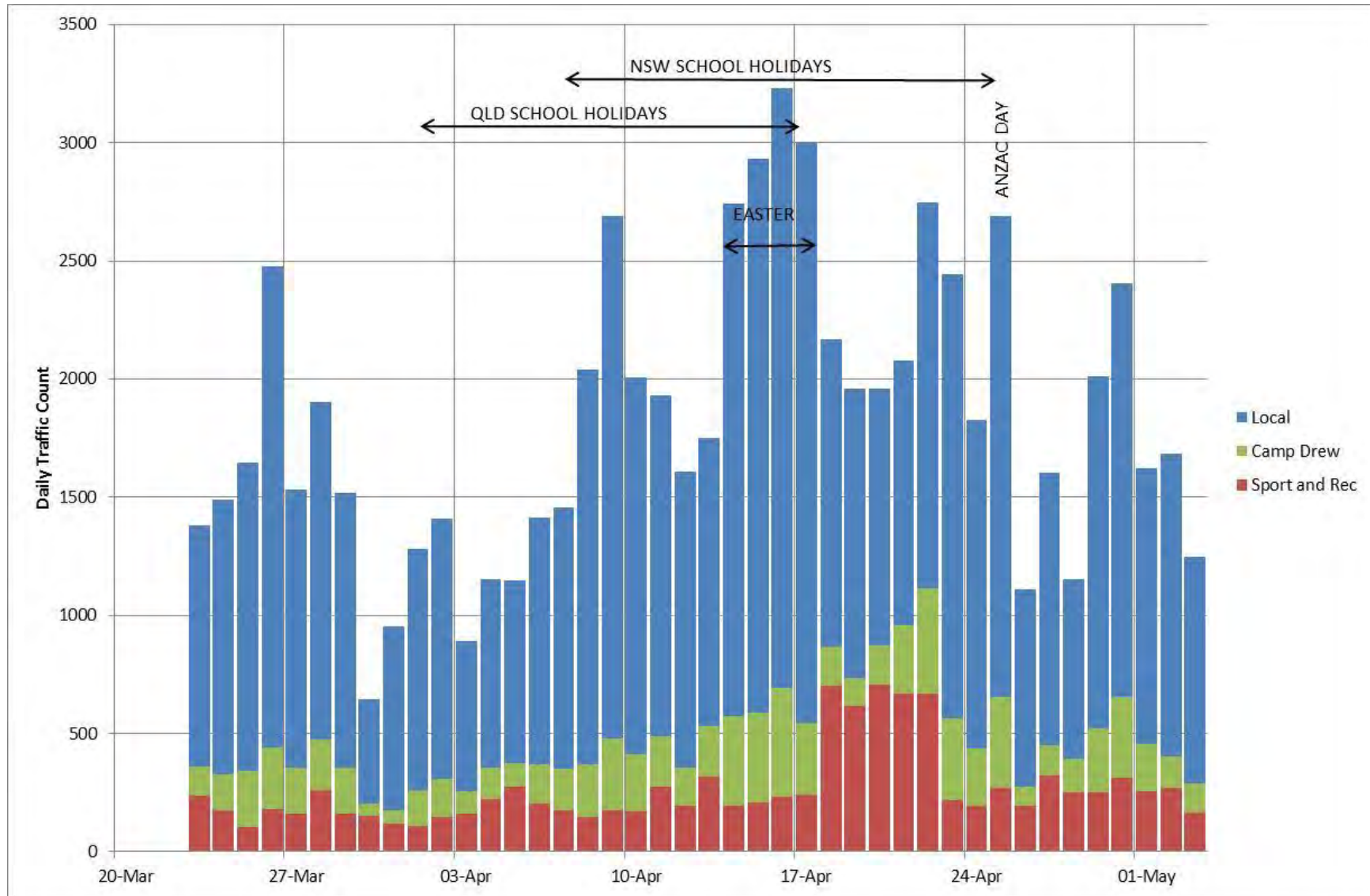


Figure 3: Daily Traffic Count for Lake Ainsworth Precinct (23/3/2017-3/5/2017)

**Table 1: Average Daily Traffic (ADT) volume (both directions) (23/3/2017-3/5/2017)**

| 3.3 Location  | 3.4 Existing    |             |                      | 3.5 Proposed    |             |                      |
|---|-----------------|-------------|----------------------|-----------------|-------------|----------------------|
|   | Off Peak Period | Peak Period | Period Daily Maximum | Off Peak Period | Peak Period | Period Daily Maximum |
| <b>Pacific Parade – Total (Counter 1)</b>                         | 1640            | 2280        | 3230                 | 1640            | 2280        | 3230                 |
| <b>Local Recreational Traffic</b>                                 | 1240            | 1670        | 2540                 | 1240            | 1670        | 2540                 |
| <b>Eastern Road Through to Lake A Sport and Recreation Centre</b> | 220             | 340         | 700                  | -               | -           | -                    |
| <b>Camp Drewe Road</b>  | 190             | 280         | 460                  | 400             | 610         | 1120                 |

The results of the traffic Counts show the total Average Daily Traffic (in both directions) to the Lake Ainsworth precinct is 1640 vpd during the monitored off peak period and 2280 vpd during the peak period with a daily maximum of 3230 vpd coinciding with a weekend during the NSW school holidays. Of the total traffic volume, approximately 6%-35% was through traffic to the Lake Ainsworth Sport and Recreation Centre, 6%-15% was through traffic along Camp Drewe Road and 55-80% is local recreational traffic.

For the period of traffic counting, the effect of traffic redistribution would increase ADT along Camp Drew Road from 190 to 400 vpd and 280 to 610 vpd for off-peak and peak periods respectively. The maximum day volume increases from 460 to 1120 vpd which coincide with special events at Camp Drewe and The Sport and Recreation Centre during school holidays. These numbers exclude potential traffic redirection along the Western Road generated by dog walkers accessing Seven Mile Beach, north of Lake Ainsworth. Quantifying existing volume of traffic generated by 'dog walkers' cannot be easily distinguished from other traffic movements using conventional survey methods because the parking is common with other usage. Based on qualitative field observations and local experience, an allowance of 10% applied to the volumes indicated above would be conservative for the purposes of this assessment.

The Christmas school holiday period has historically been the time of year when the highest traffic demands are placed on the Lake Ainsworth precinct, however the peak demands are predominantly local recreational traffic with the demands being placed on parking rather than through traffic. The traffic generation for the redirected through traffic along the Camp Drewe Road is not likely to differ significantly from those logged over the Easter peak and off-peak periods.

Based on the estimated volumes (including allowances for dog walkers), the existing formation and road reserve widths are adequate for the anticipated redirected traffic volumes ancillary to closure of the Eastern Road. The additional volume and heavy vehicle component will require more frequent maintenance/regrading of the unsealed section of road, especially the section south of the secondary entrance to the Sport and Recreation Centre. The life cycle costs of additional maintenance of the unsealed road will most likely exceed the upfront cost of sealing. The actual traffic volumes and maintenance costs will be monitored following the Eastern Road closure to consider if sealing in the future is the most cost effective wearing surface for Camp Drewe Road. There is no engineering basis in which Council is required to seal the road to meet a minimum acceptable level of service, however a sealed wearing surface would generally be considered to provide a higher level of service to the road users as compared to an unsealed road.

### 3.6 Parking

The majority of parking in the Lake Ainsworth precinct is informal parking and the quantity of parking available is not clearly defined. Managing parking during days where demands exceed available parking has historically resulted in illegal parking and often causes conflict between vehicles and pedestrians. Ballina Shire Council and the local traffic committee have over recent years regulated parking with signage. Enforcing parking is an ongoing challenge for Council.

Complete Urban in conjunction with Ballina Shire Council estimated the quantity of existing car spaces when preparing the master plan of the *Provision for Design of the Lennox Head Surf Club and Surrounding Precinct* (2014). The parking was quantified by visual inspection during a high demand day during summer when all the available car spaces were occupied along the Eastern Road. A total of **68 informal car parking spaces** were counted along the section of the Eastern Road that would be removed with the road closure. Parking counts along the southern road was not undertaken for this masterplan. It should be noted that historically the number of cars parking along the eastern road will ignore the signage at times during peak periods when demand exceeds parking provisions and the number of cars parked in the past has exceeded this number. The count of 68 spaces is based on the number of available car parking when parked legally, following the regulatory signage.

The proposed foreshore improvement works includes the formalisation of existing roadside parking along the Southern Road (Refer to drawings in Appendix A) which is a combination of 90 degree and parallel parking. The only removal of existing parking consists of an 18m of unmarked car parking at the turnaround area located at the western end of the Southern Road. Although there is incrementally very little change in the parking footprint between the existing and proposed parking arrangement along the Southern Road, historically cars parked in informal parking areas are spaced out more and there is wider space between cars compared with formal car parking. This means in practice the formalisation of parking generally yields more capacity than informal parking. Based on car park dimensions of 2.6m wide for 90 degree and 6.5m long for parallel parking (AS2890.5) the proposed works includes formalisation of **140 spaces**.

The new car park (completed September 2015) located on the eastern edge of the Lake Ainsworth Holiday Park (between the holiday park and Pacific Parade) has achieved an additional **36 spaces**. The construction of the new car parking bays along Ross Street (completed June 2016) has formalised and created new spaces to achieve a total of **34 spaces**. This has yielded a total of **70 spaces** to offset the loss of informal car parking spaces when the eastern road is closed. The balance of offset parking provisions exceeds the 68 parking spaces lost with the proposed Eastern Road closure; however the location of the newly created offset parking adds considerable walking distance to persons accessing the lake compared to what currently exists along the Eastern Road and parking preference by users would be based on proximity to the lake and the existing off leash access point.

The new (offset) parking is located immediately adjacent to the Lake Ainsworth Holiday Park, with its proximity is convenient for patrons of the holiday park. It is therefore recommended that timed parking be considered to deter overflow parking from the Holiday Parking occupying the public parking spaces and encouraging turnover to make the public parking freely available for visitors accessing the beach and lake. Timed parking is an issue that would be considered by the Ballina Local Traffic Committee and does not form part of this consent.

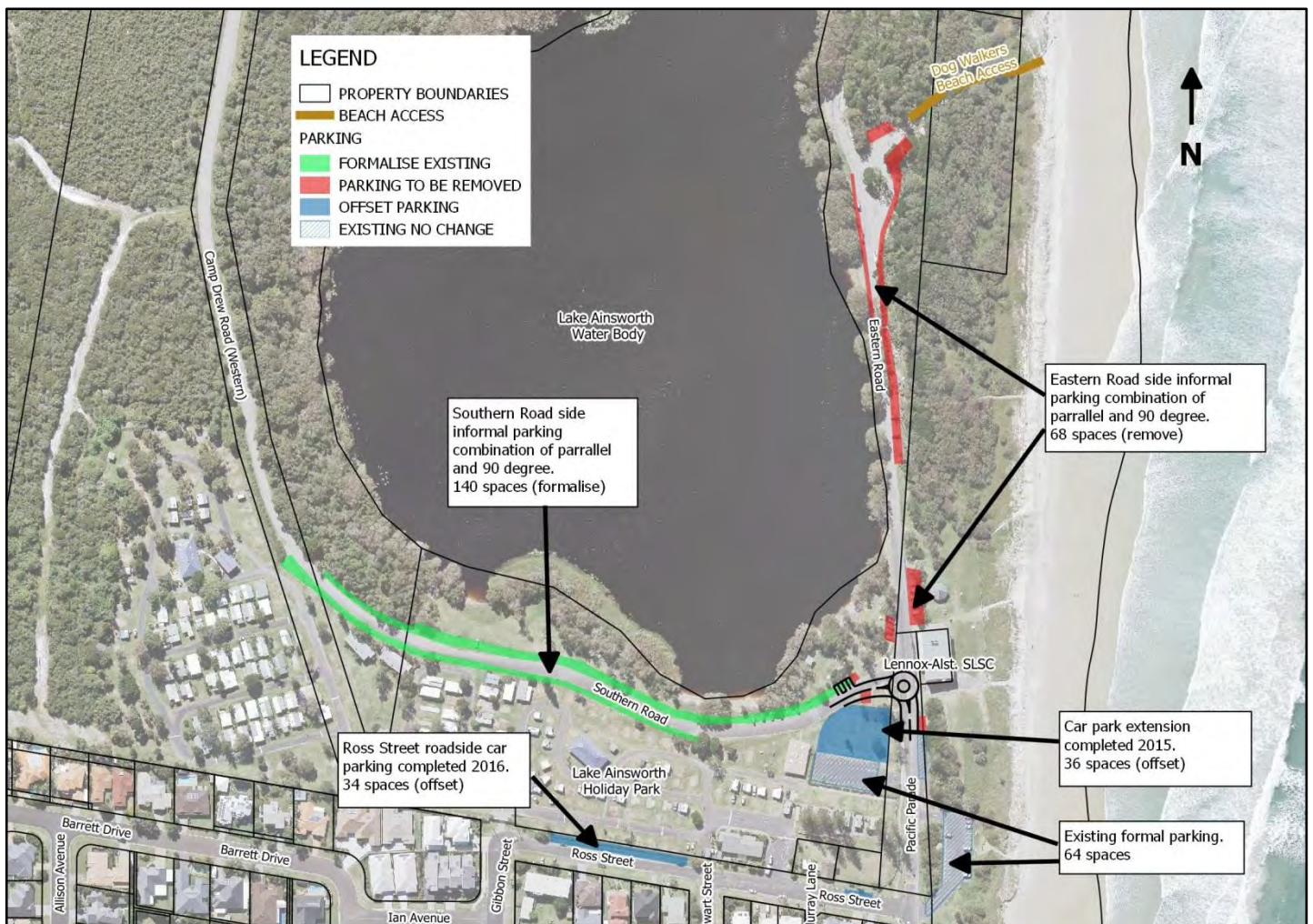


Figure 4: Plan of existing parking alterations

Designated parking for persons with a disability is currently provided on the eastern road immediately adjacent to the surf club and the off street car park opposite the surf club. There are no dedicated spaces at the northern end of the Eastern Road or along the Southern Road. Despite this, it is understood persons with disabilities currently utilise the existing road side parking provisions, especially along the flatter sections of the Eastern Road with close proximity to the lake and the lake ingress/egress is the most forgiving for a person with limited mobility. The proposed formalisation of the southern road includes 4 dedicated spaces for persons with disabilities. This would increase the total provisions from 3 to 6.

In summary, there is no net loss in total parking provisions resulting from the eastern road closure and foreshore improvement works with the inclusion of the new car park extension including the Ross Street on street parking upgrade. However, the quantity of lake side parking will be reduced and the effect of walking distance to access the offset parking will most likely result in parking priority to fill more frequently along the Southern Road more frequently than currently occurs. There is currently adequate parking for the current usage throughout the year, however there are periods in the warmer months during school holidays when demand exceeds the available spaces and this will continue to occur. The advantage with formalising the parking in the Lake Ainsworth precinct is parking can be enforced and the incidence of illegal parking is likely to reduce, however it should be anticipated that excess parking will at times spill onto the Western Road and the adjacent residential areas during these peak periods.

### **3.7 Pedestrian Access**

Existing footpaths along Pacific Parade currently provide off street pedestrian access linking the south eastern corner of Lake Ainsworth and the surf club building with the Lennox Head pathway network. Refuge islands are provided with crossing points across the intersection between Pacific Parade and the Southern Road. The existing off-street pathways link to the surf club building, however pathways terminate at the intersection. North of the intersection along the Eastern Road and west of the intersection along the Southern Road, no path ways are currently provided and pedestrians currently walk either on the road edge or along the grassed open space. The existing parking around the lake edge means during off-peak times pedestrians accessing the beach and lake generally park close to the desired destination. However, during peak periods when parking demands are high, the combination of lake users forced to park some distance away and local vehicular movements has historically resulted in some conflict between pedestrians and vehicular movements along the roadway.

The works proposed in the attached Engineering and Landscape drawings (Refer to Appendix A) incorporate an extension of the pathway network along the eastern shore area. The removal of the road provides a more pedestrian friendly environment along the eastern foreshore and improves the disability access along the shore, however does increase the walking distance between car parking and the eastern shore. There is considerable demand for passive recreational space around the lake foreshore area and the main benefit is more open space available free from vehicular movements.

The southern shore area which is fringed by the Southern Road, is largely grassed open space which is segregated by pockets of riparian vegetation. The vegetation areas are fenced which directs pedestrians walking east-west onto the road side parking areas to walk around the pockets of vegetation. During off-peak times this generally does not conflict with vehicles as the parking spaces are often vacant and people generally park close to where they want to access the lake, however during peak periods when parking demands are high, pedestrians are high along the bitumen road carriageway. The works proposed in the attached Engineering and Landscape drawings (Refer to Appendix A) incorporate low impact boardwalk linkages through the pockets of vegetation. Although no pathway is proposed along the southern foreshore area, the board walks provide off-street pedestrian linkage between the existing open spaces and improve pedestrian access and safety.

Council has installed traffic calming devices along the Eastern and Southern Road to reduce driver speed where there is high pedestrian activity. Reconstruction of the Southern Road will reinstate the speed humps to provide traffic calming. The spacing of the humps has been to a design speed of 40km/hr and the location of humps has been positioned away from pedestrian desire lines where possible to avoid confusion with pedestrian right of way crossings. This is to comply with RMS technical directions.

# 4 Stormwater Management

## 4.1 Regional Hydrology

The annual average rainfall at Lennox Head is 1780 mm which varies seasonally. The Northern region of NSW typically experiences a wet season with the majority of rainfall occurring between January and June, and a dry spring. Annual rainfall also varies considerably from year to year often corresponding to *el nino* and *la nina* periods.

The Lake Ainsworth morphology consists of a deep main basin 8-9m deep with a shallow arm extending northward along a swale within the ridge-swale system of the local dunes. The surface and groundwater processes are complex and not entirely understood. The most comprehensive holistic study of Lake Ainsworth processes is the LALPS (1996).

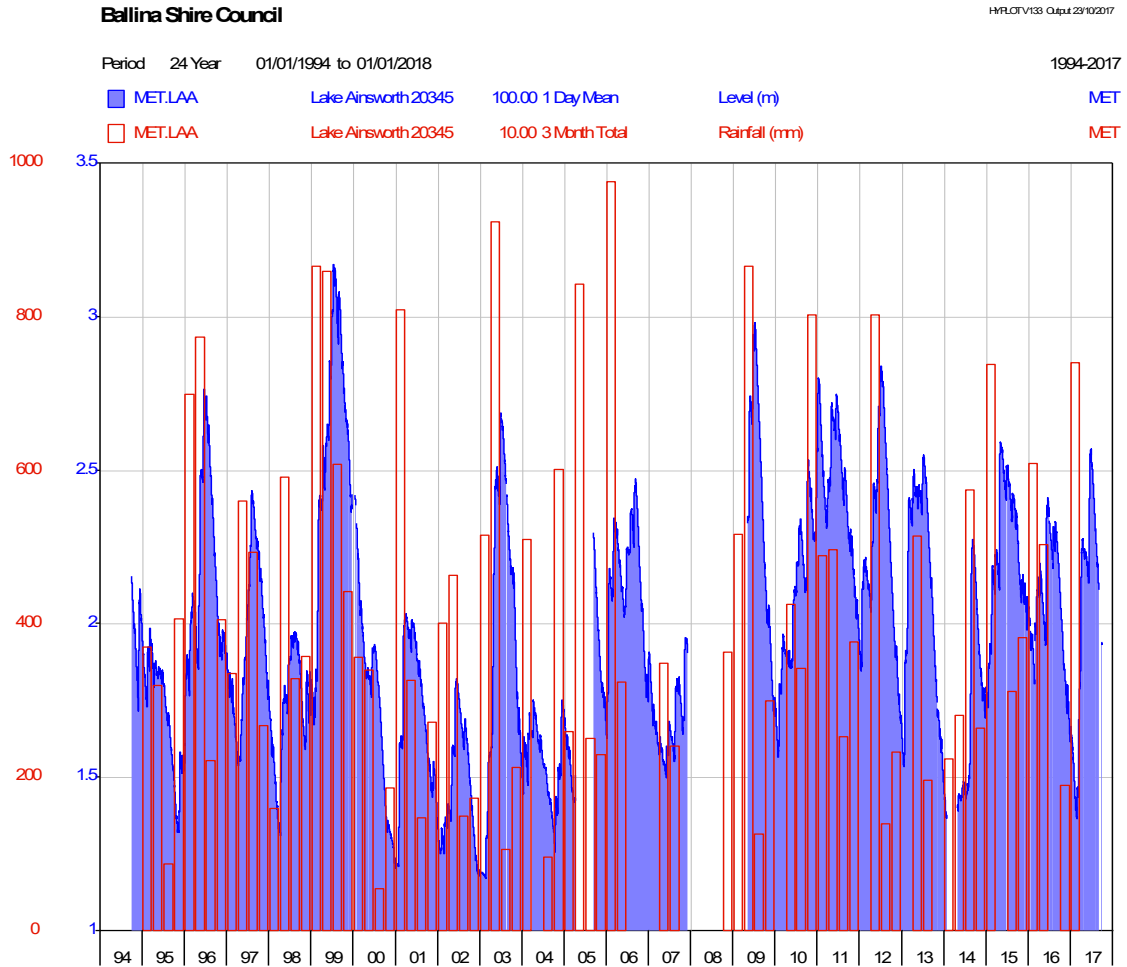
Groundwater flows into the lake predominantly from the west and south, and flows out of the lake through the eastern dunes into the ocean. The standing water level of the Lake reflects the groundwater flow gradient. The lake water balance is determined by a balance between inflows due to direct rainfall and groundwater, and outflows due to evaporation and through groundwater. Estimates from the LALPS (1996) indicated rainfall and evaporation to be the most important to maintaining lake levels while groundwater flows tends to balance the continuity of input to equal output.

Water levels and rainfall is monitored by the Manly Hydraulic Laboratory Lake Ainsworth gauging station 203455. The gauging station was installed in 1994 and has logged real time data to date, however there are some gaps and missing records over the period. The data has been used to review water level fluctuations for planning purposes and has informed the design of the foreshore improvement works. A plot of the gauged lake water level and annual rainfall for the period from 1994 to 2017 is shown in Figure 5.

The 22 year period of data shows the lake levels fluctuate considerably seasonally and climatically (over long periods of wet and dry periods). The water level varies by up to 2m with the highest level logged as **RL3.2m AHD (July 1999)** and the lowest level of **RL1.2m AHD (Feb 2003)**. There have been a number of times over data record when the lake water level inundated the Eastern Road. The lowest point of the Eastern Road is currently RL2.7m AHD and the most severe flood record by the gauging station in July 1999 inundated the road by up to 0.5m at the lowest point and cut off access for several months until flood water receded.

The high water level of 1999 has been adopted as the high water level. The design of the new pathway along the eastern road that doubles for emergency access has a minimum **RL3.0m AHD** which would reduce the depth of inundation for emergency access to 0.2m for the 1999 lake level. This is shallow enough for the passage of vehicles. Similarly, furniture and other facilities proposed below this flood level should be flood compatible.

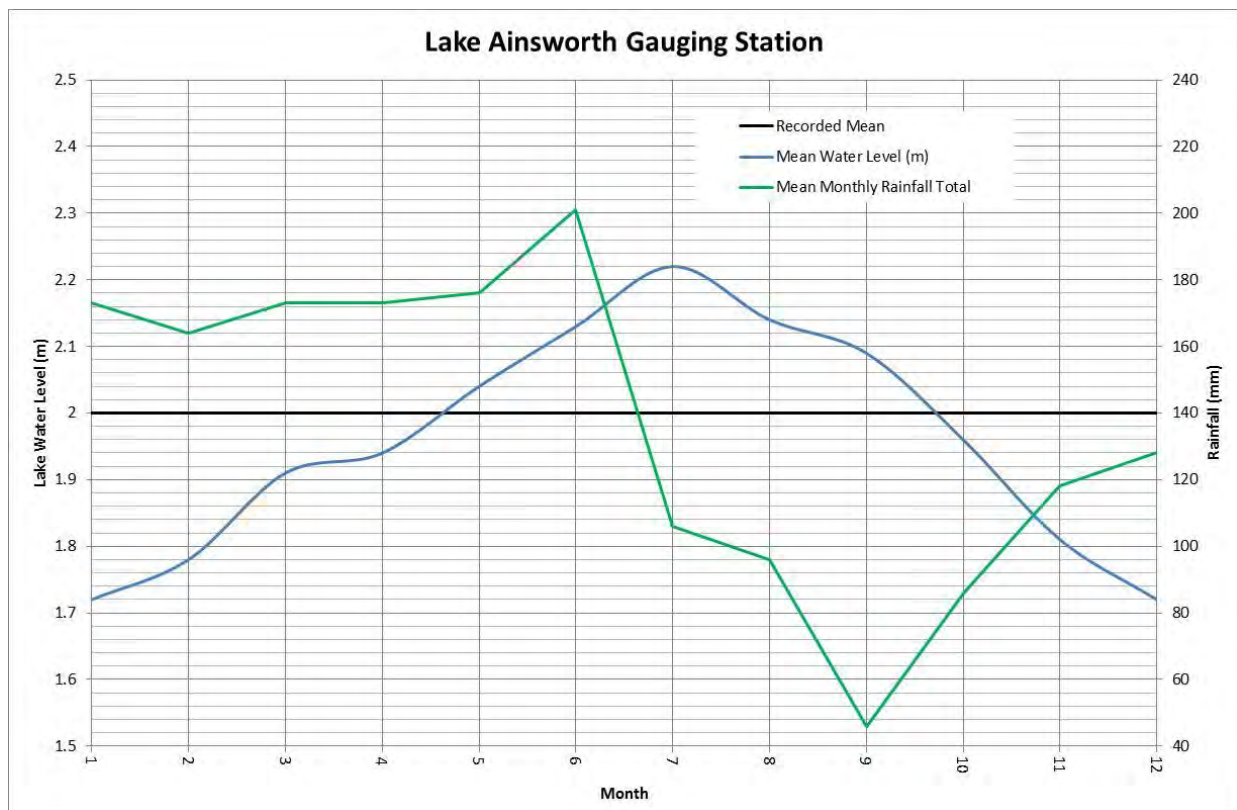




**Figure 5: Plot of Lake Water Level and annual rainfall (Source MHL station 203455)**

The seasonal variation can be observed in Figure 6 which shows the mean lake levels and rainfall for each calendar month. Figure 6 shows average lake levels to fluctuate by 0.5m over the period of a calendar year by normal seasonal variation. Based on the gauging data, January has the lowest lake mean level of RL1.7m AHD which increases steadily during first 6 months of the calendar year, which is typically when the majority of the annual rainfall occurs. July has the highest monthly mean level of RL2.2m AHD which decreases over the second 6 months of the calendar year which is typically the dry period of the year. The water level decreases more steadily during the warmer months (November to December) when evaporation is higher.

Lake water quality and the physico-chemical processes is complex; however studies indicate water quality is strongly influenced by stratification as a balance between thermal energy inputs (solar radiation) and mixing due to wind or convection. During stratified periods the deeper waters become depleted in dissolved oxygen which produces favourable conditions for algae (LALPS, 1996). Algal blooms have historically occurred and in severe cases has resulted in the lake being closed to the public for periods due to blue-green algae levels being unsafe for recreational activities.



**Figure 6: Plot of Mean Monthly Lake Level and Rainfall**

## 4.2 Existing Topography and Surface Drainage

The majority of the eastern road falls westerly toward the lake and stormwater runoff laterally sheets directly to the lake. There is no existing pit and pipe drainage system for the disposal of stormwater drainage from the eastern road.

The majority of the southern road falls to the north toward the lake and stormwater runoff laterally sheets onto the adjacent grassed areas. This grassed area generally buffers the runoff of lateral drainage from the southern road. Existing pit and pipe drainage systems cross under the road, however it principally drains the Lake Ainsworth Holiday Park and a small catchment of residential area to the south. The southern side of crowned sections of the southern road drain to roadside swales with pits located in road sags and drain via the pit and pipe system. The piped minor system currently discharges directly to the lake in three locations. The major system stormwater runoff in excess of the piped capacity overtops the crown of southern road at the sag points and flows overland through the reserve into the lake.

The pervious area and greenspace surrounding the lake foreshore area is generally sandy and does not generate significant runoff. The majority of stormwater runoff is generated by impervious surfaces. Stormwater runoff to the lake as overland flow is generally from impervious surfaces during significant rainfall events.

## 4.3 Design objectives for Stormwater Drainage

### 4.3.1 Stormwater Quantity

The project proposes to remove the Eastern Road pavement and replace with a concrete footpath and formalize parking with grassed permeable paving. The end result will be a reduction in impervious footprint. The reduced impervious area will result in a reduction of storm water quantity from the foreshore works. The grading of the southern road reconstruction will ensure there will be no redirection of stormwater drainage and the crown of the road at sag points have been established to ensure no afflux in flooding by overland flow. As such no augmentation of the existing piped drainage system is required for storm water quantity management of the foreshore works.

### 4.3.2 Stormwater Quality

The areas of proposed improvement works drain to the Lake Ainsworth freshwater basin. The works have been designed incorporating Water Sensitive Urban Design (WSUD) 'best practise' principles to reduce the pollutants generated by impervious surfaces through the use of:

- Bioretention swales to capture and treat runoff from the proposed pathway along the eastern foreshore;
- Rain gardens (bioretention) to capture and treat runoff primarily from road surfaces;
- Permeable paving (turfcell) to infiltrate rainfall and reduce the impervious footprint of the car park and reduce pollutant generation to surface water;
- Grassed buffering pave surfaces and eliminating direct drainage of paved surfaces; and
- Infiltration measures – to maintain a natural water balance

The strategy adopted in the WSUD of the foreshore works has been to 'disconnect' impervious surfaces from the lake water body. That is, to intercept runoff from pave surfaces and direct them to a variety of infiltration devices to capture and treat the 'first flush' rainfall event which generally contains the majority pollutants 'washing off' sediment accumulation on the pavement. Refer to design drawing LHR.061 for the location and arrangement of the devices.

The WSUD elements have been designed to achieve the pollutant removal rates specified in the *Ballina Shire Council Development Control Plan (2012)*. The design of storm water treatment devices has been to achieve the pollutant load removal rates contained in Table 2:

**Table 2: Stormwater Treatment Targets**

| <b>4.4 Parameters</b>               | <b>4.5 BSC DCP Removal Rate (%)<sup>1</sup></b> |
|-------------------------------------|---|
| <b>Total Suspended Solids (TSS)</b> | 80  |
| <b>Total Phosphorous (TP)</b>       | 60  |
| <b>Total Nitrogen (TN)</b>          | 45  |
| <b>Gross Pollutants (GP)</b>        | 90  |

Note:

1. Removal Rates is the pollutants captured through treatment as a percentage of total pollutants generated in the proposed form.

It should be noted that the stormwater treatment system and pollutant removal targets apply only to the impervious surfaces within the footprint of the project. The pollutant removal targets outlined above are those in the Ballina DCP (2012) and are consistent with the requirements imposed on all development within Ballina Shire Council. The area treated is only a very small proportion of the lake catchment (<2%) and the pollutant loads being removed from stormwater runoff draining to the lake is incrementally very small compared to the pre-existing water quality issues in the lake. However applying water sensitive design measures are low cost when undertaken in conjunction with the landscaping works and ensures the foreshore works do not exacerbate existing water quality issues in the lake or contribute to a cumulative effect not realised in previous process studies.

## 4.6 MUSIC Modelling

The performance of the WSUD elements has been modelled using the Model for Urban Storm water Improvement Conceptualizing (MUSIC V6.1.0). The MUSIC modelling methodology, inputs, sizing and catchment parameters are adopted in accordance with *Ballina Shire Council Stormwater Management Standards for Development (2016)* (refer to Appendix C for adopted parameters). A schematic of the MUSIC model is provided in Figure 7.

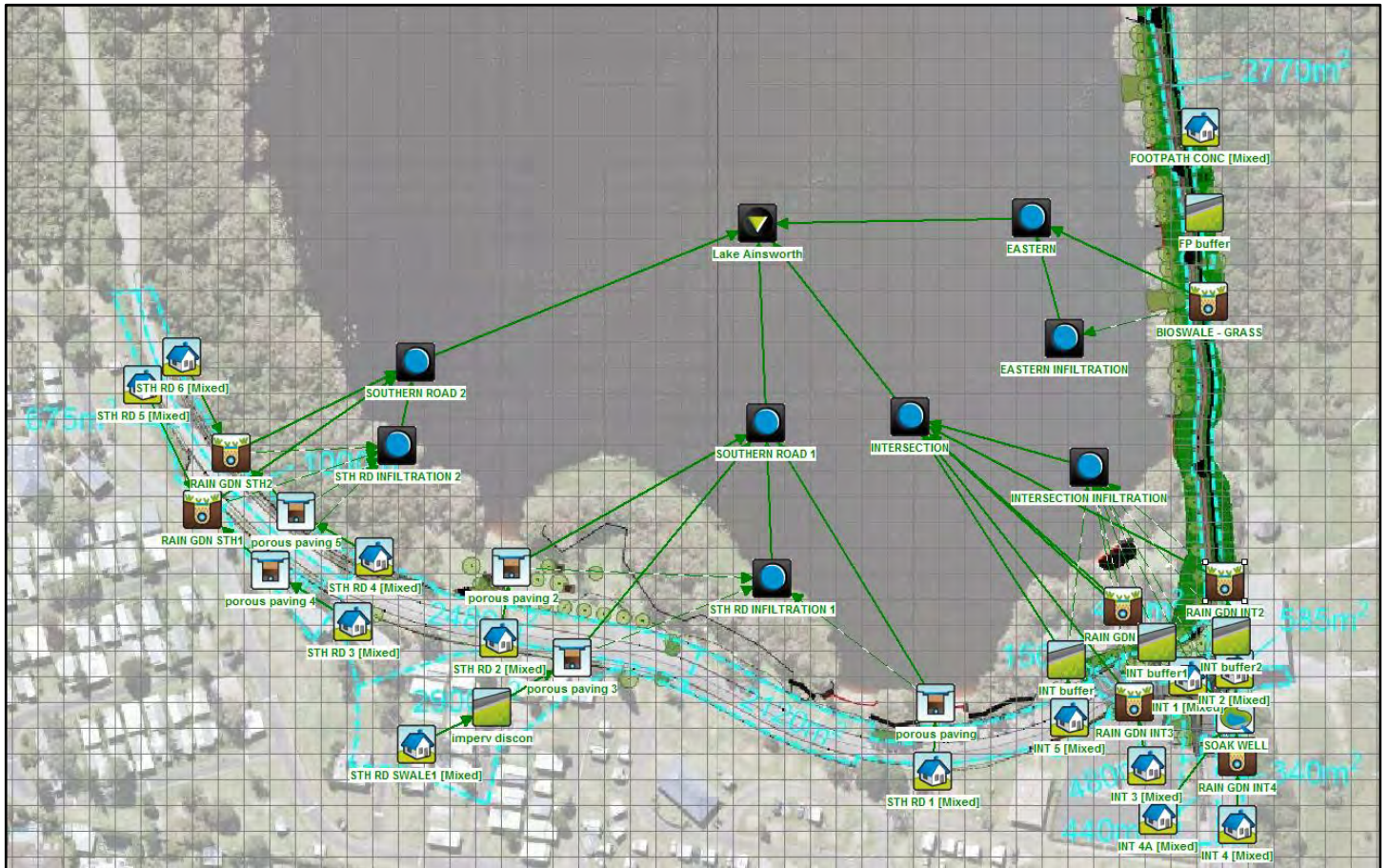


Figure 7: MUSIC model schematic

The MUSIC modelling included existing external catchment areas from the Lake Ainsworth Holiday Park where existing runoff from the holiday park area is laterally collected by road side swale drains.

Table 3 is a summary of the MUSIC modelling results and compares the modelled pollutant load removal rates of the proposed works with the target removal rates adopted from BSC DCP (2012).

**Table 3: Summary of MUSIC results**

| <b>4.7 Parameters</b>               | <b>4.8 BSC DCP<br/>4.9 Removal Rate<br/>4.10 (%)<sup>1</sup></b> | <b>4.11 MUSIC Modelling<br/>4.12 Removal Rates<br/>achieved<br/>4.13 (%)<sup>1</sup></b> |
|-------------------------------------|--|--|
| <b>Total Suspended Solids (TSS)</b> | 80   | <b>88</b>  |
| <b>Total Phosphorous (TP)</b>       | 60   | <b>66</b>  |
| <b>Total Nitrogen (TN)</b>          | 45   | <b>50</b>  |
| <b>Gross Pollutants (GP)</b>        | 90   | <b>99</b>  |

Note:

1. Removal Rates is the pollutants captured through treatment as a percentage of total pollutants generated in the proposed form.

The MUSIC modelling results in Table 3 above shows WSUD elements incorporated in the foreshore improvement works provide pollutant removal in excess of the BSC DCP (2012) required criteria and provides a considerable reduction in pollutant loads generated from the roads and ancillary foreshore paved surfaces.

## 5 Construction Sediment and Erosion Control

|  |  |
|--|--|
| <p><b>5.1 Purpose</b></p>                        | <p>To mitigate or reduce the potential environmental impacts resulting from construction activities. These include:</p> <ul style="list-style-type: none"> <li>• Topsoil stripping</li> <li>• Pavement profiling/excavation</li> <li>• Bank Stabilisation</li> <li>• Construction of road and pathways</li> <li>• Spillage during handling of materials</li> </ul>   |
| <p><b>5.2 Reporting and Responsibilities</b></p> | <p>The site coordinator or authorised representative is to undertake the following measures during construction:</p> <ul style="list-style-type: none"> <li>• Regularly inspect the storm water management devices, particularly prior to forecasted wet weather and following major rainfall events to ensure that these devices are in good working order.</li> <li>• Ensure that drains and paved surfaces are kept free of wastes or other material, especially materials which may impact on runoff water quality.</li> <li>• Prepare water monitoring records if and when required by the regulatory authority.</li> </ul>   |
| <p><b>5.3 Stormwater Drainage measures</b></p>   | <p>General storm water drainage measures include:</p> <ul style="list-style-type: none"> <li>• Wherever reasonable and practicable, stormwater runoff entering the Site from external areas, and non-sediment laden (clean) stormwater runoff entering a work area or area of soil disturbance, must be diverted around or through that area in a manner that minimises soil erosion and the contamination of that water for all discharges up to the specified design storm discharge.</li> <li>• Inlets and outlets of storm water drainage pits and pipes shall be kept clear of silt and debris.</li> <li>• Achieve vegetative cover to disturbed area as soon as practicable upon final profile/grading.</li> </ul> |
| <p><b>5.4 Stockpile Management</b></p>           | <ul style="list-style-type: none"> <li>• Stockpiling to onsite to be generally avoided. Excavated material to generally be directly to trucks and removed from site. Similarly imported material shall be clean confirming material delivered in place.</li> <li>• Where stockpiling is necessary, the erosion and sediment control shall generally be installed in accordance with the 'blue book'</li> </ul>   |
| <p><b>5.5 Erosion and sediment control</b></p>   | <p>The following strategies/mitigation measures for the management of erosion and sediment transport from the Site:</p> <p><b>5.5.1 Sediment Control</b></p>   |

|   |  |
|---|--|
| <p><b>measures</b></p>                                | <ul style="list-style-type: none"> <li>• The site in general should be kept in a manner that maximises the vegetative cover to prevent mobilisation of sediments. Clearly delineating vehicular tracks and minimising vegetation stripping and spraying.</li> <li>• Site exit points must be appropriately managed to minimise the risk of sediment being tracked onto sealed, public roadways.</li> <li>• Wetting of unsealed internal access roads shall be undertaken to suppress dusts during dry weather</li> <li>• Efforts shall be employed to trap sediment within the Site, and as close as practicable to its source.</li> <li>• Sediment traps must be installed on the downstream limit of the site intercepting runoff prior to draining to the lake.</li> </ul>  |
| <p><b>5.6 Monitoring Investigation Indicators</b></p> | <p>The following indicators are to be used to identify if the objectives of the SWMP are being met:</p> <ul style="list-style-type: none"> <li>• Visible evidence of deterioration of baseline water quality in the Lake Ainsworth that is directly attributable to the Site.</li> <li>• Visible significant erosion.</li> <li>• Failure of control measures.</li> </ul> <p>The triggering of an investigation indicator will require the following remedial actions:</p> <ul style="list-style-type: none"> <li>• Locate the source of water quality deterioration.</li> <li>• Prevent continuing deterioration with temporary controls.</li> <li>• Repair existing controls, construct additional controls or modify procedures to prevent future deterioration in water quality.</li> </ul>   |
| <p><b>5.7 Maintenance</b></p>                         | <ul style="list-style-type: none"> <li>• All erosion and sediment control measures, including drainage control measures, must be maintained in proper working order at all times for the duration of works.</li> <li>• Sediment removed from sediment traps and places of sediment deposition must be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm.</li> <li>• Mowing must be done in a manner that maintains healthy ground coverage and does not damage the profile of formed, soft edges, such as the crest of earth embankments.</li> <li>• Maintenance of sedimentation ponds shall be undertaken during dry weather where practicable and the frequency of desilting shall be undertaken in conjunction with monitoring to determine an appropriate frequency of desilting according to sediment loads depositing in the storage zones of ponds.</li> </ul> |



## 6 Conclusions

Ballina Shire Council has prepared this Engineering Services Report to support the Part V assessment of the Lake Ainsworth Foreshore Improvement Works. The summary of our conclusions is as follows:

- The closure of the Eastern Road will redirect traffic along the Southern Road and Camp Drewe Road. The existing road network has adequate capacity for the increase traffic volume.
- The car park extension and Ross Street road side parking upgrades compensates in quantity for the loss in road side car parking spaces resulting from the closure of the Eastern Road.
- The proposed foreshore works maintains linkage along the eastern foreshore for emergency vehicles.
- Off street pathways improve pedestrian accessibility and pedestrian safety in and around the lake foreshore area and provide improved connectivity to the Lennox Head pathway network.
- The proposed works will not increase stormwater quantity generated by the proposed foreshore improvement works. Water sensitive design measures integrated in the landscape design provide stormwater treatment to meet the criteria in Ballina Shire Council DCP (2012)

## 7 References

Anderson, P. Howells, L and van Senden, D. (1996) *Lake Ainsworth Processes Study* by Australian Water and Coastal Studies in association with The Ecology Lab Pty Ltd.

Ballina Shire Council (2003, revised 2011) *Ballina Coastal Reserve Plan of Management*

Ballina Shire Council (2016) *Ballina Shire Council Stormwater Management Standards for Development*

Complete Urban Pty Ltd (2014) *Provision for Design of the Lennox Head Surf Club and Surrounding Precinct*

Connell Wagner (2005) *Lake Ainsworth Crown Reserve Master Plan*

Design Team Inc. (2016) *Concept plan of the Lake Ainsworth Recreation Precinct Works*

Geolink and NSW Dept. of Public Works and Services (2002) *Lake Ainsworth Management Plan*

LANDCOM (2004) *Managing Urban Stormwater – Soils and Construction Volume 1*

# Appendix A

Drawings

# FORESHORE IMPROVEMENT WORKS LAKE AINSWORTH, LENNOX HEAD

DRAWING No: LHR30.061

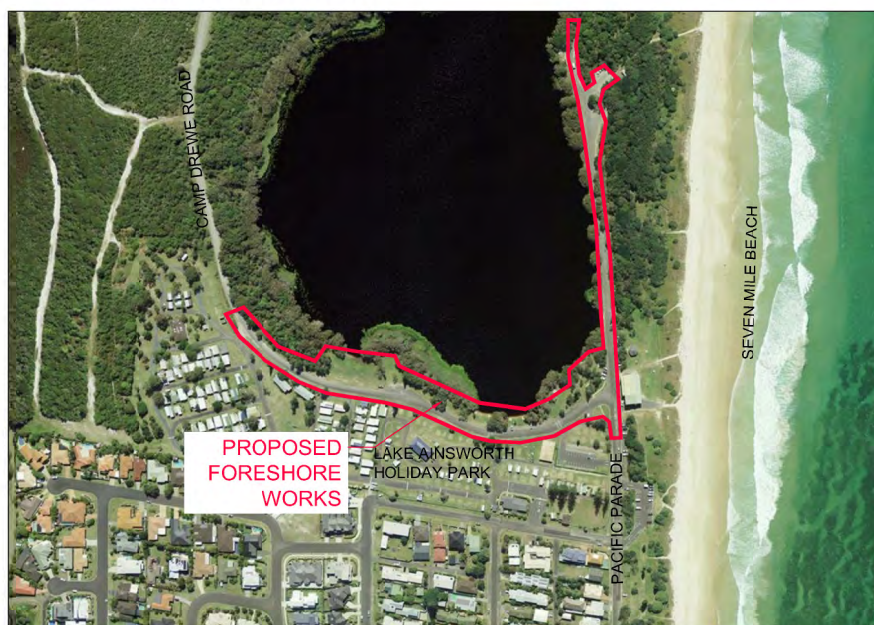
NOVEMBER 2017

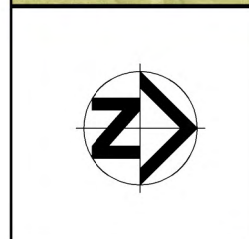
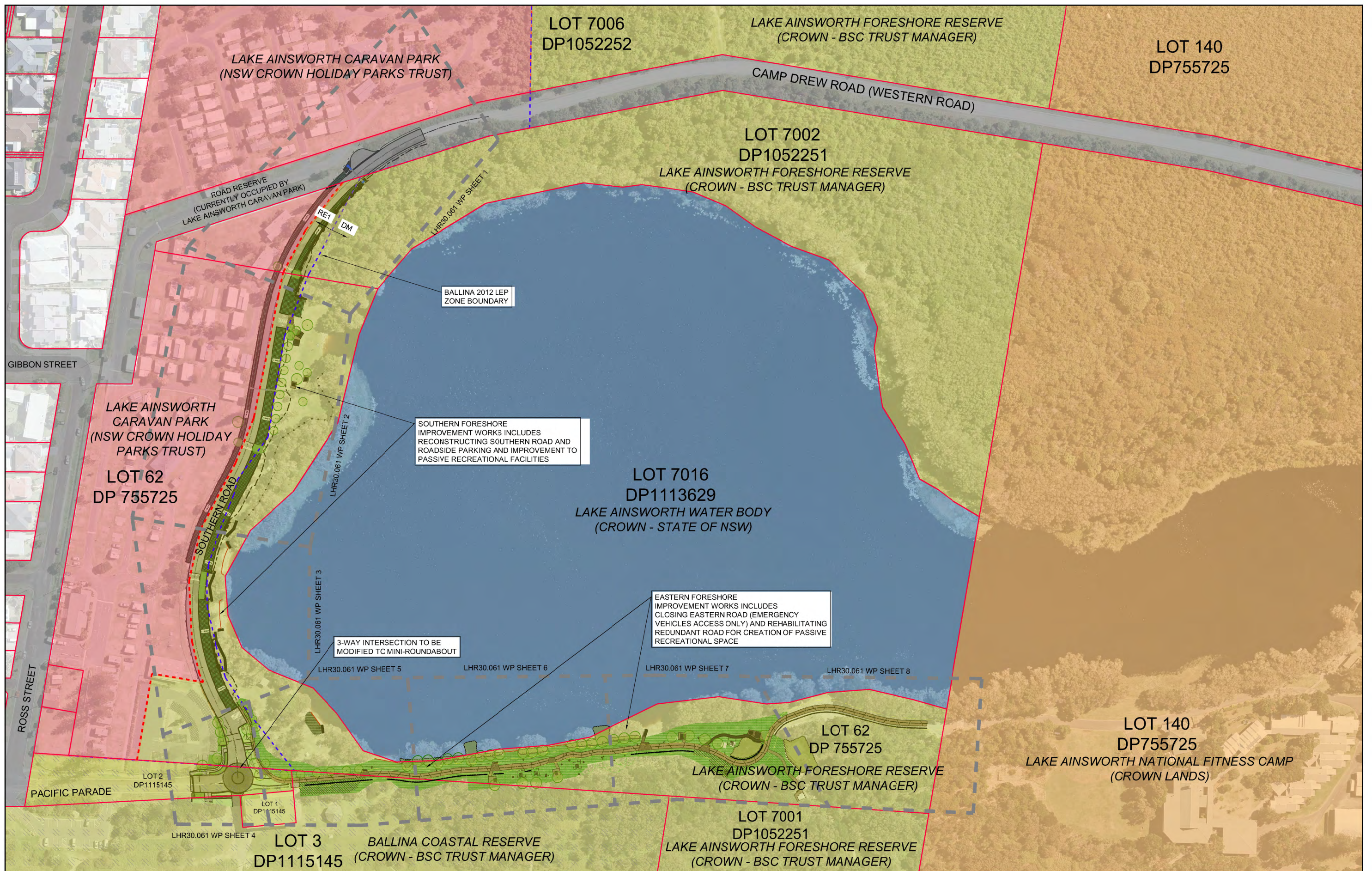
## GENERAL WORKS DRAWINGS

### DRAWING REGISTER

| DRAWING      | SHEET  | ISSUE | DATE      | TITLE  |
|--------------|--------|-------|-----------|--|
| LHR30.061/OP | 1 OF 1 | B     | 3/11/2017 | OVERALL PLAN   |
| LHR30.061/WP | 1 OF 8 | B     | 3/11/2017 | SOUTHERN FORESHORE GENERAL WORKS PLAN (CH0 TO CH105)                           |
| LHR30.061/WP | 2 OF 8 | B     | 3/11/2017 | SOUTHERN FORESHORE GENERAL WORKS PLAN (CH105 TO CH255)                         |
| LHR30.061/WP | 3 OF 8 | B     | 3/11/2017 | SOUTHERN FORESHORE GENERAL WORKS PLAN (CH255 TO CH380)                         |
| LHR30.061/WP | 4 OF 8 | B     | 3/11/2017 | INTERSECTION GENERAL WORKS PLAN  |
| LHR30.061/WP | 5 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH0 TO CH120)   |
| LHR30.061/WP | 6 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH120 TO CH240) |
| LHR30.061/WP | 7 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH240 TO CH360) |
| LHR30.061/WP | 8 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH360 TO CH440) |
| LHR30.061/LS | 1 OF 2 | B     | 3/11/2017 | SOUTHERN ROAD ALIGNMENT PLAN AND LONGITUDINAL SECTION (CH0 TO CH300)           |
| LHR30.061/LS | 2 OF 2 | B     | 3/11/2017 | SOUTHERN ROAD ALIGNMENT PLAN AND LONGITUDINAL SECTION (CH300 TO CH380)         |
| LHR30.061/DT | 1 OF 1 | B     | 3/11/2017 | LOG REVETMENT AND BEACH ACCESS RAMP TYPICAL DETAIL                             |

### LOCALITY PLAN





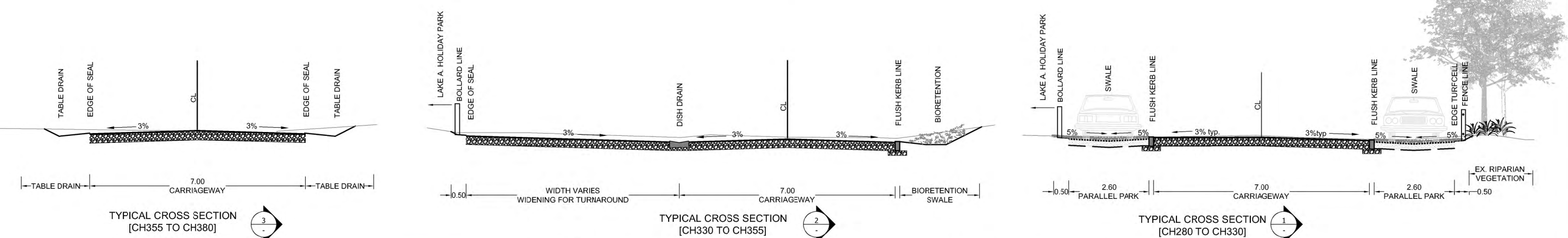
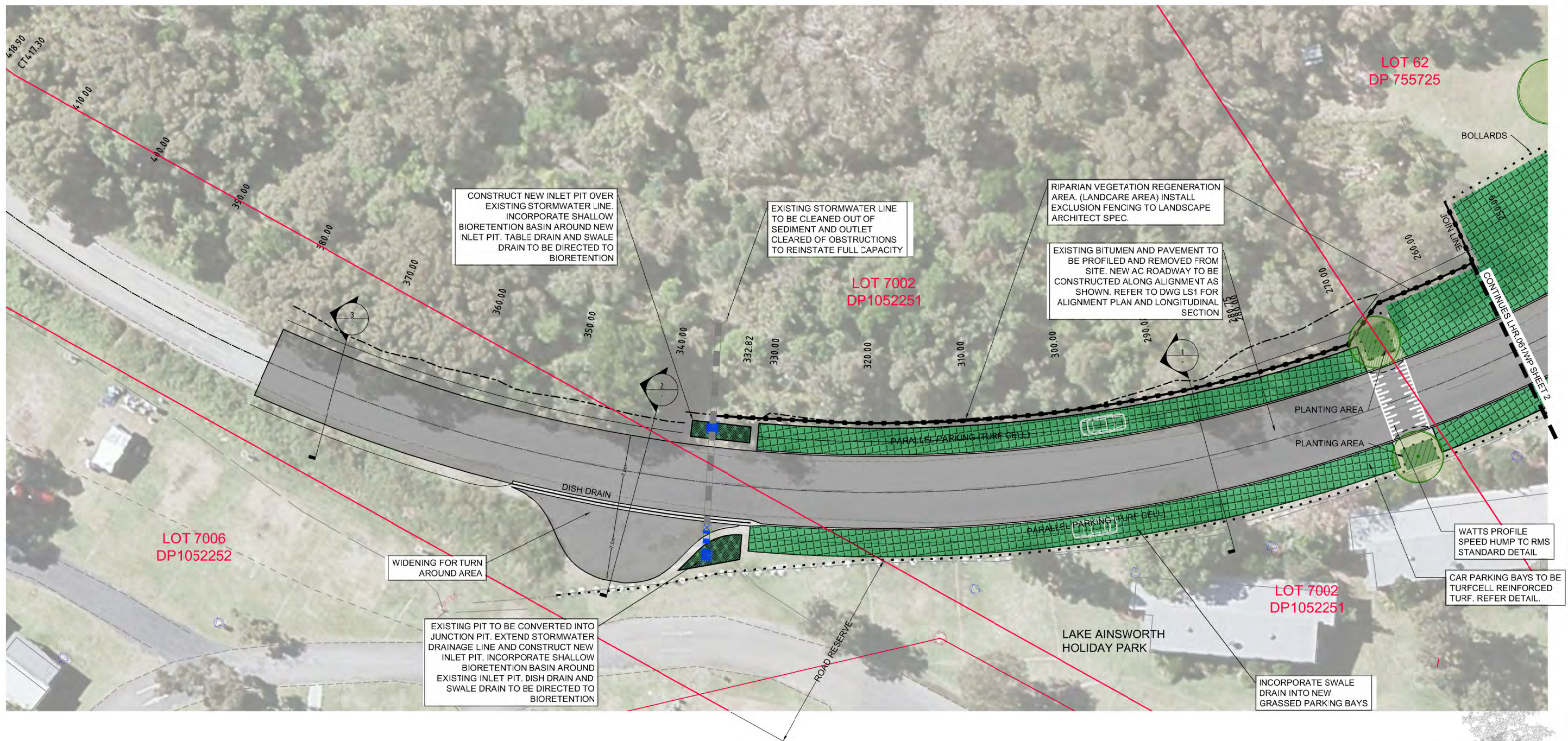
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|        | CROWN RESERVE<br>LAKE AINSWORTH FORESHORE RESERVE<br>(CROWN - BSC TRUST MANAGER)                 |
|        | CROWN RESERVE<br>SEVEN MILE BEACH FORESHORE RESERVE<br>(BSC TRUST MANAGER)                       |
|        | CROWN RESERVE - LAKE AINSWORTH<br>FOR ACCESS AND PUBLIC REQUIREMENTS<br>AND OTHER (STATE OF NSW) |
|        | PROPERTY BOUNDARY  |
|        | CROWN TRUST BOUNDARY   |
|        | BALLINA 2012 LEP<br>ZONE BOUNDARY  |
|        | CROWN RESERVE<br>(NSW CROWN HOLIDAY<br>PARKS TRUST)  |
|        | CROWN RESERVE<br>(LAKE AINSWORTH<br>NATIONAL FITNESS CAMP)                                       |

| No. | Date     | By  | Change                       | X'd |
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| B   | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A   | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
|     |          |     | Amendments                   |     |

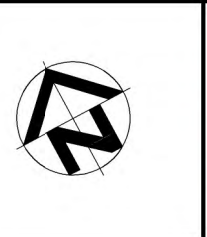
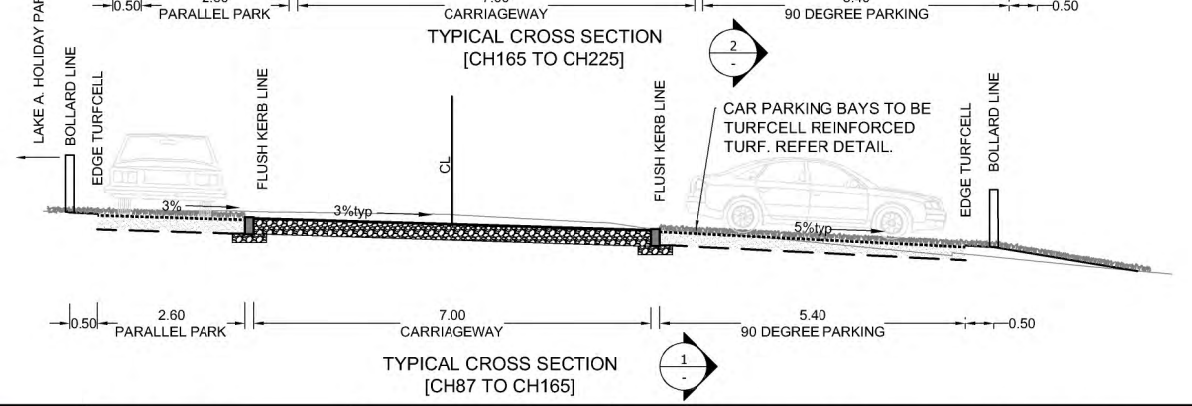
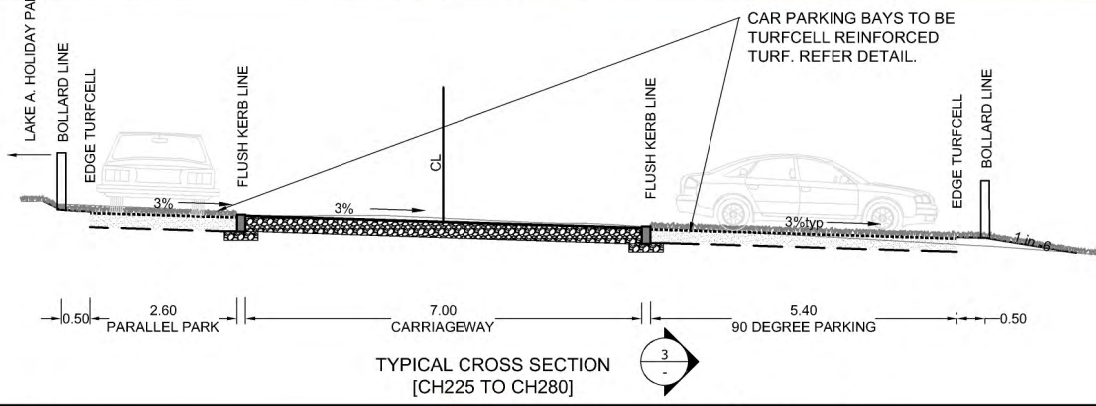
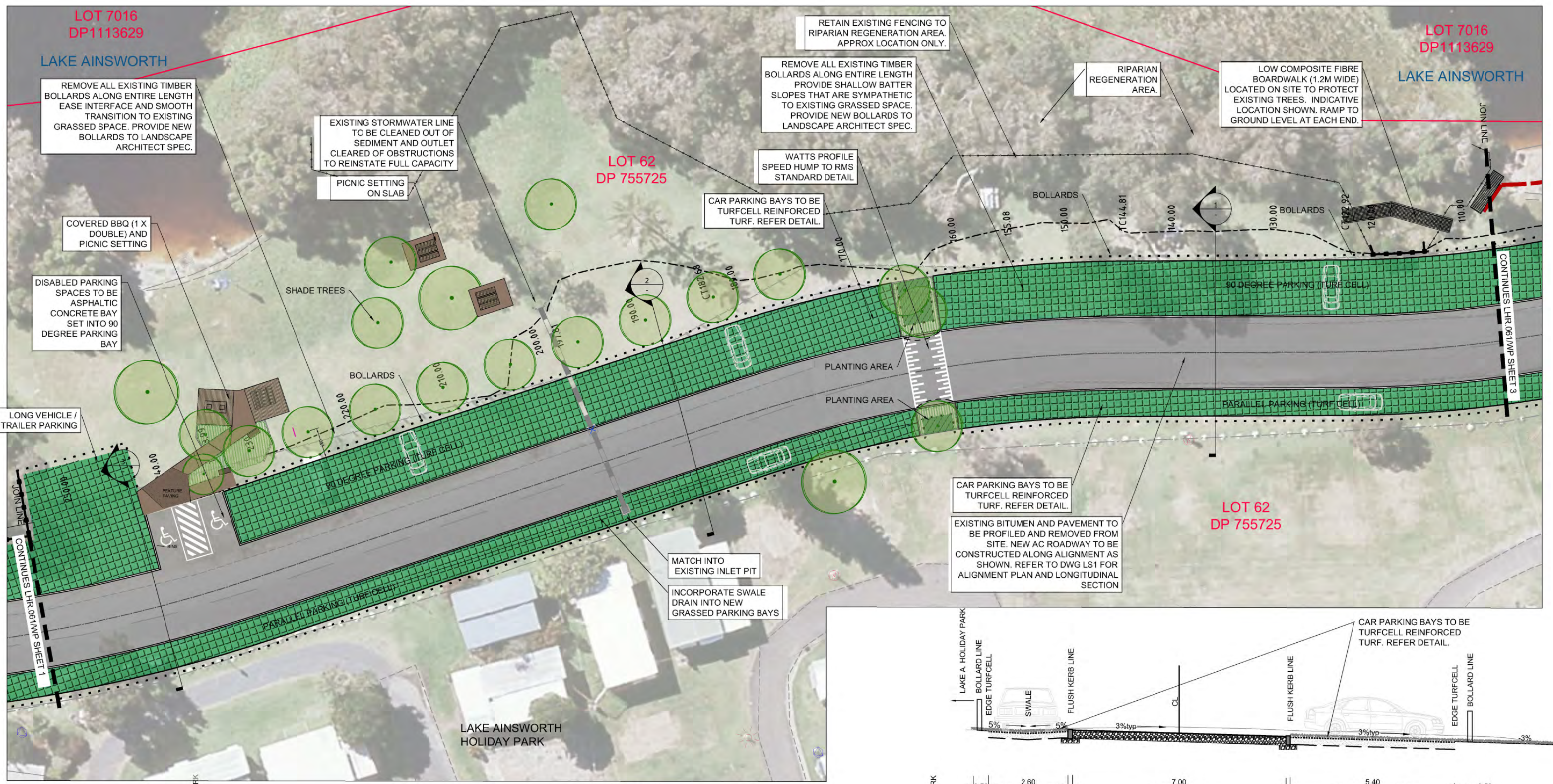


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| SURVEY       | BSC                                | DESIGNED | PJB |
| DATE         | JULY 2017                          | DRAWN    | PJB |
| F.B.         | L.B.                               | CHECKED  |     |
| DATUM        | AHD                                | APPROVED |     |
| DRAWING      | LHR 30_061 LAKE A FORESHORE DA.dwg |          |     |
| SHEET 1 OF 1 |                                    |          |     |

|  |        |                             |
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| <b>BALLINA SHIRE COUNCIL</b>                           |        |                             |
| <b>LAKE AINSWORTH FORESHORE WORKS<br/>OVERALL PLAN</b> |        |                             |
| Scale  | 1:1000 | Plan No.<br>LHR30.061/OP A1 |



|              |   |  |  |  |   |         |     |                              |  |   |          |     |                  |  |     |      |    |        |     |            |  |  |  |  |  |  |  |   |  |                                      |           |
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|              | <b>LEGEND</b><br><ul style="list-style-type: none"> <li>TELSTRA FIBRE OPTIC CABLE</li> <li>TELSTRA CABLE</li> <li>UNDER GROUND ELECTRICITY</li> <li>OVER HEAD ELECTRICITY</li> <li>SEWER (GRAVITY)</li> <li>SEWER RISING MAIN (EXISTING)</li> <li>STORMWATER PIPE (EX)</li> <li>WATER (EX)</li> <li>FENCE (EX)</li> <li>EDGE OF BITUMEN (EX)</li> </ul> | <ul style="list-style-type: none"> <li>SIGN</li> <li>STOP VALVE</li> <li>HYDRANT</li> <li>TELSTRA PIT</li> <li>POWER POLE</li> <li>STAY POLE</li> <li>STN/GIN</li> <li>SSM/PM</li> </ul> | <ul style="list-style-type: none"> <li>STORMWATER PIPE (NEW)</li> <li>LANDSCAPE FENCE (NEW)</li> <li>BOLLARD LINE (NEW)</li> <li>BOLLARD LINE (EXISTING)</li> <li>BOUNDARY</li> <li>FK 4.95 FINISHED SURFACE RL</li> <li>BIORETENTION</li> <li>TURFCELL CAR PARKING</li> <li>LANDSCAPING</li> <li>AC SEAL</li> </ul> | <table border="1"> <tr> <td>B</td> <td>3/11/17</td> <td>PJB</td> <td>ISSUED FOR PART V ASSESSMENT</td> <td></td> </tr> <tr> <td>A</td> <td>27/10/17</td> <td>PJB</td> <td>DRAFT FOR REVIEW</td> <td></td> </tr> <tr> <td>No.</td> <td>Date</td> <td>By</td> <td>Change</td> <td>X'd</td> </tr> <tr> <td colspan="5" style="text-align: center;">Amendments</td> </tr> </table> | B | 3/11/17 | PJB | ISSUED FOR PART V ASSESSMENT |  | A | 27/10/17 | PJB | DRAFT FOR REVIEW |  | No. | Date | By | Change | X'd | Amendments |  |  |  |  |  | SURVEY BSC<br>DATE JULY 2017<br>F.B. L.B.<br>DATUM AHD<br>DRAWING LHR 30_061 LAKE A FORESHORE DA.dwg | DESIGNED PJB<br>DRAWN PJB<br>CHECKED<br>APPROVED | <b>BALLINA SHIRE COUNCIL</b><br><b>LAKE AINSWORTH FORESHORE WORKS</b><br><b>SOUTHERN FORESHORE GENERAL WORKS PLAN</b><br><b>AND TYPICAL DETAILS</b> |  | Scale 1:200<br>Plan No. LHR30.061/WP | <b>A1</b> |
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| SHEET 1 OF 8 |   |  |  |  |   |         |     |                              |  |   |          |     |                  |  |     |      |    |        |     |            |  |  |  |  |  |  |  |   |  |                                      |           |



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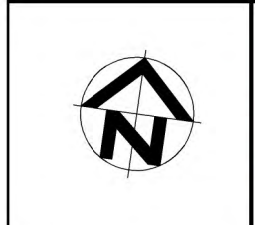
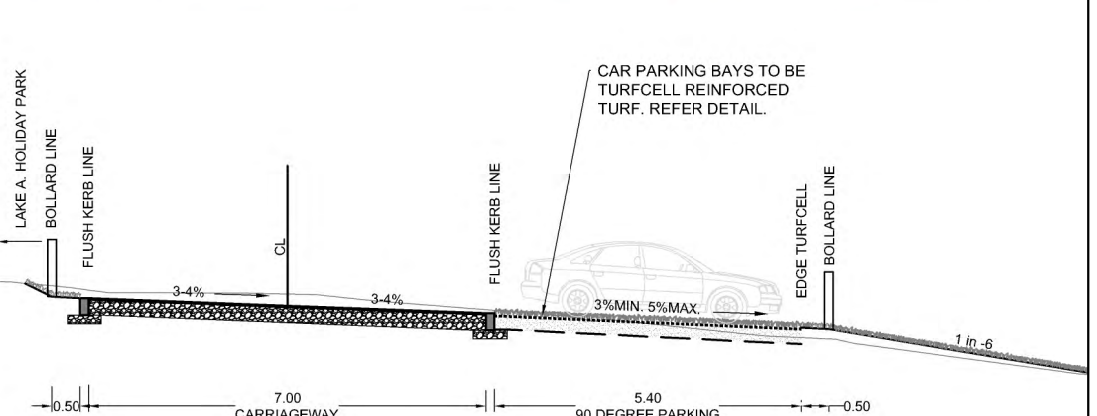
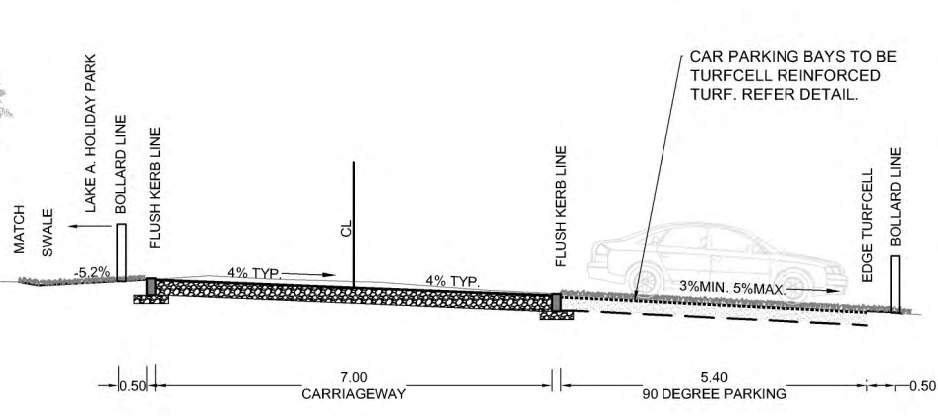
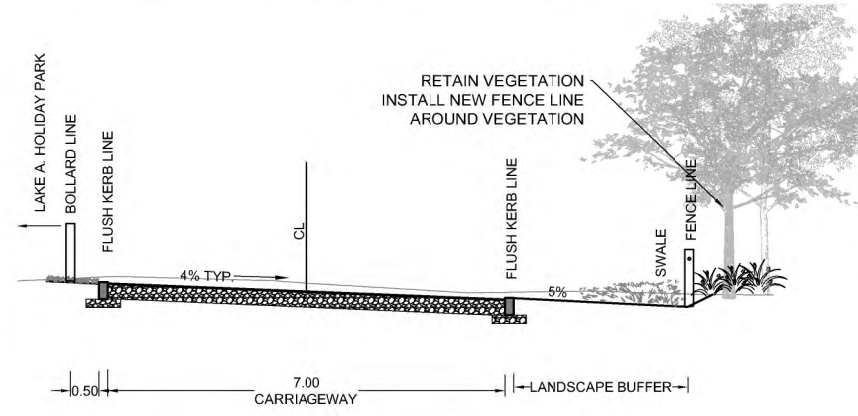
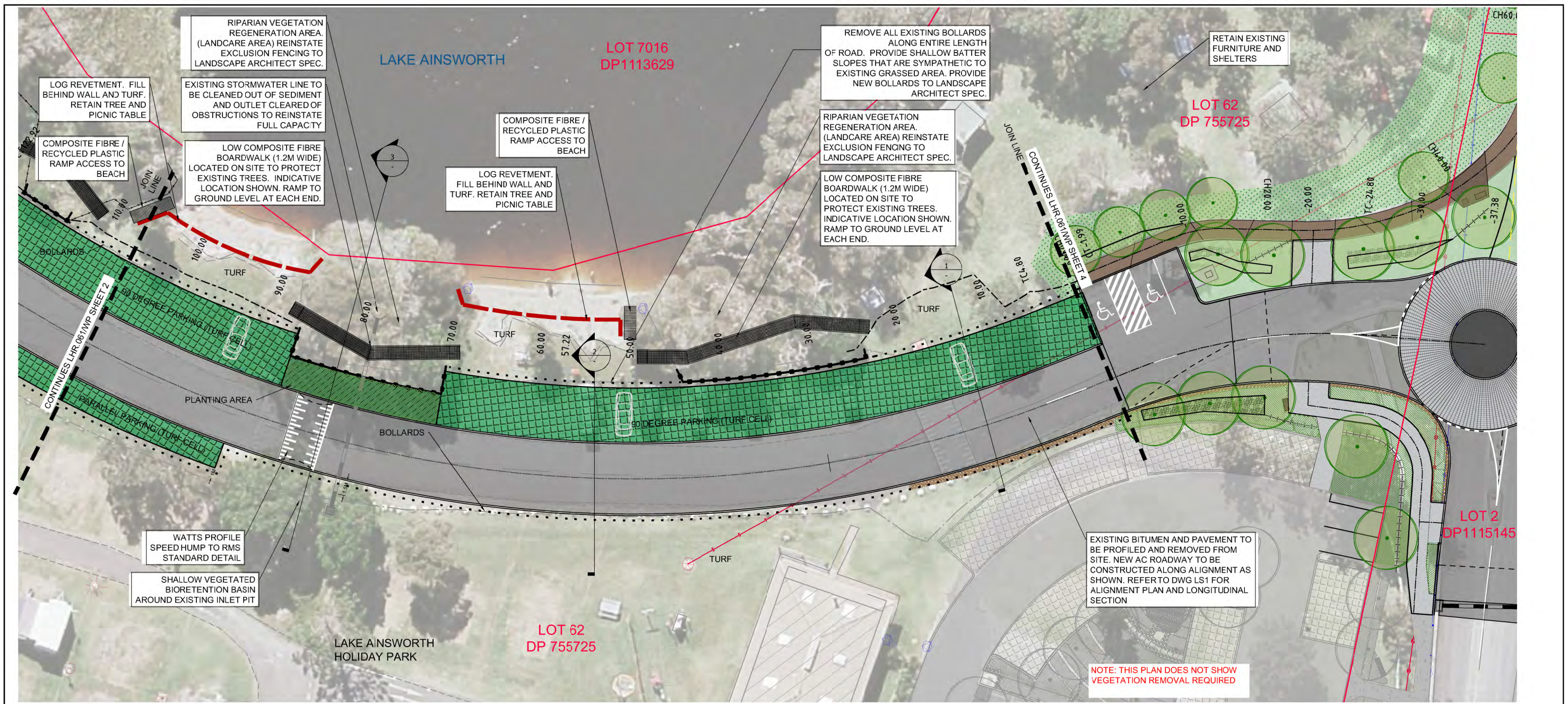
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| UNDER GROUND ELECTRICITY     | HYDRANT        | BOLLARD LINE (NEW)          |
| OVER HEAD ELECTRICITY        | TELSTRA PIT    | BOLLARD LINE (EXISTING)     |
| SEWER (GRAVITY)              | OPP POWER POLE | BOUNDARY                    |
| SEWER RISING MAIN (EXISTING) | STAY POLE      | FK 4.95 FINISHED SURFACE RL |
| STORMWATER PIPE (EX)         | STN/GIN        | BIORETENTION                |
| WATER (EX)                   | SSM/PM         | TURFCELL CAR PARKING        |
| FENCE (EX)                   |                | LANDSCAPING                 |
| EDGE OF BITUMEN (EX)         |                | AC SEAL                     |

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| No. | Date     | By  | Change                       | X'd |
|     |          |     | Amendments                   |     |



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| DATUM        | AHD                                | APPROVED |     |
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| SHEET 2 OF 8 |                                    |          |     |

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| <b>BALLINA SHIRE COUNCIL</b>  |                 |
| <b>LAKE AINSWORTH FORESHORE WORKS<br/>SOUTHERN FORESHORE GENERAL WORKS PLAN<br/>AND TYPICAL DETAILS</b> |                 |
| Scale   | 1:200           |
| Plan No.  | LHR30.061/WP A1 |



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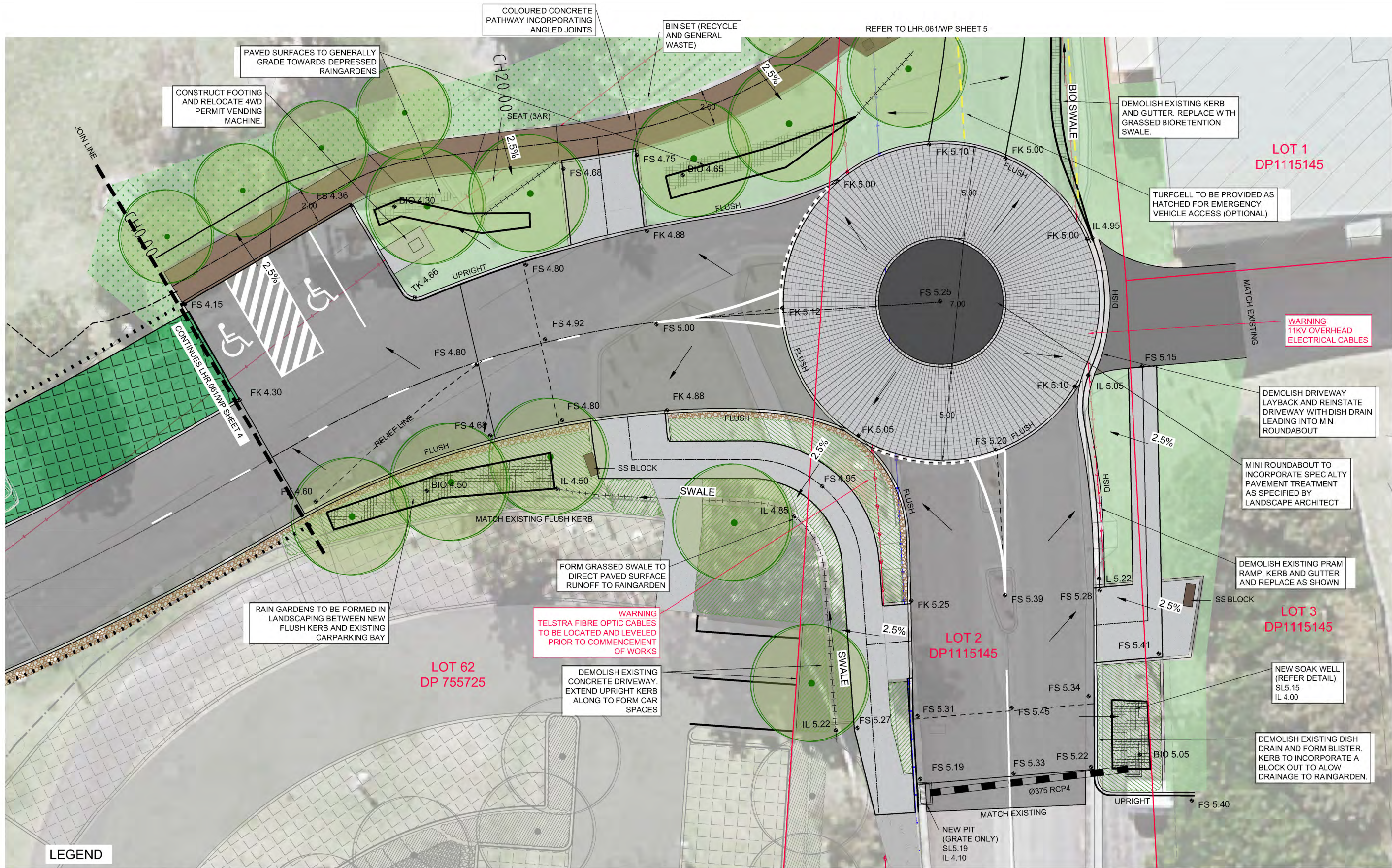
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| UNDER GROUND ELECTRICITY     | HYDRANT        | BOLLARD LINE (NEW)          |
| OVER HEAD ELECTRICITY        | TELSTRA PIT    | BOLLARD LINE (EXISTING)     |
| SEWER (GRAVITY)              | OPP POWER POLE | BOUNDARY                    |
| SEWER RISING MAIN (EXISTING) | STAY POLE      | FK 4.95 FINISHED SURFACE RL |
| STORMWATER PIPE (EX)         | STN/GIN        | BIORETENTION                |
| WATER (EX)                   | SSM/PM         | TURFCELL CAR PARKING        |
| FENCE (EX)                   |                | AC SEAL                     |
| EDGE OF BITUMEN (EX)         |                | LANDSCAPING                 |

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| DATE         | JULY 2017                          | DRAWN    | PJB |
| F.B.         | L.B.                               | CHECKED  |     |
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| SHEET 3 OF 8 |                                    |          |     |

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| <b>BALLINA SHIRE COUNCIL</b>                 |       |          |                 |
| <b>LAKE AINSWORTH FORESHORE WORKS</b>        |       |          |                 |
| <b>SOUTHERN FORESHORE GENERAL WORKS PLAN</b> |       |          |                 |
| <b>AND TYPICAL DETAILS</b>                   |       |          |                 |
| Scale  | 1:200 | Plan No. | LHR30.061/WP A1 |



**LEGEND**

- LANDSCAPING - TURF
- RIPARIAN VEGETATION REHABILITATION AREA
- PAVEMENT REHAB AND REGRADING
- BIORETENTION
- TREE (EXISTING RETAIN)
- TREE (EXISTING REMOVE)
- TREE (NEW)
- BITUMEN (NEW)
- COLOURED CONCRETE PATH
- COBBLE GRANITE (GREY)
- COBBLE GRANITE (BLACK)
- BENCH SEAT

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER (GRAVITY)
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- STORMWATER PIPE (NEW)
- FENCE (NEW)
- FENCE (EXISTING)
- EXISTING EDGE OF BITUMEN
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STN/GIN
- SSM/PM
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FK 4.95 FINISHED SURFACE RL
- BOUNDARY
- EMERGENCY ACCESS
- FK- FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH DRAIN
- TK- TOP OF KERB
- FS FINISHED SURFACE

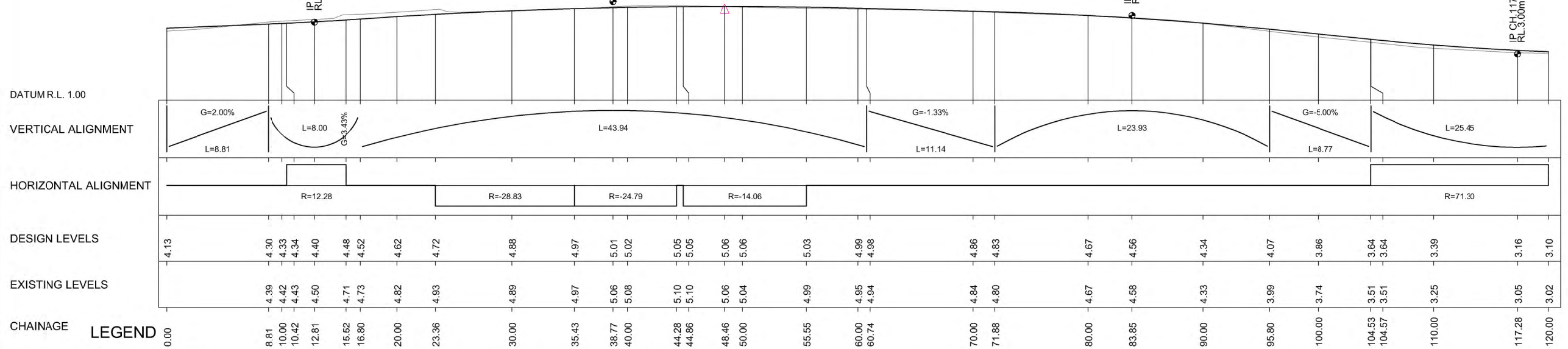
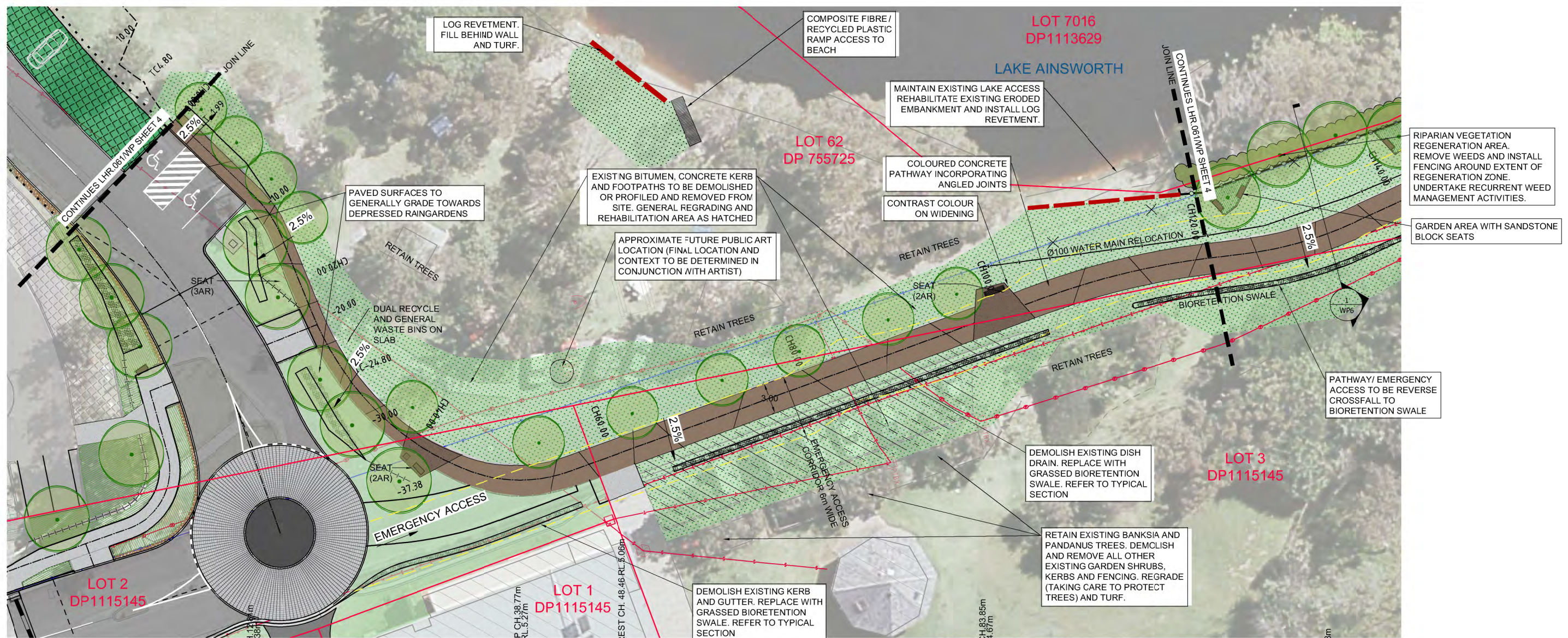
|            |          |     |                              |     |
|------------|----------|-----|------------------------------|-----|
| B          | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A          | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
| No.        | Date     | By  | Change                       | X'd |
| Amendments |          |     |                              |     |



|  |           |          |     |
|--|-----------|----------|-----|
| SURVEY                                     | BSC       | DESIGNED | PJB |
| DATE                                       | JULY 2017 | DRAWN    | PJB |
| F.B.                                       | L.B.      | CHECKED  |     |
| DATUM                                      | AHD       | APPROVED |     |
| DRAWING LHR 30_061 LAKE A FORESHORE DA.dwg |           |          |     |
| SHEET 4 OF 8                               |           |          |     |

|   |             |          |                 |
|---|-------------|----------|-----------------|
| <b>BALLINA SHIRE COUNCIL</b>  |             |          |                 |
| <b>LAKE AINSWORTH FORESHORE WORKS<br/>PACIFIC PDE &amp; SOUTHERN RD INTERSECTION<br/>GENERAL WORKS PLAN</b> |             |          |                 |
| Scale   | SCALE 1:100 | Plan No. | LHR30.061/WP A1 |





LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)

**LEGEND**

|  |  |  |  |  |
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|------------------------------|--|--|--|
| ISSUED FOR PART V ASSESSMENT |  | DESIGNED PJB                               |  |
| DRAFT FOR REVIEW             |  | DRAWN PJB                                  |  |
| Change                       |  | CHECKED                                    |  |
| Amendments                   |  | APPROVED                                   |  |
| SHEET 5 OF 8                 |  | DRAWING LHR 30_061 LAKE A FORESHORE DA.dwg |  |

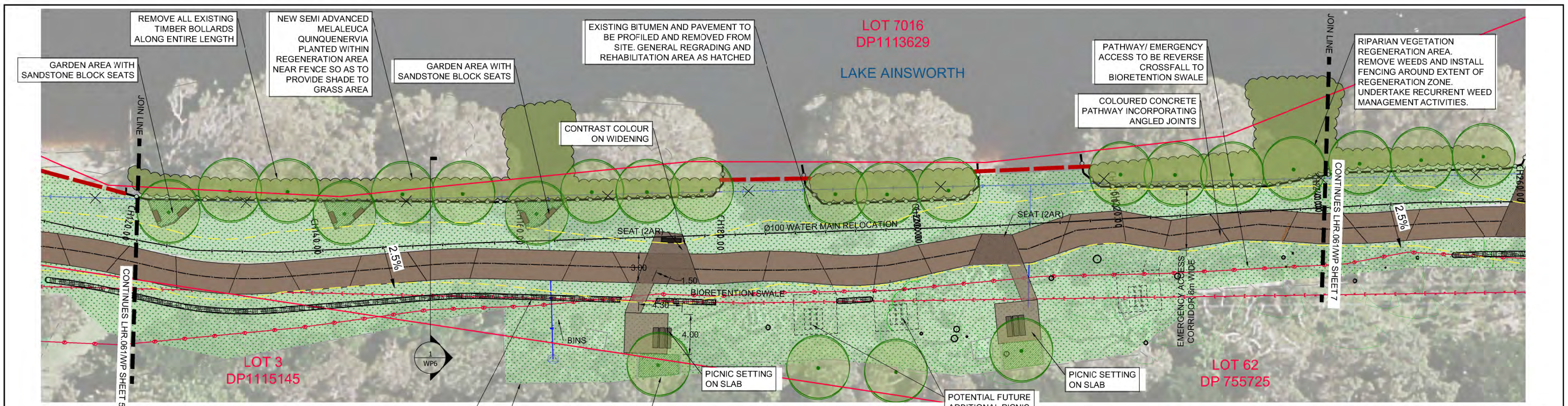
**BALLINA SHIRE COUNCIL**

LAKE AINSWORTH FORESHORE WORKS  
EASTERN FORESHORE GENERAL WORKS  
PLAN AND LONGSECTION (CH0 TO CH120)

Scale: 1:200 [H], 1:100 [V]

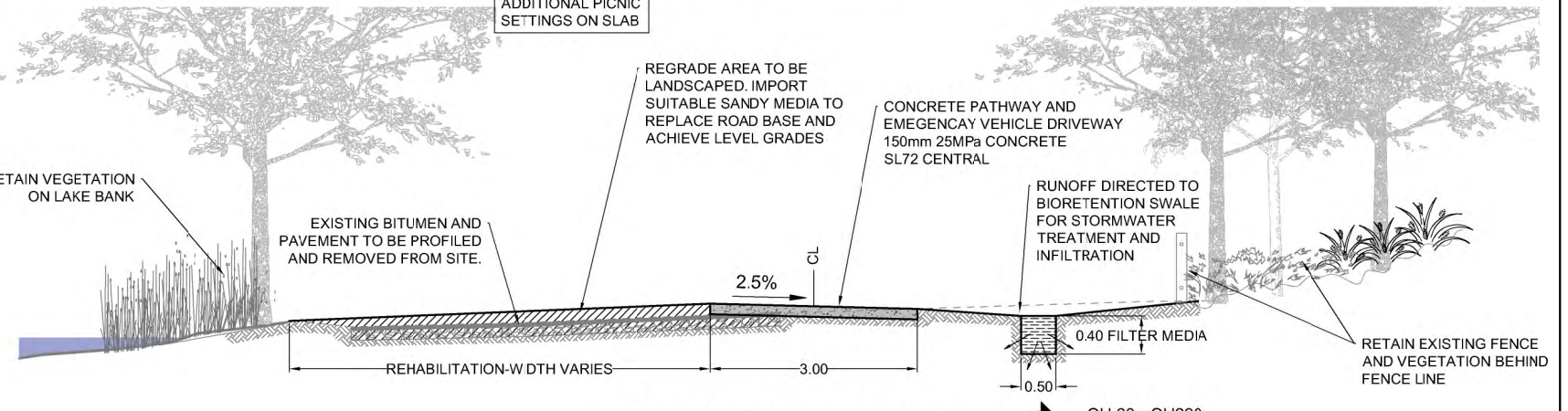
Plan No. LHR30.061/WP A1



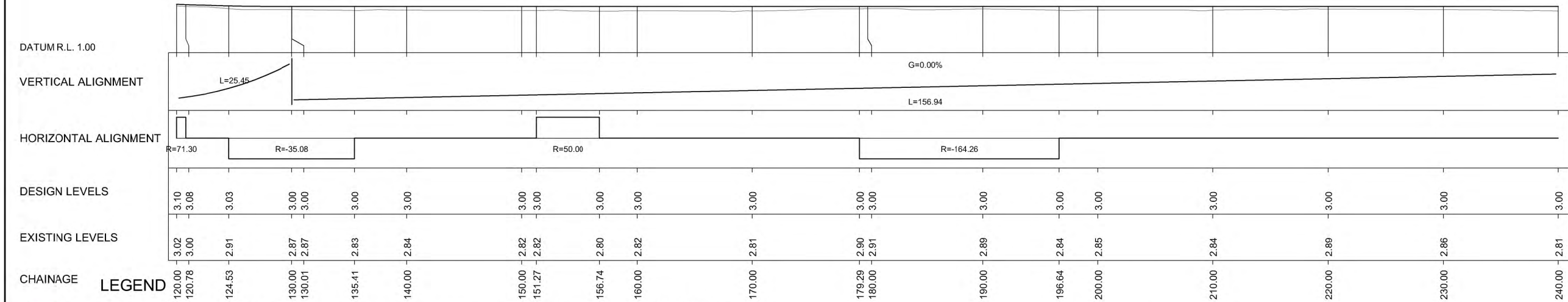


**FILTER MEDIA SPECIFICATION**

1. pH BETWEEN 5.5 TO 7.5
2. EC < 1.2 dS/m
3. ORGANIC MATTER CONTENT < 5% w/w
4. PHOSPHOROUS CONTENT < 100 mg/kg
5. TOTAL SILT & CLAY CONTENT < 3% w/w
6. HYDRAULIC CONDUCTIVITY BETWEEN 100 & 300 mm/h



TYPICAL SECTION THROUGH PATHWAY



LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)

**LEGEND**

|   |                              |                        |                        |                        |
|---|------------------------------|------------------------|------------------------|------------------------|
| LANDSCAPING - TURF                      | PAVEMENT REHAB AND REGRADING | TREE (EXISTING RETAIN) | BITUMEN (NEW)          | COBBLE GRANITE (GREY)  |
| RIPARIAN VEGETATION REHABILITATION AREA | BIORETENTION                 | TREE (EXISTING REMOVE) | COLOURED CONCRETE PATH | COBBLE GRANITE (BLACK) |
|   |                              | TREE (NEW)             | BENCH SEAT             |                        |

|                              |             |                             |
|------------------------------|-------------|-----------------------------|
| TELSTRA FIBRE OPTIC CABLE    | SIGN        | WATER MAIN (NEW)            |
| TELSTRA CABLE                | STOP VALVE  | WATER MAIN (EXISTING)       |
| UNDER GROUND ELECTRICITY     | HYDRANT     | FK 4.95 FINISHED SURFACE RL |
| OVER HEAD ELECTRICITY        | TELSTRA PIT | BOUNDARY                    |
| SEWER (GRAVITY)              | POWER POLE  | EMERGENCY ACCESS            |
| SEWER RISING MAIN (EXISTING) | STAY POLE   | FK- FLUSH KERB              |
| STORMWATER PIPE (EX)         | STN/GIN     | K&G - KERB AND GUTTER       |
| STORMWATER PIPE (NEW)        | SSM/PM      | DISH - DISH DRAIN           |
| FENCE (NEW)                  |             | TK- TOP OF KERB             |
| FENCE (EXISTING)             |             | FS FINISHED SURFACE         |
| EXISTING EDGE OF BITUMEN     |             |                             |

|              |                                    |          |     |
|--------------|------------------------------------|----------|-----|
| SURVEY       | BSC                                | DESIGNED | PJB |
| DATE         | JULY 2017                          | DRAWN    | PJB |
| F.B.         | L.B.                               | CHECKED  |     |
| DATUM        | AHD                                | APPROVED |     |
| DRAWING      | LHR 30_061 LAKE A FORESHORE DA.dwg |          |     |
| SHEET 6 OF 8 |                                    |          |     |

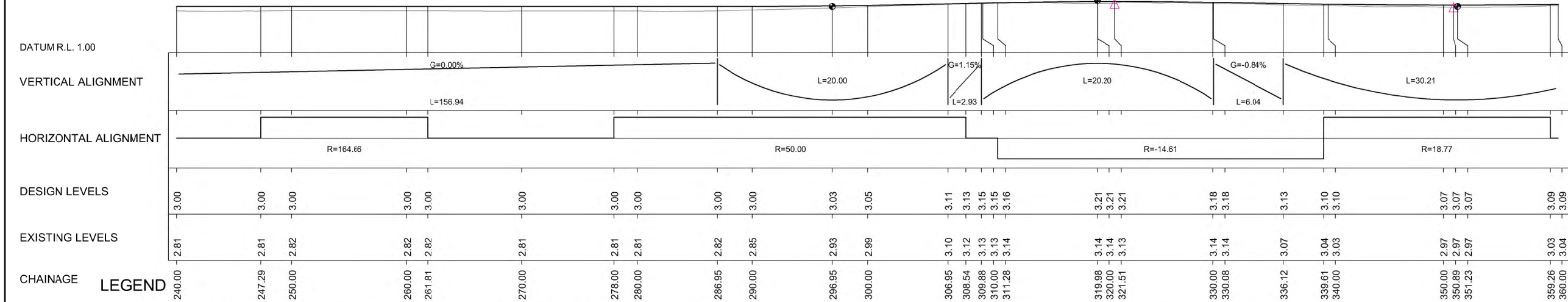
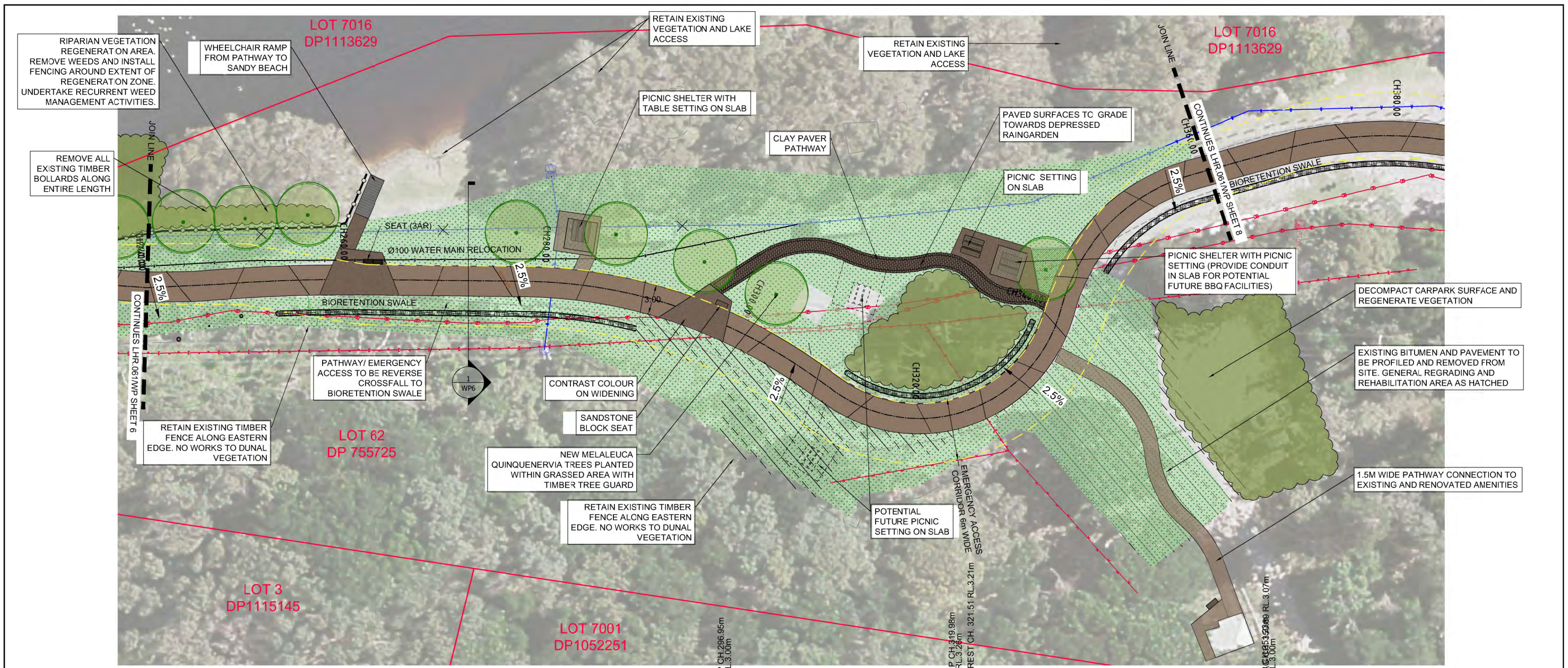
**BALLINA SHIRE COUNCIL**

LAKE AINSWORTH FORESHORE WORKS  
EASTERN FORESHORE GENERAL WORKS  
PLAN AND LONGSECTION (CH120 TO CH240)

Scale: 1:200 [H], 1:100 [V]

Plan No. LHR30.061/WP A1

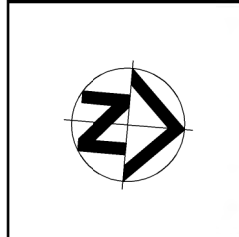




LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)

**LEGEND**

|   |                              |                        |                        |                        |
|---|------------------------------|------------------------|------------------------|------------------------|
| LANDSCAPING - TURF                      | PAVEMENT REHAB AND REGRADING | TREE (EXISTING RETAIN) | BITUMEN (NEW)          | COBBLE GRANITE (GREY)  |
| RIPARIAN VEGETATION REHABILITATION AREA | BIORETENTION                 | TREE (EXISTING REMOVE) | COLOURED CONCRETE PATH | COBBLE GRANITE (BLACK) |
| TREE (NEW)                              |                              | BENCH SEAT             |                        |                        |



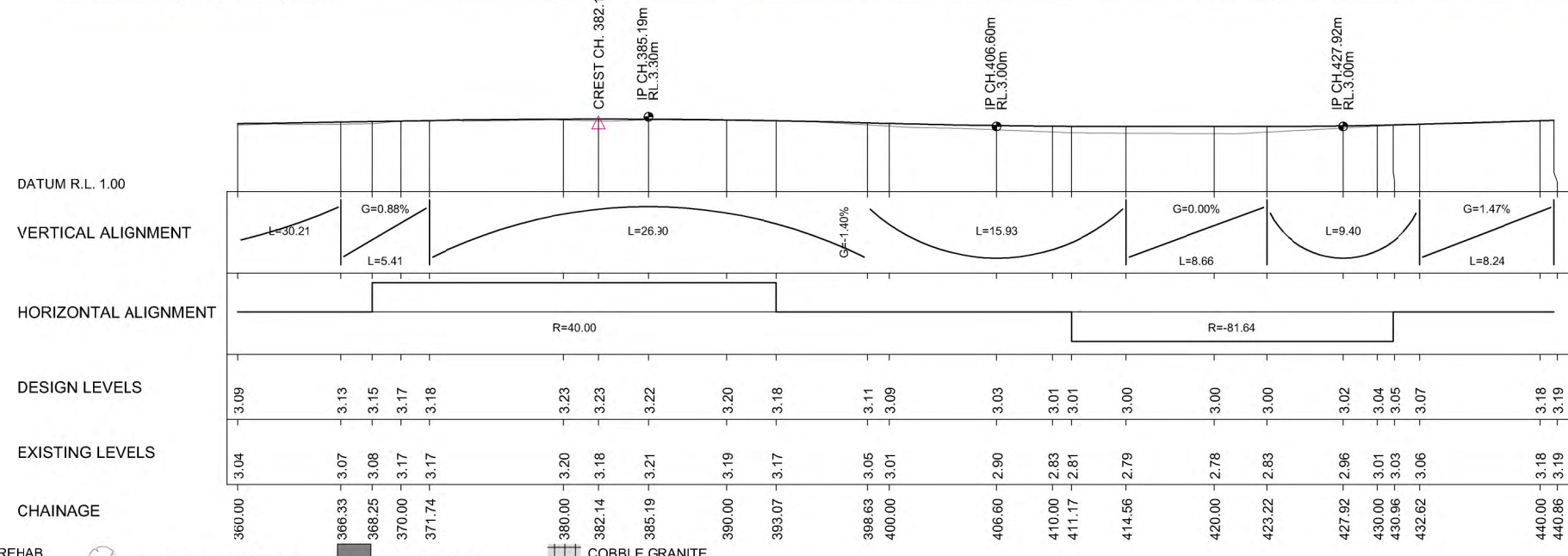
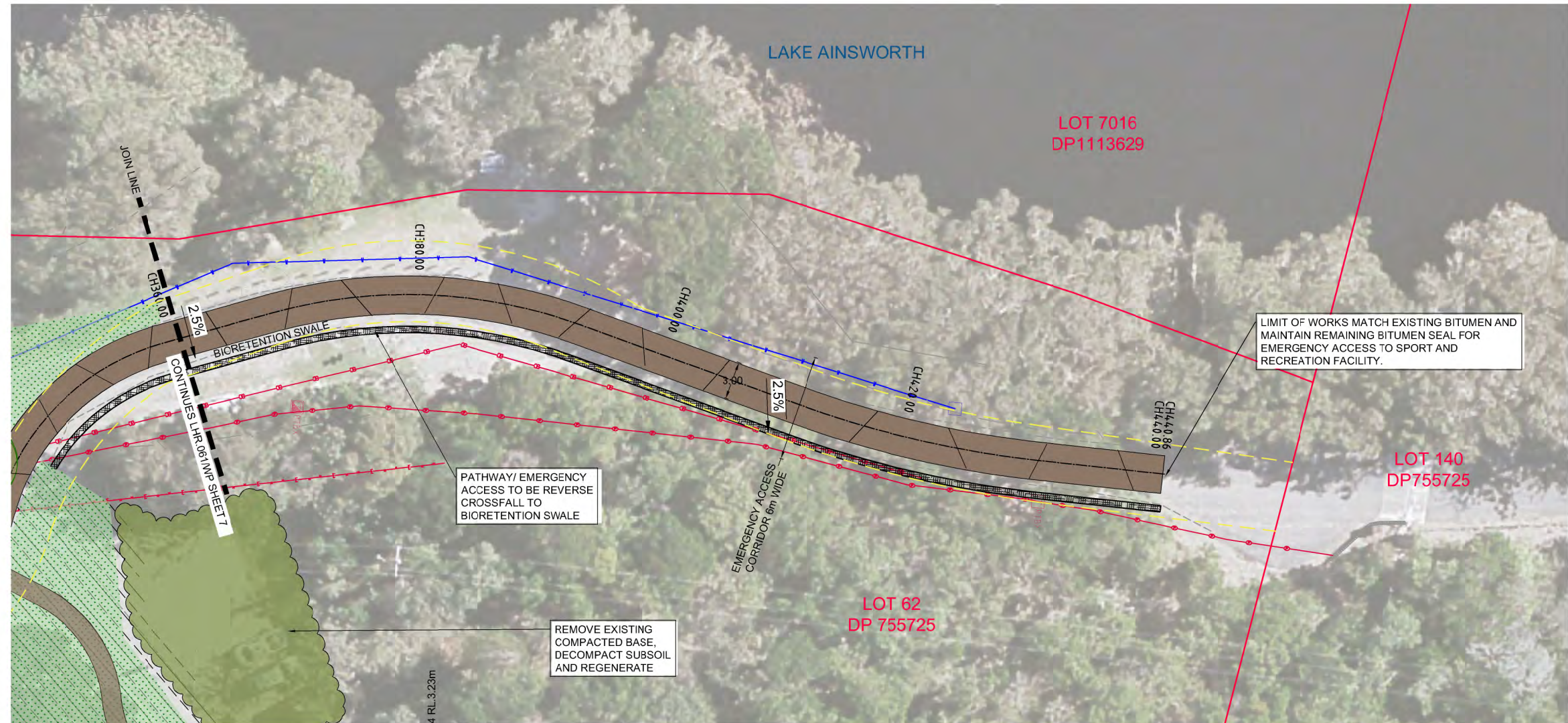
|                              |             |                             |
|------------------------------|-------------|-----------------------------|
| TELSTRA FIBRE OPTIC CABLE    | SIGN        | WATER MAIN (NEW)            |
| TELSTRA CABLE                | STOP VALVE  | WATER MAIN (EXISTING)       |
| UNDER GROUND ELECTRICITY     | HYDRANT     | FK 4.95 FINISHED SURFACE RL |
| OVER HEAD ELECTRICITY        | TELSTRA PIT | BOUNDARY                    |
| SEWER (GRAVITY)              | POWER POLE  | EMERGENCY ACCESS            |
| SEWER RISING MAIN (EXISTING) | STAY POLE   | FK - FLUSH KERB             |
| STORMWATER PIPE (EX)         | SSM/PM      | K&G - KERB AND GUTTER       |
| STORMWATER PIPE (NEW)        |             | DISH - DISH DRAIN           |
| FENCE (NEW)                  |             | TK - TOP OF KERB            |
| FENCE (EXISTING)             |             | FS FINISHED SURFACE         |
| EXISTING EDGE OF BITUMEN     |             |                             |

| No.        | Date     | By  | Change                       | X'd |
|------------|----------|-----|------------------------------|-----|
| B          | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A          | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
| Amendments |          |     |                              |     |



|  |           |          |     |
|--|-----------|----------|-----|
| SURVEY                                     | BSC       | DESIGNED | PJB |
| DATE                                       | JULY 2017 | DRAWN    | PJB |
| F.B.                                       | L.B.      | CHECKED  |     |
| DATUM                                      | AHD       | APPROVED |     |
| DRAWING LHR 30_061 LAKE A FORESHORE DA.dwg |           |          |     |
| SHEET 7 OF 8                               |           |          |     |

|  |                        |          |                 |
|--|------------------------|----------|-----------------|
| <b>BALLINA SHIRE COUNCIL</b>   |                        |          |                 |
| LAKE AINSWORTH FORESHORE WORKS<br>STAGE 1 - EASTERN FORESHORE<br>PLAN AND LONGSECTION (CH240 TO CH360) |                        |          |                 |
| Scale  | 1:200 [H]<br>1:100 [V] | Plan No. | LHR30.061/WP A1 |



LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)

LEGEND

- LANDSCAPING - TURF
- PAVEMENT REHAB AND REGRADING
- TREE (EXISTING RETAIN)
- BITUMEN (NEW)
- COBBLE GRANITE (GREY)
- RIPARIAN VEGETATION REHABILITATION AREA
- BIORETENTION
- TREE (EXISTING REMOVE)
- COBBLE GRANITE (BLACK)
- COLOURED CONCRETE PATH
- BENCH SEAT
- TREE (NEW)

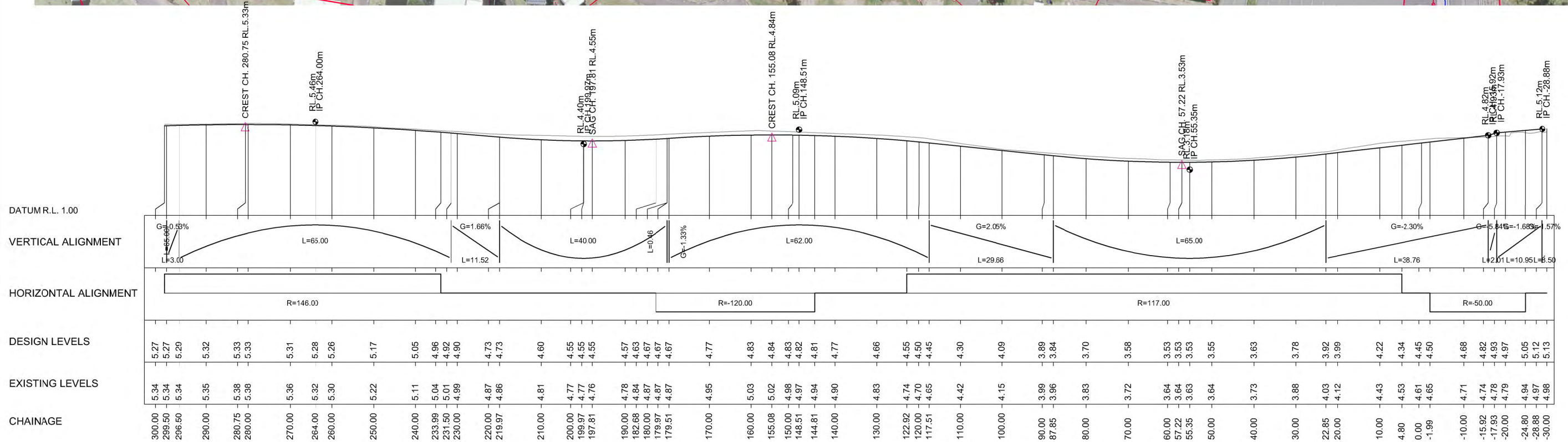
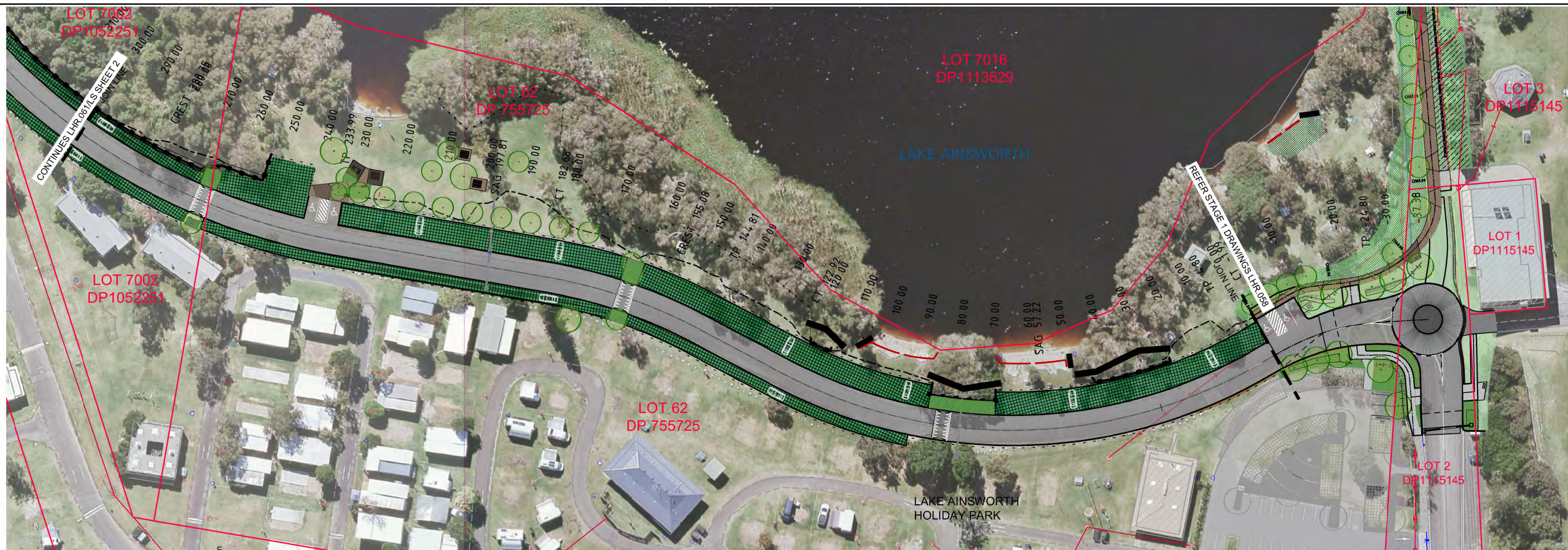
- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER (GRAVITY)
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- STORMWATER PIPE (NEW)
- FENCE (NEW)
- FENCE (EXISTING)
- EXISTING EDGE OF BITUMEN
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STN/GIN
- SSM/PM
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FK 4.95 FINISHED SURFACE RL
- BOUNDARY
- EMERGENCY ACCESS
- FK- FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH DRAIN
- TK- TOP OF KERB
- FS FINISHED SURFACE

|            |          |     |                              |     |
|------------|----------|-----|------------------------------|-----|
| No.        | Date     | By  | Change                       | X'd |
| B          | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A          | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
| Amendments |          |     |                              |     |



|  |           |          |     |
|--|-----------|----------|-----|
| SURVEY                                     | BSC       | DESIGNED | PJB |
| DATE                                       | JULY 2017 | DRAWN    | PJB |
| F.B.                                       | L.B.      | CHECKED  |     |
| DATUM                                      | AHD       | APPROVED |     |
| DRAWING LHR 30_061 LAKE A FORESHORE DA.dwg |           |          |     |
| SHEET 8 OF 8                               |           |          |     |

|  |                        |          |                 |
|--|------------------------|----------|-----------------|
| <b>BALLINA SHIRE COUNCIL</b>   |                        |          |                 |
| LAKE AINSWORTH FORESHORE WORKS<br>EASTERN FORESHORE GENERAL WORKS<br>PLAN AND LONGSECTION (CH360 TO CH440) |                        |          |                 |
| Scale  | 1:200 [H]<br>1:100 [V] | Plan No. | LHR30.061/WP A1 |



LONGITUDINAL SECTION



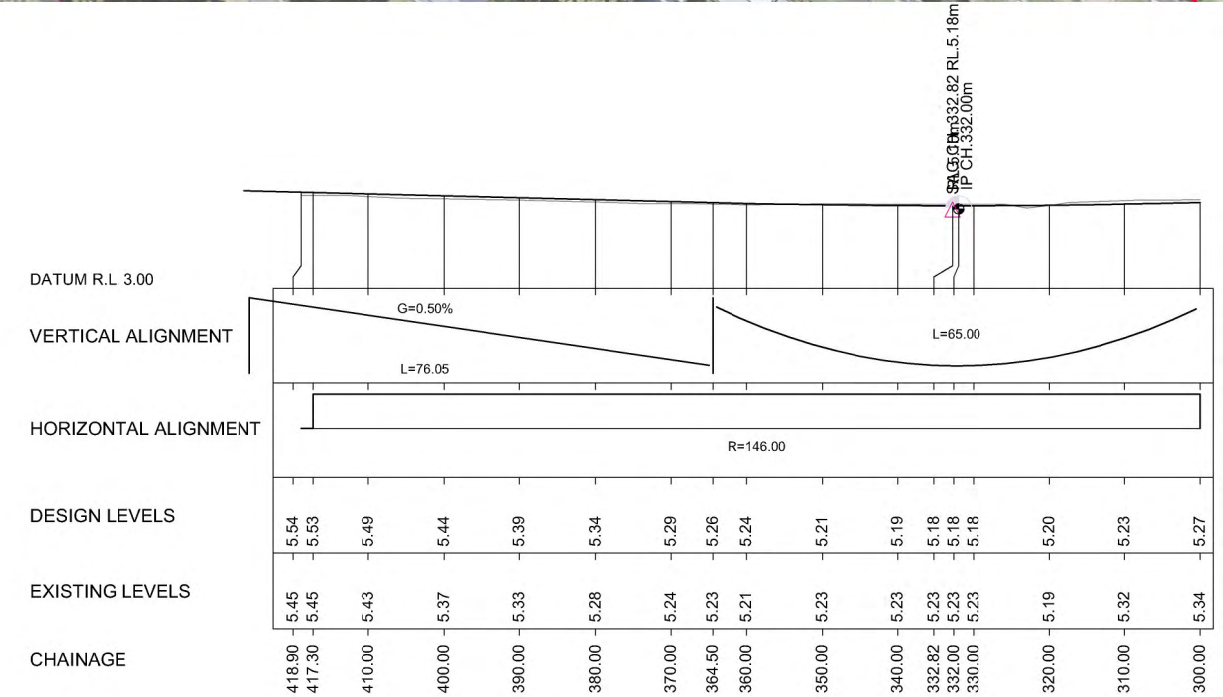
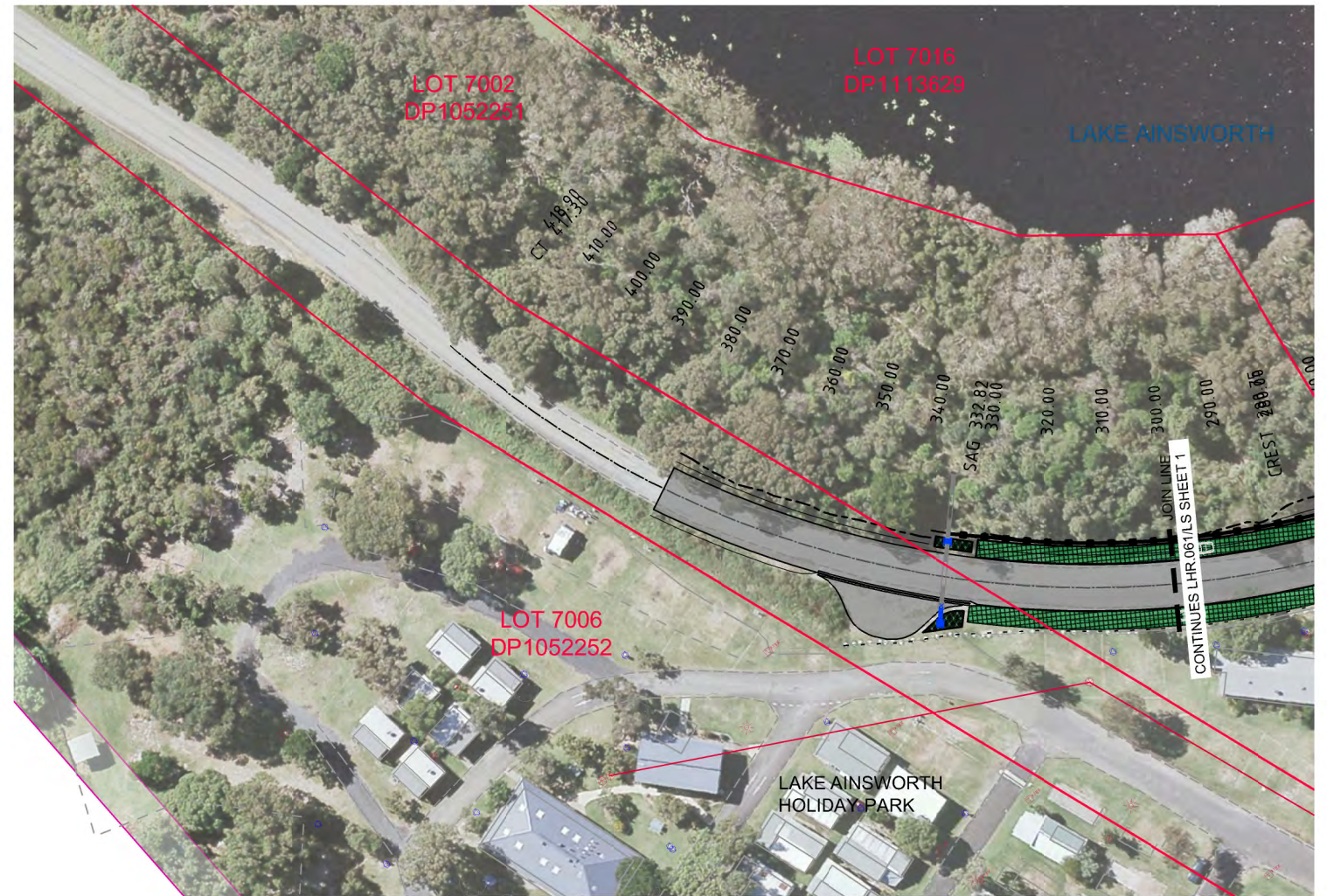
| LEGEND |                              |
|--------|------------------------------|
|        | TELSTRA FIBRE OPTIC CABLE    |
|        | TELSTRA CABLE                |
|        | UNDER GROUND ELECTRICITY     |
|        | OVER HEAD ELECTRICITY        |
|        | SEWER (GRAVITY)              |
|        | SEWER RISING MAIN (EXISTING) |
|        | STORMWATER PIPE (EX)         |
|        | WATER (EX)                   |
|        | FENCE (EX)                   |
|        | EDGE OF BITUMEN (EX)         |
|        | SIGN                         |
|        | STOP VALVE                   |
|        | HYDRANT                      |
|        | TELSTRA PIT                  |
|        | POWER POLE                   |
|        | STAY POLE                    |
|        | STN/GIN                      |
|        | SSM/PM                       |
|        | STORMWATER PIPE (NEW)        |
|        | LANDSCAPE FENCE (NEW)        |
|        | BOLLARD LINE (NEW)           |
|        | BOLLARD LINE (EXISTING)      |
|        | BOUNDARY                     |
|        | BIORETENTION                 |
|        | TURFCCELL                    |
|        | CAR PARKING                  |
|        | AC SEAL                      |

| No. | Date     | By  | Change                       | X'd |
|-----|----------|-----|------------------------------|-----|
| B   | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A   | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
|     |          |     | Amendments                   |     |



| SURVEY       | BSC                                | DESIGNED | PJB |
|--------------|------------------------------------|----------|-----|
| DATE         | JULY 2017                          | DRAWN    | PJB |
| F.B.         | L.B.                               | CHECKED  |     |
| DATUM        | AHD                                | APPROVED |     |
| DRAWING      | LHR 30_061 LAKE A FORESHORE DA.dwg |          |     |
| SHEET 1 OF 2 |                                    |          |     |

| BALLINA SHIRE COUNCIL            |           |          |              |
|----------------------------------|-----------|----------|--------------|
| LAKE AINSWORTH FORESHORE WORKS   |           |          |              |
| SOUTHERN ROAD ALIGNMENT          |           |          |              |
| PLAN AND LONGSECTION (CH0 - 300) |           |          |              |
| Scale                            | 1:500 [H] | Plan No. | LHR30.061/LS |
|                                  | 1:100 [V] |          | A1           |



LONGITUDINAL SECTION



**LEGEND**

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER (GRAVITY)
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- WATER (EX)
- FENCE (EX)
- EDGE OF BITUMEN (EX)
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STN/GIN
- SSM/PM
- STORMWATER PIPE (NEW)
- LANDSCAPE FENCE (NEW)
- BOLLARD LINE (NEW)
- BOLLARD LINE (EXISTING)
- BOUNDARY
- FK 4.95 FINISHED SURFACE RL
- BIORETENTION
- LANDSCAPING
- TURFCELL
- CAR PARKING
- AC SEAL

|            |          |     |                              |     |
|------------|----------|-----|------------------------------|-----|
| B          | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A          | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
| No.        | Date     | By  | Change                       | X'd |
| Amendments |          |     |                              |     |

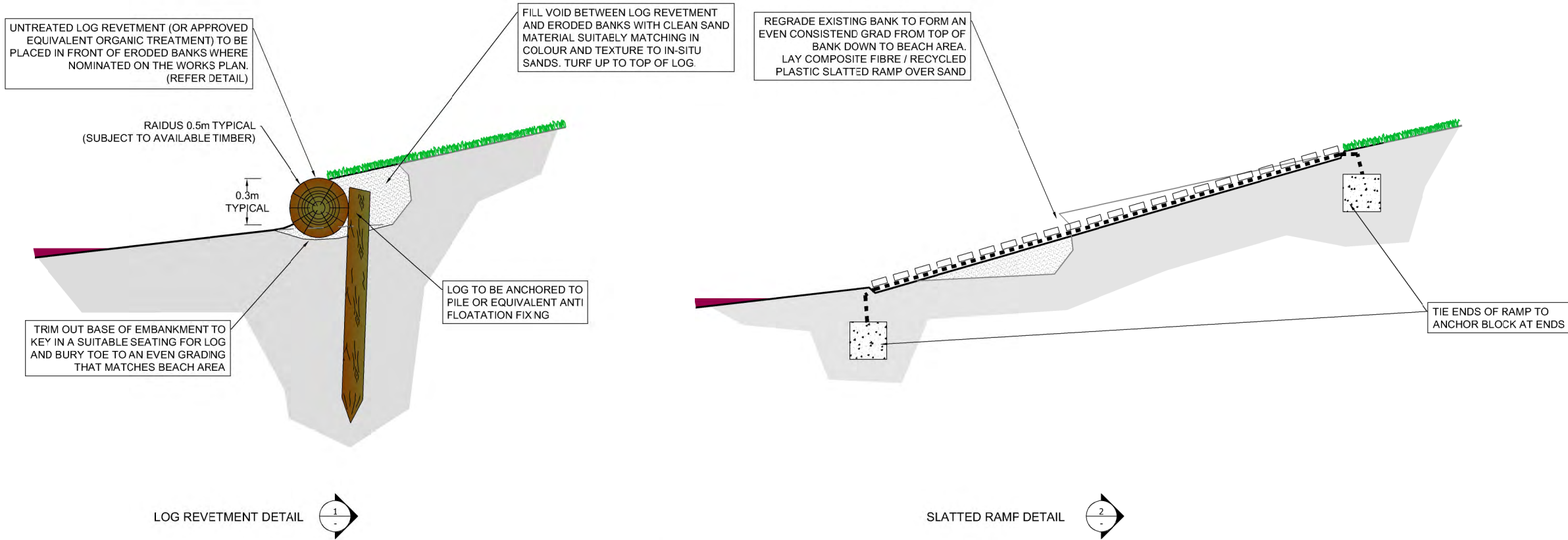
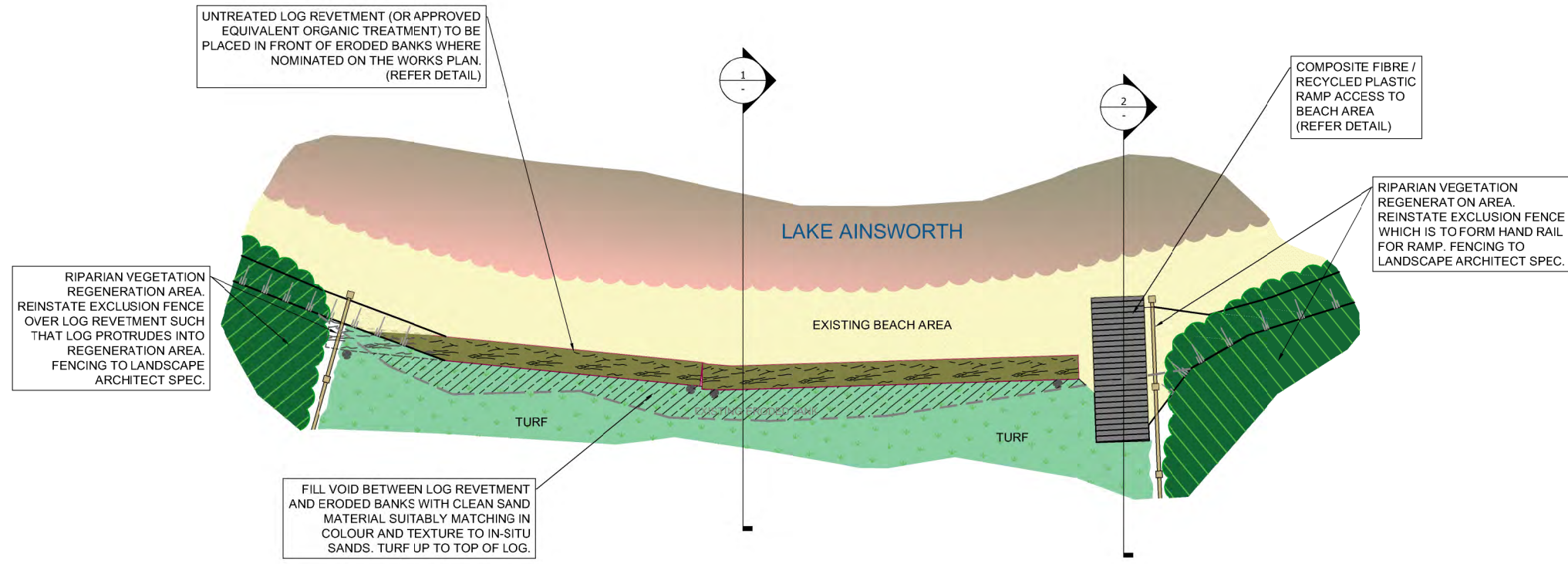


|  |           |          |     |
|--|-----------|----------|-----|
| SURVEY                                     | BSC       | DESIGNED | PJB |
| DATE                                       | JULY 2017 | DRAWN    | PJB |
| F.B.                                       | L.B.      | CHECKED  |     |
| DATUM                                      | AHD       | APPROVED |     |
| DRAWING LHR 30_061 LAKE A FORESHORE DA.dwg |           |          |     |
| SHEET 2 OF 2                               |           |          |     |

**BALLINA SHIRE COUNCIL**

**LAKE AINSWORTH FORESHORE WORKS  
SOUTHERN ROAD ALIGNMENT  
PLAN AND LONGSECTION (CH300 - 380)**

|       |                        |          |              |    |
|-------|------------------------|----------|--------------|----|
| Scale | 1:500 [H]<br>1:100 [V] | Plan No. | LHR30.061/LS | A1 |
|-------|------------------------|----------|--------------|----|



|            |          |     |                              |     |
|------------|----------|-----|------------------------------|-----|
| B          | 3/11/17  | PJB | ISSUED FOR PART V ASSESSMENT |     |
| A          | 27/10/17 | PJB | DRAFT FOR REVIEW             |     |
| No.        | Date     | By  | Change                       | X'd |
| Amendments |          |     |                              |     |



|              |                                    |          |     |
|--------------|------------------------------------|----------|-----|
| SURVEY       | BSC                                | DESIGNED | PJB |
| DATE         | JULY 2017                          | DRAWN    | PJB |
| F.B.         | L.B.                               | CHECKED  |     |
| DATUM        | AHD                                | APPROVED |     |
| DRAWING      | LHR 30_061 LAKE A FORESHORE DA.dwg |          |     |
| SHEET 1 OF 1 |                                    |          |     |

|   |              |                          |
|---|--------------|--------------------------|
| <b>BALLINA SHIRE COUNCIL</b>  |              |                          |
| <b>LAKE AINSWORTH FORESHORE WORKS<br/>LOG REVETMENT AND BEACH ACCESS RAMP<br/>TYPICAL DETAILS</b> |              |                          |
| Scale   | NOT TO SCALE | Plan No.<br>LHR30.061/DT |
|   |              | A1                       |

# Appendix B

Metrocount Traffic Classifier data



## MetroCount Traffic Executive Daily Classes

### DailyClass-535 -- English (ENA)

**Datasets:**

**Site:** [13125] PACIFIC PARADE,LENNOX HEAD ,BETWEEN ROSS ST & RD TO CAMP  
**DREWE – LOCATION 1**  
**Attribute:** LENNOX HEAD  
**Direction:** 5 - South bound A>B, North bound B>A. **Lane:** 0  
**Survey Duration:** 11:09 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017,  
**Zone:**  
**File:** 13125 0 2017-05-04 1402.EC0 (Plus )  
**Identifier:** K663GTVH MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

**Profile:**

**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017 (43.1608)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 10 - 160 km/h.  
**Direction:** North, East, South, West (bound), P = North  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 78525 / 78652 (99.84%)

## Daily Classes

**DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE, LENNOX HEAD , BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 20 March 2017**

|             | 1    | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|-------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon*</b> | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue*</b> | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed*</b> | 929  | 1   | 37  | 3   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 972   |
| (%)         | 95.6 | 0.1 | 3.8 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b>  | 1305 | 3   | 68  | 1   | 2   | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 1383  |
| (%)         | 94.4 | 0.2 | 4.9 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b>  | 1383 | 8   | 90  | 8   | 0   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 1491  |
| (%)         | 92.8 | 0.5 | 6.0 | 0.5 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b>  | 1567 | 4   | 70  | 2   | 3   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1647  |
| (%)         | 95.1 | 0.2 | 4.3 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b>  | 2390 | 10  | 72  | 1   | 2   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 2476  |
| (%)         | 96.5 | 0.4 | 2.9 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |      |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| <b>Entire week</b> |      |     |     |     |     |     |     |     |     |     |     |     |      |
|                    | 1661 | 5   | 74  | 2   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 1748 |
| (%)                | 95.0 | 0.3 | 4.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |
| <b>Weekdays</b>    |      |     |     |     |     |     |     |     |     |     |     |     |      |
|                    | 1344 | 5   | 79  | 4   | 0   | 2   | 1   | 0   | 0   | 0   | 0   | 0   | 1436 |
| (%)                | 93.6 | 0.3 | 5.5 | 0.3 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |
| <b>Weekend</b>     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|                    | 1978 | 6   | 71  | 1   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2061 |
| (%)                | 96.0 | 0.3 | 3.4 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

\* - Incomplete

**Daily Classes****DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD ,BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 27 March 2017**

|            | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>Total</u> |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|--------------|
| <b>Mon</b> | 1427     | 8        | 89       | 6        | 2        | 1        | 2        | 0        | 0        | 0         | 0         | 0         | 1535         |
| (%)        | 93.0     | 0.5      | 5.8      | 0.4      | 0.1      | 0.1      | 0.1      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Tue</b> | 1820     | 9        | 69       | 3        | 2        | 0        | 2        | 0        | 0        | 0         | 0         | 0         | 1905         |
| (%)        | 95.5     | 0.5      | 3.6      | 0.2      | 0.1      | 0.0      | 0.1      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Wed</b> | 1454     | 3        | 53       | 4        | 2        | 0        | 3        | 0        | 0        | 0         | 0         | 0         | 1519         |
| (%)        | 95.7     | 0.2      | 3.5      | 0.3      | 0.1      | 0.0      | 0.2      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Thu</b> | 569      | 4        | 65       | 3        | 4        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 645          |
| (%)        | 88.2     | 0.6      | 10.1     | 0.5      | 0.6      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Fri</b> | 915      | 1        | 35       | 2        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 953          |
| (%)        | 96.0     | 0.1      | 3.7      | 0.2      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sat</b> | 1247     | 4        | 26       | 1        | 1        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 1279         |
| (%)        | 97.5     | 0.3      | 2.0      | 0.1      | 0.1      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sun</b> | 1366     | 6        | 38       | 1        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 1411         |
| (%)        | 96.8     | 0.4      | 2.7      | 0.1      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1256 | 4   | 53  | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1320 |
| (%) | 95.2 | 0.3 | 4.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1236 | 5   | 61  | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1311 |
| (%) | 94.3 | 0.4 | 4.7 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1306 | 5   | 32  | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1344 |
| (%) | 97.2 | 0.4 | 2.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

\* - Incomplete

## Daily Classes

**DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD ,BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 3 April 2017**

|            | 1    | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 839  | 3   | 42  | 5   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 891   |
| (%)        | 94.2 | 0.3 | 4.7 | 0.6 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 1072 | 3   | 69  | 7   | 2   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 1154  |
| (%)        | 92.9 | 0.3 | 6.0 | 0.6 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 1067 | 4   | 68  | 6   | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1146  |
| (%)        | 93.1 | 0.3 | 5.9 | 0.5 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 1339 | 8   | 60  | 4   | 3   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1415  |
| (%)        | 94.6 | 0.6 | 4.2 | 0.3 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 1384 | 3   | 63  | 4   | 1   | 0   | 2   | 0   | 0   | 0   | 0   | 0   | 1457  |
| (%)        | 95.0 | 0.2 | 4.3 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 1950 | 4   | 75  | 4   | 2   | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 2039  |
| (%)        | 95.6 | 0.2 | 3.7 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 2580 | 5   | 97  | 3   | 3   | 2   | 1   | 1   | 0   | 0   | 0   | 0   | 2692  |
| (%)        | 95.8 | 0.2 | 3.6 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

**Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1461 | 3   | 67  | 4   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1541 |
| (%) | 94.8 | 0.2 | 4.3 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1139 | 3   | 60  | 4   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1212 |
| (%) | 94.0 | 0.2 | 5.0 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 2265 | 4   | 85  | 3   | 2   | 2   | 1   | 0   | 0   | 0   | 0   | 0   | 2365 |
| (%) | 95.8 | 0.2 | 3.6 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

\* - Incomplete

**Daily Classes****DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD ,BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Monday, 10 April 2017

|            | 1    | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 1893 | 12  | 89  | 6   | 4   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 2006  |
| (%)        | 94.4 | 0.6 | 4.4 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 1833 | 10  | 77  | 6   | 3   | 0   | 3   | 0   | 1   | 0   | 0   | 0   | 1933  |
| (%)        | 94.8 | 0.5 | 4.0 | 0.3 | 0.2 | 0.0 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 1514 | 11  | 75  | 2   | 4   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1607  |
| (%)        | 94.2 | 0.7 | 4.7 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 1641 | 15  | 90  | 2   | 4   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 1753  |
| (%)        | 93.6 | 0.9 | 5.1 | 0.1 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 2641 | 7   | 88  | 2   | 2   | 0   | 2   | 0   | 1   | 0   | 0   | 0   | 2743  |
| (%)        | 96.3 | 0.3 | 3.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 2818 | 3   | 107 | 2   | 4   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 2935  |
| (%)        | 96.0 | 0.1 | 3.6 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 3090 | 10  | 119 | 6   | 4   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 3230  |
| (%)        | 95.7 | 0.3 | 3.7 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 2203 | 9   | 91  | 3   | 3   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2314 |
| (%) | 95.2 | 0.4 | 3.9 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1904 | 11  | 83  | 3   | 3   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 2008 |
| (%) | 94.8 | 0.5 | 4.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 2953 | 6   | 112 | 4   | 3   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 3082 |
| (%) | 95.8 | 0.2 | 3.6 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

\* - Incomplete

## Daily Classes

**DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE, LENNOX HEAD , BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 17 April 2017**

|            | 1    | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 2886 | 6   | 105 | 2   | 2   | 0   | 3   | 1   | 0   | 0   | 0   | 0   | 3005  |
| (%)        | 96.0 | 0.2 | 3.5 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 2060 | 8   | 89  | 3   | 5   | 2   | 4   | 0   | 0   | 0   | 0   | 0   | 2171  |
| (%)        | 94.9 | 0.4 | 4.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 1872 | 1   | 83  | 3   | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1960  |
| (%)        | 95.5 | 0.1 | 4.2 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 1875 | 9   | 70  | 1   | 2   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1958  |
| (%)        | 95.8 | 0.5 | 3.6 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 1995 | 5   | 74  | 1   | 2   | 0   | 3   | 0   | 0   | 0   | 0   | 0   | 2080  |
| (%)        | 95.9 | 0.2 | 3.6 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 2641 | 6   | 89  | 7   | 1   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 2746  |
| (%)        | 96.2 | 0.2 | 3.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 2332 | 10  | 98  | 0   | 4   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2444  |
| (%)        | 95.4 | 0.4 | 4.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |      |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| <b>Entire week</b> |      |     |     |     |     |     |     |     |     |     |     |     |      |
|                    | 2237 | 6   | 86  | 1   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 2337 |
| (%)                | 95.7 | 0.3 | 3.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |
| <b>Weekdays</b>    |      |     |     |     |     |     |     |     |     |     |     |     |      |
|                    | 2137 | 5   | 84  | 1   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 2234 |
| (%)                | 95.7 | 0.2 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |
| <b>Weekend</b>     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|                    | 2486 | 8   | 93  | 3   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 2595 |
| (%)                | 95.8 | 0.3 | 3.6 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

\* - Incomplete

**Daily Classes****DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD ,BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Monday, 24 April 2017

|            | 1    | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 1738 | 6   | 73  | 6   | 2   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 1827  |
| (%)        | 95.1 | 0.3 | 4.0 | 0.3 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 2599 | 6   | 81  | 1   | 5   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 2693  |
| (%)        | 96.5 | 0.2 | 3.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 1031 | 1   | 66  | 9   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1109  |
| (%)        | 93.0 | 0.1 | 6.0 | 0.8 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 1507 | 7   | 80  | 4   | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 1602  |
| (%)        | 94.1 | 0.4 | 5.0 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 1056 | 6   | 82  | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1154  |
| (%)        | 91.5 | 0.5 | 7.1 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 1921 | 8   | 76  | 2   | 3   | 0   | 1   | 0   | 2   | 0   | 0   | 0   | 2013  |
| (%)        | 95.4 | 0.4 | 3.8 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 2303 | 8   | 92  | 2   | 0   | 1   | 2   | 0   | 0   | 0   | 0   | 0   | 2408  |
| (%)        | 95.6 | 0.3 | 3.8 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1736 | 5   | 77  | 4   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1829 |
| (%) | 94.9 | 0.3 | 4.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1586 | 4   | 76  | 6   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1676 |
| (%) | 94.6 | 0.2 | 4.5 | 0.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 2111 | 8   | 83  | 1   | 1   | 0   | 1   | 0   | 1   | 0   | 0   | 0   | 2210 |
| (%) | 95.5 | 0.4 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

\* - Incomplete

## Daily Classes

**DailyClass-535**

**Site:** 13125.0.1SN  
**Description:** PACIFIC PARADE, LENNOX HEAD , BETWEEN ROSS ST & RD TO CAMP DREWE  
**Filter time:** 11:10 Wednesday, 22 March 2017 => 15:01 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 1 May 2017**

|             | 1    | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|-------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b>  | 1540 | 7   | 70  | 4   | 2   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1624  |
| (%)         | 94.8 | 0.4 | 4.3 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b>  | 1584 | 4   | 89  | 3   | 3   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1684  |
| (%)         | 94.1 | 0.2 | 5.3 | 0.2 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b>  | 1180 | 3   | 52  | 7   | 1   | 1   | 3   | 0   | 0   | 0   | 0   | 0   | 1247  |
| (%)         | 94.6 | 0.2 | 4.2 | 0.6 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu*</b> | 532  | 5   | 42  | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 583   |
| (%)         | 91.3 | 0.9 | 7.2 | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri*</b> | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat*</b> | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun*</b> | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

**Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1434 | 4   | 69  | 4   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1518 |
| (%) | 94.5 | 0.3 | 4.5 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |      |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
|     | 1434 | 4   | 69  | 4   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 1518 |
| (%) | 94.5 | 0.3 | 4.5 | 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |      |

**Weekend** No complete days.

**\* - Incomplete**



## MetroCount Traffic Executive Daily Classes

### DailyClass-539 -- English (ENA)

#### Datasets:

**Site:** [14835] PACIFIC PARADE, LENNOX HEAD. BETWEEN DOG EXERCISE AREA AND ENT.TO DEPT SPORT & REC – LOCATION 2  
**Attribute:** LENNOX HEAD  
**Direction:** 5 - South bound A>B, North bound B>A. **Lane:** 0  
**Survey Duration:** 9:19 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017,  
**Zone:**  
**File:** 14835 0 2017-05-04 1448.EC0 (Plus )  
**Identifier:** JH84XH90 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017 (44.2695)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 10 - 160 km/h.  
**Direction:** North, East, South, West (bound), P = North  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 11548 / 12948 (89.19%)

## Daily Classes

**DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD.BETWEEN DOG EXERCISE AREA AND ENT.TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 20 March 2017**

|             | 1    | 2   | 3   | 4    | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|-------------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon*</b> | 0    | 0   | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue*</b> | 139  | 0   | 0   | 5    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 144   |
| (%)         | 96.5 | 0.0 | 0.0 | 3.5  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b>  | 140  | 0   | 14  | 9    | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 164   |
| (%)         | 85.4 | 0.0 | 8.5 | 5.5  | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b>  | 212  | 0   | 12  | 12   | 3   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 239   |
| (%)         | 88.7 | 0.0 | 5.0 | 5.0  | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b>  | 155  | 0   | 15  | 7    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 177   |
| (%)         | 87.6 | 0.0 | 8.5 | 4.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b>  | 84   | 0   | 4   | 16   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 104   |
| (%)         | 80.8 | 0.0 | 3.8 | 15.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b>  | 165  | 0   | 4   | 12   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 181   |
| (%)         | 91.2 | 0.0 | 2.2 | 6.6  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> | 150  | 0   | 9   | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 172 |
| (%)                | 87.2 | 0.0 | 5.2 | 5.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    | 169  | 0   | 13  | 8   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 193 |
| (%)                | 87.6 | 0.0 | 6.7 | 4.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     | 124  | 0   | 3   | 14  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 142 |
| (%)                | 87.3 | 0.0 | 2.1 | 9.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

**Daily Classes****DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD.BETWEEN DOG EXERCISE AREA AND ENT.TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 27 March 2017**

|            | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> | <b>6</b> | <b>7</b> | <b>8</b> | <b>9</b> | <b>10</b> | <b>11</b> | <b>12</b> | <b>Total</b> |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|--------------|
| <b>Mon</b> | 139      | 0        | 10       | 9        | 2        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 160          |
| (%)        | 86.9     | 0.0      | 6.3      | 5.6      | 1.3      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Tue</b> | 236      | 1        | 16       | 7        | 2        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 262          |
| (%)        | 90.1     | 0.4      | 6.1      | 2.7      | 0.8      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Wed</b> | 145      | 0        | 9        | 9        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 163          |
| (%)        | 89.0     | 0.0      | 5.5      | 5.5      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Thu</b> | 121      | 0        | 19       | 8        | 2        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 150          |
| (%)        | 80.7     | 0.0      | 12.7     | 5.3      | 1.3      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Fri</b> | 100      | 0        | 14       | 4        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 118          |
| (%)        | 84.7     | 0.0      | 11.9     | 3.4      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sat</b> | 100      | 0        | 4        | 6        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 110          |
| (%)        | 90.9     | 0.0      | 3.6      | 5.5      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sun</b> | 138      | 0        | 6        | 3        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 147          |
| (%)        | 93.9     | 0.0      | 4.1      | 2.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> | 139  | 0   | 10  | 6   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 157 |
| (%)                | 88.5 | 0.0 | 6.4 | 3.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    | 148  | 0   | 13  | 6   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 170 |
| (%)                | 87.1 | 0.0 | 7.6 | 3.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     | 118  | 0   | 5   | 4   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 128 |
| (%)                | 92.2 | 0.0 | 3.9 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

## Daily Classes

**DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD.BETWEEN DOG EXERCISE AREA AND ENT.TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 3 April 2017**

|            | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 130  | 0   | 19   | 13  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 162   |
| (%)        | 80.2 | 0.0 | 11.7 | 8.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 185  | 0   | 27   | 10  | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 224   |
| (%)        | 82.6 | 0.0 | 12.1 | 4.5 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 225  | 3   | 35   | 12  | 0   | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 276   |
| (%)        | 81.5 | 1.1 | 12.7 | 4.3 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 178  | 2   | 11   | 13  | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 206   |
| (%)        | 86.4 | 1.0 | 5.3  | 6.3 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 148  | 0   | 17   | 11  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 176   |
| (%)        | 84.1 | 0.0 | 9.7  | 6.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 138  | 0   | 2    | 6   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 146   |
| (%)        | 94.5 | 0.0 | 1.4  | 4.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 155  | 0   | 8    | 14  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 177   |
| (%)        | 87.6 | 0.0 | 4.5  | 7.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |      |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> | 164  | 0   | 17   | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 194 |
| (%)                | 84.5 | 0.0 | 8.8  | 5.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    | 172  | 0   | 21   | 11  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 208 |
| (%)                | 82.7 | 0.0 | 10.1 | 5.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     | 146  | 0   | 5    | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 161 |
| (%)                | 90.7 | 0.0 | 3.1  | 6.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

**Daily Classes****DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD.BETWEEN DOG EXERCISE AREA AND ENT.TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Monday, 10 April 2017

|            | 1    | 2   | 3    | 4    | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 147  | 1   | 17   | 3    | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 170   |
| (%)        | 86.5 | 0.6 | 10.0 | 1.8  | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 247  | 1   | 17   | 6    | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 273   |
| (%)        | 90.5 | 0.4 | 6.2  | 2.2  | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 168  | 0   | 18   | 7    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 193   |
| (%)        | 87.0 | 0.0 | 9.3  | 3.6  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 275  | 0   | 28   | 11   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 316   |
| (%)        | 87.0 | 0.0 | 8.9  | 3.5  | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 173  | 0   | 14   | 9    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 196   |
| (%)        | 88.3 | 0.0 | 7.1  | 4.6  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 178  | 1   | 9    | 21   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 210   |
| (%)        | 84.8 | 0.5 | 4.3  | 10.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 201  | 0   | 9    | 20   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 231   |
| (%)        | 87.0 | 0.0 | 3.9  | 8.7  | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 198  | 0   | 15  | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 226 |
| (%) | 87.6 | 0.0 | 6.6 | 4.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 201  | 0   | 18  | 6   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 229 |
| (%) | 87.8 | 0.0 | 7.9 | 2.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 189  | 0   | 9   | 20  | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 220 |
| (%) | 85.9 | 0.0 | 4.1 | 9.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

## Daily Classes

**DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD.BETWEEN DOG EXERCISE AREA AND ENT.TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 17 April 2017**

|            | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>Total</u> |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|--------------|
| <b>Mon</b> | 224      | 0        | 10       | 6        | 3        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 243          |
| (%)        | 92.2     | 0.0      | 4.1      | 2.5      | 1.2      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Tue</b> | 659      | 1        | 31       | 7        | 2        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 700          |
| (%)        | 94.1     | 0.1      | 4.4      | 1.0      | 0.3      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Wed</b> | 578      | 0        | 30       | 9        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 617          |
| (%)        | 93.7     | 0.0      | 4.9      | 1.5      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Thu</b> | 660      | 0        | 32       | 11       | 1        | 0        | 1        | 0        | 0        | 0         | 0         | 0         | 705          |
| (%)        | 93.6     | 0.0      | 4.5      | 1.6      | 0.1      | 0.0      | 0.1      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Fri</b> | 636      | 2        | 24       | 6        | 0        | 0        | 1        | 0        | 0        | 0         | 0         | 0         | 669          |
| (%)        | 95.1     | 0.3      | 3.6      | 0.9      | 0.0      | 0.0      | 0.1      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sat</b> | 631      | 2        | 27       | 10       | 0        | 1        | 0        | 0        | 0        | 0         | 0         | 0         | 671          |
| (%)        | 94.0     | 0.3      | 4.0      | 1.5      | 0.0      | 0.1      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sun</b> | 195      | 0        | 14       | 8        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 217          |
| (%)        | 89.9     | 0.0      | 6.5      | 3.7      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> |      |     |     |     |     |     |     |     |     |     |     |     |     |
|                    | 511  | 0   | 23  | 8   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 546 |
| (%)                | 93.6 | 0.0 | 4.2 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|                    | 550  | 0   | 24  | 7   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 586 |
| (%)                | 93.9 | 0.0 | 4.1 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|                    | 413  | 1   | 20  | 9   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 444 |
| (%)                | 93.0 | 0.2 | 4.5 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

**Daily Classes****DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE,LENNOX HEAD.BETWEEN DOG EXERCISE AREA AND ENT.TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Monday, 24 April 2017

|            | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 167  | 0   | 15   | 8   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 192   |
| (%)        | 87.0 | 0.0 | 7.8  | 4.2 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 249  | 0   | 14   | 5   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 270   |
| (%)        | 92.2 | 0.0 | 5.2  | 1.9 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 157  | 0   | 25   | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 192   |
| (%)        | 81.8 | 0.0 | 13.0 | 5.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 290  | 2   | 18   | 8   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 320   |
| (%)        | 90.6 | 0.6 | 5.6  | 2.5 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 213  | 0   | 27   | 12  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 252   |
| (%)        | 84.5 | 0.0 | 10.7 | 4.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 237  | 0   | 9    | 5   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 252   |
| (%)        | 94.0 | 0.0 | 3.6  | 2.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 283  | 0   | 12   | 15  | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 311   |
| (%)        | 91.0 | 0.0 | 3.9  | 4.8 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> | 227  | 0   | 17  | 8   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 255 |
| (%)                | 89.0 | 0.0 | 6.7 | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    | 214  | 0   | 19  | 8   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 245 |
| (%)                | 87.3 | 0.0 | 7.8 | 3.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     | 259  | 0   | 10  | 9   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 281 |
| (%)                | 92.2 | 0.0 | 3.6 | 3.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

## Daily Classes

**DailyClass-539**

**Site:** 14835.0.1SN  
**Description:** PACIFIC PARADE, LENNOX HEAD. BETWEEN DOG EXERCISE AREA AND ENT. TO  
**DEPT SPORT & REC**  
**Filter time:** 9:20 Tuesday, 21 March 2017 => 15:48 Thursday, 4 May 2017  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 1 May 2017**

|             | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|-------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b>  | 230  | 0   | 12   | 10  | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 254   |
| (%)         | 90.6 | 0.0 | 4.7  | 3.9 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b>  | 246  | 0   | 22   | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 272   |
| (%)         | 90.4 | 0.0 | 8.1  | 0.7 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b>  | 145  | 0   | 11   | 8   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 165   |
| (%)         | 87.9 | 0.0 | 6.7  | 4.8 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu*</b> | 134  | 0   | 29   | 6   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 171   |
| (%)         | 78.4 | 0.0 | 17.0 | 3.5 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri*</b> | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat*</b> | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun*</b> | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> | 206  | 0   | 14  | 6   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 230 |
| (%)                | 89.6 | 0.0 | 6.1 | 2.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    | 206  | 0   | 14  | 6   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 230 |
| (%)                | 89.6 | 0.0 | 6.1 | 2.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekend** No complete days.

**\* - Incomplete**



## MetroCount Traffic Executive Daily Classes

### DailyClass-540 -- English (ENA)

#### Datasets:

**Site:** [14945] CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK –  
**LOCATION 3**  
**Attribute:** LENNOX HEAD  
**Direction:** 5 - South bound A>B, North bound B>A. **Lane:** 0  
**Survey Duration:** 10:08 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017,  
**Zone:**  
**File:** 14945 0 2017-05-04 1515.EC0 (Plus )  
**Identifier:** K087S0Q5 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default axle (v4.06)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

#### Profile:

**Filter time:** 10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017 (44.2526)  
**Included classes:** 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
**Speed range:** 10 - 160 km/h.  
**Direction:** North, East, South, West (bound), P = North  
**Separation:** Headway > 0 sec, Span 0 - 100 metre  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94)  
**Units:** Metric (metre, kilometre, m/s, km/h, kg, tonne)  
**In profile:** Vehicles = 9232 / 9260 (99.70%)

## Daily Classes

**DailyClass-540**

**Site:** 14945.0.1SN  
**Description:** **CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK**  
**Filter time:** **10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017**  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 20 March 2017**

|             | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|-------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon*</b> | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0  | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue*</b> | 96   | 4   | 7    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 107   |
| (%)         | 89.7 | 3.7 | 6.5  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b>  | 125  | 0   | 24   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 150   |
| (%)         | 83.3 | 0.0 | 16.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b>  | 107  | 2   | 10   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 121   |
| (%)         | 88.4 | 1.7 | 8.3  | 0.8 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b>  | 139  | 1   | 10   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 150   |
| (%)         | 92.7 | 0.7 | 6.7  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b>  | 226  | 2   | 10   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 239   |
| (%)         | 94.6 | 0.8 | 4.2  | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b>  | 241  | 2   | 14   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 258   |
| (%)         | 93.4 | 0.8 | 5.4  | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |      |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> |      |     |      |     |     |     |     |     |     |     |     |     |     |
|                    | 166  | 0   | 13   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 182 |
| (%)                | 91.2 | 0.0 | 7.1  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    |      |     |      |     |     |     |     |     |     |     |     |     |     |
|                    | 123  | 0   | 14   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 140 |
| (%)                | 87.9 | 0.0 | 10.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     |      |     |      |     |     |     |     |     |     |     |     |     |     |
|                    | 233  | 2   | 11   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 248 |
| (%)                | 94.0 | 0.8 | 4.4  | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

**Daily Classes****DailyClass-540****Site:**

14945.0.1SN

**Description:****CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK****Filter time:****10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017****Scheme:**

Vehicle classification (AustRoads94)

**Filter:**

Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(&gt;0) Span(0 - 100)

**Monday, 27 March 2017**

|            | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>Total</u> |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|--------------|
| <b>Mon</b> | 163      | 3        | 26       | 2        | 0        | 1        | 0        | 0        | 0        | 0         | 0         | 0         | 195          |
| (%)        | 83.6     | 1.5      | 13.3     | 1.0      | 0.0      | 0.5      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Tue</b> | 200      | 2        | 11       | 0        | 0        | 1        | 0        | 0        | 0        | 0         | 0         | 0         | 214          |
| (%)        | 93.5     | 0.9      | 5.1      | 0.0      | 0.0      | 0.5      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Wed</b> | 174      | 4        | 15       | 0        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 193          |
| (%)        | 90.2     | 2.1      | 7.8      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Thu</b> | 47       | 1        | 5        | 1        | 1        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 55           |
| (%)        | 85.5     | 1.8      | 9.1      | 1.8      | 1.8      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Fri</b> | 57       | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 57           |
| (%)        | 100.0    | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sat</b> | 138      | 0        | 10       | 1        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 149          |
| (%)        | 92.6     | 0.0      | 6.7      | 0.7      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sun</b> | 152      | 0        | 9        | 0        | 1        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 162          |
| (%)        | 93.8     | 0.0      | 5.6      | 0.0      | 0.6      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 132  | 0   | 10  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 145 |
| (%) | 91.0 | 0.0 | 6.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 127  | 2   | 11  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 142 |
| (%) | 89.4 | 1.4 | 7.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 144  | 0   | 9   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 155 |
| (%) | 92.9 | 0.0 | 5.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**\* - Incomplete**

## Daily Classes

**DailyClass-540**

**Site:** 14945.0.1SN  
**Description:** **CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK**  
**Filter time:** **10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017**  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 3 April 2017**

|            | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 77   | 2   | 11   | 2   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 93    |
| (%)        | 82.8 | 2.2 | 11.8 | 2.2 | 1.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 121  | 2   | 5    | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 132   |
| (%)        | 91.7 | 1.5 | 3.8  | 1.5 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 89   | 0   | 6    | 1   | 0   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 98    |
| (%)        | 90.8 | 0.0 | 6.1  | 1.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 152  | 2   | 7    | 0   | 0   | 2   | 1   | 0   | 0   | 0   | 0   | 0   | 164   |
| (%)        | 92.7 | 1.2 | 4.3  | 0.0 | 0.0 | 1.2 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 162  | 2   | 10   | 3   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 177   |
| (%)        | 91.5 | 1.1 | 5.6  | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 205  | 3   | 12   | 3   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 223   |
| (%)        | 91.9 | 1.3 | 5.4  | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 282  | 1   | 17   | 0   | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 301   |
| (%)        | 93.7 | 0.3 | 5.6  | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> | 155  | 1   | 9   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 168 |
| (%)                | 92.3 | 0.6 | 5.4 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    | 119  | 1   | 7   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 132 |
| (%)                | 90.2 | 0.8 | 5.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     | 243  | 2   | 14  | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 261 |
| (%)                | 93.1 | 0.8 | 5.4 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

**Daily Classes****DailyClass-540**

**Site:** 14945.0.1SN  
**Description:** **CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK**  
**Filter time:** **10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017**  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

Monday, 10 April 2017

|            | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 213  | 3   | 22   | 2   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 242   |
| (%)        | 88.0 | 1.2 | 9.1  | 0.8 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 191  | 4   | 14   | 4   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 215   |
| (%)        | 88.8 | 1.9 | 6.5  | 1.9 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 143  | 0   | 14   | 1   | 0   | 0   | 4   | 0   | 0   | 0   | 0   | 0   | 162   |
| (%)        | 88.3 | 0.0 | 8.6  | 0.6 | 0.0 | 0.0 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 188  | 2   | 23   | 2   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 217   |
| (%)        | 86.6 | 0.9 | 10.6 | 0.9 | 0.5 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 356  | 0   | 22   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 379   |
| (%)        | 93.9 | 0.0 | 5.8  | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 359  | 2   | 18   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 379   |
| (%)        | 94.7 | 0.5 | 4.7  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 416  | 3   | 40   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 461   |
| (%)        | 90.2 | 0.7 | 8.7  | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 266  | 1   | 21  | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 293 |
| (%) | 90.8 | 0.3 | 7.2 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 218  | 1   | 19  | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 242 |
| (%) | 90.1 | 0.4 | 7.9 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 387  | 2   | 28  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 419 |
| (%) | 92.4 | 0.5 | 6.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

## Daily Classes

**DailyClass-540**

**Site:** 14945.0.1SN  
**Description:** **CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK**  
**Filter time:** **10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017**  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 17 April 2017**

|            | 1    | 2   | 3    | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|------------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b> | 264  | 6   | 28   | 0   | 2   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 301   |
| (%)        | 87.7 | 2.0 | 9.3  | 0.0 | 0.7 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b> | 147  | 0   | 20   | 0   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 169   |
| (%)        | 87.0 | 0.0 | 11.8 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b> | 107  | 2   | 11   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 120   |
| (%)        | 89.2 | 1.7 | 9.2  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu</b> | 147  | 0   | 18   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 166   |
| (%)        | 88.6 | 0.0 | 10.8 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri</b> | 272  | 1   | 16   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 289   |
| (%)        | 94.1 | 0.3 | 5.5  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat</b> | 416  | 0   | 30   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 446   |
| (%)        | 93.3 | 0.0 | 6.7  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun</b> | 323  | 4   | 19   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 346   |
| (%)        | 93.4 | 1.2 | 5.5  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

|                    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|--------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <b>Entire week</b> |      |     |     |     |     |     |     |     |     |     |     |     |     |
|                    | 238  | 1   | 19  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 261 |
| (%)                | 91.2 | 0.4 | 7.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b>    |      |     |     |     |     |     |     |     |     |     |     |     |     |
|                    | 187  | 1   | 18  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 208 |
| (%)                | 89.9 | 0.5 | 8.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekend</b>     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|                    | 369  | 2   | 24  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 396 |
| (%)                | 93.2 | 0.5 | 6.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

\* - Incomplete

**Daily Classes****DailyClass-540****Site:**

14945.0.1SN

**Description:****CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK****Filter time:****10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017****Scheme:**

Vehicle classification (AustRoads94)

**Filter:**

Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(&gt;0) Span(0 - 100)

**Monday, 24 April 2017**

|            | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>Total</u> |
|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|--------------|
| <b>Mon</b> | 228      | 5        | 10       | 1        | 1        | 1        | 0        | 0        | 0        | 0         | 0         | 0         | 246          |
| (%)        | 92.7     | 2.0      | 4.1      | 0.4      | 0.4      | 0.4      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Tue</b> | 363      | 1        | 19       | 0        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 383          |
| (%)        | 94.8     | 0.3      | 5.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Wed</b> | 75       | 0        | 9        | 0        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 84           |
| (%)        | 89.3     | 0.0      | 10.7     | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Thu</b> | 116      | 2        | 10       | 0        | 0        | 2        | 0        | 0        | 0        | 0         | 0         | 0         | 130          |
| (%)        | 89.2     | 1.5      | 7.7      | 0.0      | 0.0      | 1.5      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Fri</b> | 123      | 0        | 17       | 0        | 0        | 1        | 1        | 0        | 0        | 0         | 0         | 0         | 142          |
| (%)        | 86.6     | 0.0      | 12.0     | 0.0      | 0.0      | 0.7      | 0.7      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sat</b> | 253      | 0        | 13       | 0        | 0        | 0        | 2        | 0        | 0        | 0         | 0         | 0         | 268          |
| (%)        | 94.4     | 0.0      | 4.9      | 0.0      | 0.0      | 0.0      | 0.7      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |
| <b>Sun</b> | 322      | 2        | 18       | 1        | 0        | 0        | 0        | 0        | 0        | 0         | 0         | 0         | 343          |
| (%)        | 93.9     | 0.6      | 5.2      | 0.3      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0      | 0.0       | 0.0       | 0.0       |              |

**Average daily volume****Entire week**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 210  | 0   | 13  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 227 |
| (%) | 92.5 | 0.0 | 5.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekdays**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 181  | 1   | 12  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 196 |
| (%) | 92.3 | 0.5 | 6.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekend**

|     |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|     | 287  | 0   | 15  | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 305 |
| (%) | 94.1 | 0.0 | 4.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**\* - Incomplete**

## Daily Classes

**DailyClass-540**

**Site:** 14945.0.1SN  
**Description:** **CAMP DREWE ROAD,NORTHERN BOUNDARY OF CARAVAN PARK**  
**Filter time:** **10:09 Tuesday, 21 March 2017 => 16:12 Thursday, 4 May 2017**  
**Scheme:** Vehicle classification (AustRoads94)  
**Filter:** Cls(1 2 3 4 5 6 7 8 9 10 11 12 ) Dir(NESW) Sp(10,160) Headway(>0) Span(0 - 100)

**Monday, 1 May 2017**

|             | 1     | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | Total |
|-------------|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| <b>Mon</b>  | 188   | 0   | 12  | 0   | 2   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 202   |
| (%)         | 93.1  | 0.0 | 5.9 | 0.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Tue</b>  | 119   | 0   | 10  | 1   | 2   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 133   |
| (%)         | 89.5  | 0.0 | 7.5 | 0.8 | 1.5 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Wed</b>  | 116   | 2   | 7   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 125   |
| (%)         | 92.8  | 1.6 | 5.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Thu*</b> | 46    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 46    |
| (%)         | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Fri*</b> | 0     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sat*</b> | 0     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |
| <b>Sun*</b> | 0     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0     |
| (%)         | 0.0   | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |       |

**Average daily volume**

**Entire week**

|                 |      |     |     |     |     |     |     |     |     |     |     |     |     |
|-----------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                 | 141  | 0   | 9   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 153 |
| (%)             | 92.2 | 0.0 | 5.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |
| <b>Weekdays</b> | 141  | 0   | 9   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 153 |
| (%)             | 92.2 | 0.0 | 5.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |     |

**Weekend** No complete days.

**\* - Incomplete**




# Appendix C

## MUSIC Model Parameters

### Rainfall Data

|                     |                          |
|---------------------|--------------------------|
| Catchment Name      | Lake Ainsworth Carpark   |
| Rainfall Station    | 58131 ALSTONVILLE        |
| ET Station          | User-defined monthly PET |
| Start Date          | 1/1/1996 12:00 AM        |
| End Date            | 12/31/2006 11:54 PM      |
| Modelling Time Step | 6 Minutes                |

 Close

### Rainfall- Runoff Parameters for Sand

|                                       |        |
|---------------------------------------|--------|
| <b>Impervious Area Properties</b>     |        |
| Rainfall Threshold (mm/day)           | 1.50   |
| <b>Pervious Area Properties</b>       |        |
| Soil Storage Capacity (mm)            | 170.00 |
| Initial Storage (% of Capacity)       | 30     |
| Field Capacity (mm)                   | 70.00  |
| Infiltration Capacity Coefficient - a | 360.00 |
| Infiltration Capacity Exponent - b    | 0.50   |
| <b>Groundwater Properties</b>         |        |
| Initial Depth (mm)                    | 10.00  |
| Daily Recharge Rate (%)               | 100.00 |
| Daily Baseflow Rate (%)               | 50.00  |
| Daily Deep Seepage Rate (%)           | 0.00   |



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**DAC Planning Pty Ltd**

A.C.N. 093 157 165

Town Planning & Development Consultants

# BLACKWOOD ECOLOGICAL SERVICES



## Ecological Assessment Proposed Lake Ainsworth Foreshore Improvement Works

A Report to Ballina Shire Council  
November 2017



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**Document Verification**

|                    |   |                           |              |
|--------------------|---|---------------------------|--------------|
| Project Title:     | Lake Ainsworth Foreshore Improvement Works – Flora and Fauna Assessment |                           |              |
| Project Number:    | 1723  |                           |              |
| Project File Name: | Lake Ainsworth Foreshore Improvement F&F_draft.docx                     |                           |              |
| Revision           | Date  | Prepared by:              | Reviewed by: |
| Draft              | 30/10/17  | Kelly Simpson & Mark Free | Mark Free    |
| Final              | 2/11/17   |                           |              |

A handwritten signature in black ink, appearing to be 'Mark Free', is written over the signature line of the table.

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# 1 INTRODUCTION

## 1.1 Background

Blackwood Ecological Services have been engaged by Ballina Shire Council (BSC) to complete a Flora and Fauna Assessment for proposed foreshore improvement works at Lake Ainsworth, Pacific Parade, Lennox Head, NSW. The Flora and Fauna Assessment report is to be assessed under Part V of the Environmental Planning and Assessment Act 1979 (the EP&A Act).

BSC received a Part V approval under the EP&A Act in November 2016 for part of the works (the approval did not include works associated with the Southern Road and Foreshore Area). Environmental assessments completed as part of this Part V approval, including a Review of Environmental Factors (REF), were reviewed as part of this assessment. Given the high public profile of the site and degree of public interest, Council have decided to complete further assessment in order to address concerns raised by the community.

The works are on Crown Land for which the Council is the trust manager. The area is also subject to the Lake Ainsworth Management Plan (2002).

## 1.2 Subject site

The Subject site refers to the area directly affected by the proposal. The Subject site for this study consists of:

- the eastern road (west of fenced dune vegetation) area up to the Sport and Recreation Facility entrance.
- the intersection of Pacific Parade, eastern road and southern road.
- Camp Drewe Road as far as the beach access point north of the lake.
- foreshore areas of Lake Ainsworth where stabilisation/restoration works and the boardwalk are proposed.

FIGURE 1 shows the location of the Subject site.

## 1.3 Study area

The Study area refers to the Subject site together with any additional areas which are likely to be affected by the proposal, either directly or indirectly. The Study area includes surrounding areas of vegetation, dunes, parkland and Lake Ainsworth itself.

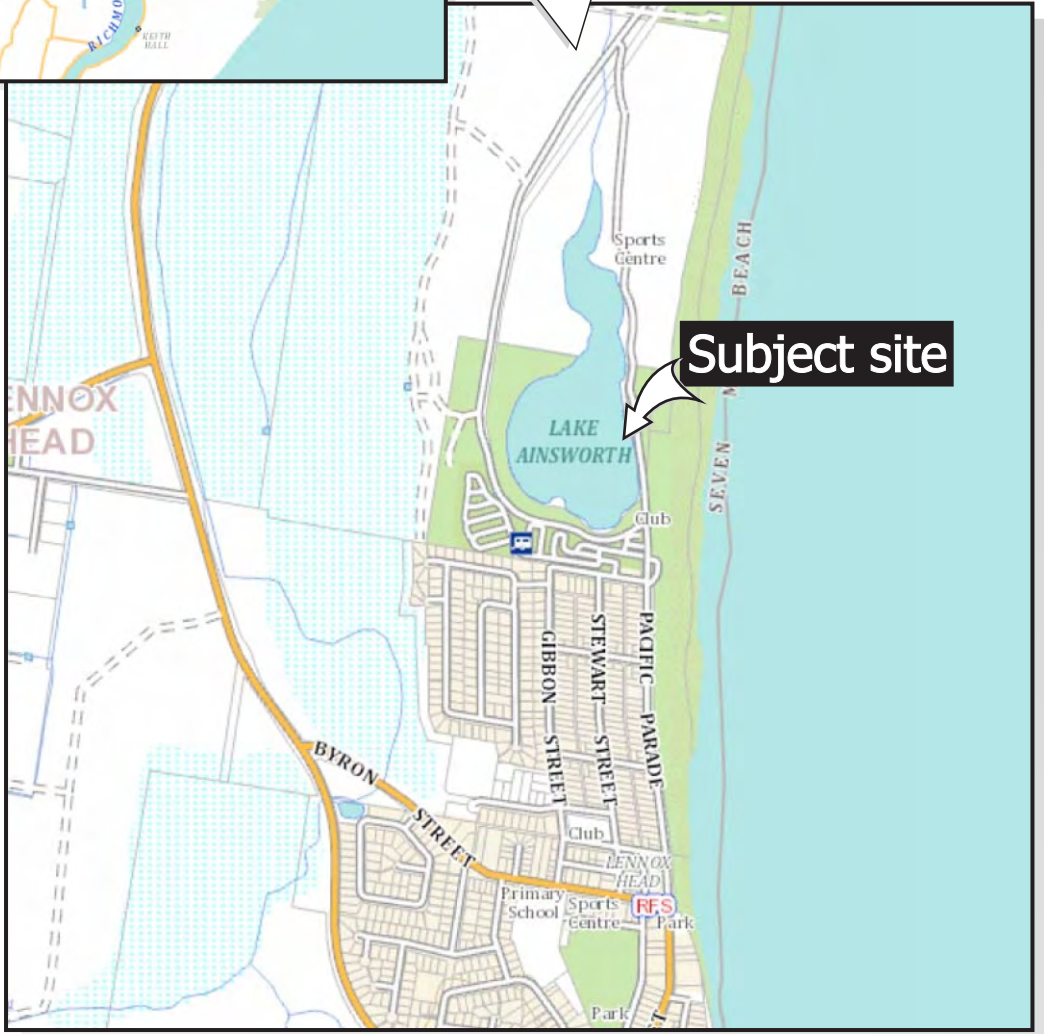
## 1.4 Proposed development

The proposed works involve improvements along the eastern and-south eastern foreshore of Lake Ainsworth and adjacent recreational spaces. The proposed works are described in detail below:

### Eastern Road Rehabilitation

The eastern road rehabilitation involves profiling the existing road pavement and removing concrete footpaths and kerb and gutter. The Eastern Road is currently a bitumen seal roadway approximately 7-8m wide with a turn head approximately 300m north of the surf club building. The roadway will be closed to public vehicles and the road way will be replaced with a 3.0m wide concrete footpath which will provide a wearing surface for pedestrians and emergency vehicles. The surrounding landscaping of the eastern road rehabilitation will be an extension of the existing passive recreational area comprising of seating, turfed areas, tree planting and embellishment of existing riparian vegetation. Disturbance will be restricted to a footprint contained within the limits of existing clearings which are currently grass, bitumen or hardstand surfaces. The works extend to the north gate of the Sport and Recreation Centre, east to the shoreline of Lake Ainsworth,







west to the existing dune vegetation delineated by timber fence lines and south to the intersection between Pacific Parade and the southern road.

### **Intersection**

The intersection works involve profiling the existing road pavement and removing concrete footpaths and kerb and gutter. Pedestrian crossing points are incorporated into the intersection design.

It should be noted that the intersection works are described above to provide context of the road closure works, however are permissible works, without development consent, under the State Environmental Planning Policy (Infrastructure SEPP) 2007.

### **Bank Stabilisation**

Sections of the Lake Ainsworth shore have experienced degradation and eroded banks predominantly from foot traffic of people using the Lake for recreational purposes. The proposed works include undertaking measures to manage foot traffic accessing the lake and protect the banks against ongoing erosion. The access points along the eastern shore are proposed to be stabilised with log revetment (or equivalent depending on availability of natural timber) which will form a natural hard edge to retain the bank where vegetation cannot be used to stabilise the banks. The log revetment will be backfilled with clean sand where banks have retreated by erosion to reinstate the original alignment of the banks. This treatment will need to periodically pull sand that retreats into the lake back up to the toe of the log revetment by mechanical excavation.

### **Southern Road and Foreshore Area**

These works involve reconstruction of the existing road way and formalising the adjoining car parking bays between Pacific Parade and Camp Drewe Road. These works are located along the overbank area of public reserve along the southern shore of Lake Ainsworth and include bank stabilisation, improvement of the open spaces for passive recreation and potential pedestrian linkages between existing isolated open spaces.

### **Boardwalk**

Three short sections of boardwalk are proposed to be located within clumps of lakeside paperbark forest on the southern bank of the lake. The purpose is to allow for pedestrian access round the southern bank without requiring visitors to use the roadway. Boardwalks are to be located so as to avoid loss of established paperbark trees and will be constructed of composite mesh to minimise impacts on groundcover and aquatic vegetation.

Detailed plans of the foreshore works are provided in **APPENDIX A**.

## **1.5 Literature review**

The following reports and plans were reviewed as part of this assessment.

### ***1.5.1 Lennox Head (Coastal) Vegetation Management Plan (Blackwood Ecological Services 2017)***

This vegetation management plan covers coastal areas of vegetation from Sharpes Creek in the south to the Ballina/Byron council boundary in the north. The plan has been completed to consolidate several previous management plans undertaken by Envite and provide an updated description of site vegetation and weed distribution to account for the significant restoration works which have been undertaken. The plan provides detailed mapping of vegetation communities and

endangered ecological communities across the project site. Vegetation management recommendations outlined for the Lake Ainsworth area have been taken into consideration as part of this assessment and mitigation measures detailed in this report are consistent with these recommendations.

### ***1.5.2 Lake Ainsworth Vegetation Management Plan (Envite and WetlandCare Australia 2007)***

This VMP covers the area around Lake Ainsworth and is bound to the west by a fire-trail amongst the extensive heathland, dune vegetation to the east, the Sport and Recreation Camp to the north and the Caravan Park to the south. The plan outlines a series of guidelines relating to the protection and enhancement of both terrestrial and aquatic vegetation within this area. The western side of Lake Ainsworth is noted to be in good condition with minimal weed presence, while other areas around the lake are subject to extensive recreational usage which has resulted in heavily modified vegetation. Management of the aquatic vegetation within the lake is addressed including the mechanical removal of Yellow waterlily and Salvinia as well as the planting of several semi-aquatic species in shallow areas (<1.5m) around the western side of the lake.

### ***1.5.3 Lake Ainsworth Management Plan (Geolink & BSC 2002)***

This plan provides a framework for the effective management of Lake Ainsworth with the overall objective of achieving an integrated, balanced, responsible and ecologically sustainable use of the area in the future. The plan identifies a number of key issues and management actions in relation to ecology which are of relevance to this assessment including:

- rehabilitate coastal dunes to provide a buffer for the lake;
- control the spread of water primrose and other aquatic weeds;
- rehabilitate and restore areas infested with terrestrial weeds;
- target introduced fauna species for the eradication;
- enhance current riparian flora management strategies and ensure revegetation works utilise species that are tolerant to infrequent but potentially prolonged periods of inundation; and
- continue aeration practices to reduce incidence of algal blooms and investigate other strategies to improve water quality such as sediment capping, biomanipulation, sediment removal etc.

The proposed foreshore improvement works will further address a number of additional management actions identified in the plan which relate to water quality, traffic management, erosion and sediment management and recreation:

- installation of grassed filter swales to treat runoff from road/parking areas;
- reduce traffic numbers along the eastern road and foreshore erosion associated with carparking;
- improve safety of visitors to the lake (including addressing conflict with pedestrians and traffic, frequent crossing of eastern road from picnic facilities/parking areas to lake foreshore);
- provide designated pedestrian access paths and walking tracks, reduce erosion in vegetated areas;
- upgrade existing BBQ and picnic facilities;
- enhance riparian vegetation to reduce erosion and sedimentation; and
- reduce runoff from sealed roads.

## 2 FLORA

### 2.1 Introduction

This section discusses the methods used in the vegetation assessment and presents the results of the assessment. Relevant databases and reports were reviewed to identify records of locally occurring Threatened and Rare plant species, populations and communities. Surveys of site vegetation were undertaken on the 2<sup>nd</sup> May and 9<sup>th</sup> of August 2017.

The objectives of the site assessment were:

- To identify vegetation communities and flora species present in the area subject to the proposed works.
- To complete targeted searches for significant flora species known from the locality and considered possible occurrences based on an assessment of site habitats.
- To identify potential impacts including vegetation removal and trimming likely as a result of the proposed works.
- To identify areas of high ecological value.

### 2.2 Database searches

#### 2.2.1 NPWS Database search

A search of the NPWS Database revealed records of 20 Threatened flora species within 10km of the Subject site. These species are shown in **TABLE 1**.

**TABLE 1**  
**NPWS DATABASE RECORDS OF THREATENED FLORA**  
**SPECIES WITHIN 10 KM OF THE SUBJECT SITE**

| Botanical name                             | Common name              | NSW Status |
|--|--------------------------|------------|
| <i>Acronychia littoralis</i>               | Scented Acronychia       | E1         |
| <i>Archidendron hendersonii</i>            | White Lace Flower        | V          |
| <i>Arthraxon hispidus</i>                  | Hairy Jointgrass         | V          |
| <i>Cryptocarya foetida</i>                 | Stinking Cryptocarya     | V          |
| <i>Davidsonia jerseyana</i>                | Davidson's Plum          | E1         |
| <i>Davidsonia johnsonii</i>                | Smooth Davidson's Plum   | E1         |
| <i>Diploglottis campbellii</i>             | Small-leaved Tamarind    | E1         |
| <i>Diuris sp. aff. chrysantha</i>          | Byron Bay Diuris         | E1         |
| <i>Endiandra muelleri subsp. bracteata</i> | Green-leaved Rose Walnut | E1         |
| <i>Fontainea oraria</i>                    | Coastal Fontainea        | E4A        |
| <i>Gossia fragrantissima</i>               | Sweet Myrtle             | E1         |
| <i>Macadamia tetraphylla</i>               | Rough-shelled Bush Nut   | V          |
| <i>Niemeyera whitei</i>                    | Rusty Plum, Plum Boxwood | V          |
| <i>Ochrosia moorei</i>                     | Southern Ochrosia        | E1         |
| <i>Owenia cepiodora</i>                    | Onion Cedar              | V          |
| <i>Pterostylis nigricans</i>               | Dark Greenhood           | V          |
| <i>Senna acclinis</i>                      | Rainforest Cassia        | E1         |
| <i>Syzygium hodgkinsoniae</i>              | Red Lilly Pilly          | V          |
| <i>Syzygium moorei</i>                     | Durobby                  | V          |
| <i>Tinospora tinosporoides</i>             | Arrow-head Vine          | V          |

**KEY**

|     |                       |
|-----|-----------------------|
| E1  | Endangered            |
| E4A | Critically endangered |
| V   | Vulnerable            |

### 2.2.2 Commonwealth EPBC Act (1999) Database search

A search of the Commonwealth EPBC Act (1999) Database revealed potential suitable habitat for a number of Threatened flora species within 5km of the Subject site. These species are shown in **TABLE 2**. The Commonwealth EPBC Act Protected Matters Report is included in full in **APPENDIX B**.

**TABLE 2**  
**COMMONWEALTH EPBC ACT (1999) DATABASE SEARCH RESULTS**  
**THREATENED FLORA SPECIES WITH POTENTIAL HABITAT**  
**WITHIN 5 KM RADIUS OF THE SUBJECT SITE**

| Botanical name                                     | Common Name            | Status |
|--|------------------------|--------|
| <i>Acronychia littoralis</i>                       | Scented acronychia     | E      |
| <i>Allocasuarina defungens</i>                     | Dwarf heath casuarina  | E      |
| <i>Arthraxon hispidus</i>                          | Hairy Jointgrass       | V      |
| <i>Baloghia marmorata</i>                          | Jointed baloghia       | V      |
| <i>Bulbophyllum globuliforme</i>                   | Miniature Moss-orchid  | V      |
| <i>Cryptocarya foetida</i>                         | Stinking cryptocarya   | V      |
| <i>Cryptostylis hunteriana</i>                     | Leafless Tongue-orchid | V      |
| <i>Davidsonia jerseyana</i>                        | Davidson's Plum        | E      |
| <i>Davidsonia johnsonii</i>                        | Smooth Davidson's plum | E      |
| <i>Diploglottis campbellii</i>                     | Small-leaved tamarind  | E      |
| <i>Floydia praealta</i>                            | Ball Nut               | V      |
| <i>Fontainea oraria</i>                            | Coastal fontainea      | E      |
| <i>Gossia fragrantissima</i>                       | Sweet Myrtle           | E      |
| <i>Macadamia integrifolia</i>                      | Macadamia Nut          | V      |
| <i>Macadamia tetraphylla</i>                       | Rough-shelled bush nut | V      |
| <i>Owenia cepiodora</i>                            | Onionwood              | V      |
| <i>Phaius australis</i>                            | Lesser swamp orchid    | E      |
| <i>Randia moorei</i>                               | Spiny Gardenia         | E      |
| <i>Syzygium hodgkinsoniae</i>                      | Red Lilly Pilly        | V      |
| <i>Syzygium moorei</i>                             | Durobby                | V      |
| <i>Thesium australe</i>                            | Austral toadflax       | V      |
| <b>EECs</b>  |                        |        |
| <i>Littoral Rainforest and Coastal Vine</i>        |                        |        |
| <i>Thickets of Eastern Australia</i>               |                        | CE     |
| <i>Lowland Rainforest of Subtropical Australia</i> |                        | CE     |

**KEY**

|    |                       |
|----|-----------------------|
| CE | Critically Endangered |
| E  | Endangered            |
| V  | Vulnerable            |

## 2.3 Site assessment

### 2.3.1 Flora species recorded

A total of 67 flora species were recorded during the surveys including 19 (28% of the total) exotic species. A full list of all species recorded is provided in **APPENDIX C**.

### 2.3.2 Vegetation communities

Five vegetation communities were identified within the Subject site. These vegetation communities are shown in **TABLE 3**. The location and extent of these vegetation communities on the Subject site is shown in **FIGURE 2**. Vegetation communities are described in detail below.

**TABLE 3**  
**VEGETATION COMMUNITIES WITHIN THE SUBJECT SITE**

| Vegetation Community |  |
|----------------------|--|
| 1                    | Swamp sclerophyll woodland/forest (Broad-leaved paperbark dominant)          |
| 2                    | Coast banksia woodland to open forest  |
| 3                    | Dry sclerophyll woodland (Wallum banksia dominant)                           |
| 4                    | Aquatic vegetation   |
| 5                    | Maintained lawn with scattered Pandanus/Coast banksia/Norfolk pine/Paperbark |

#### 2.3.2.1 Community 1 Swamp sclerophyll woodland/forest (Swamp paperbark dominant)

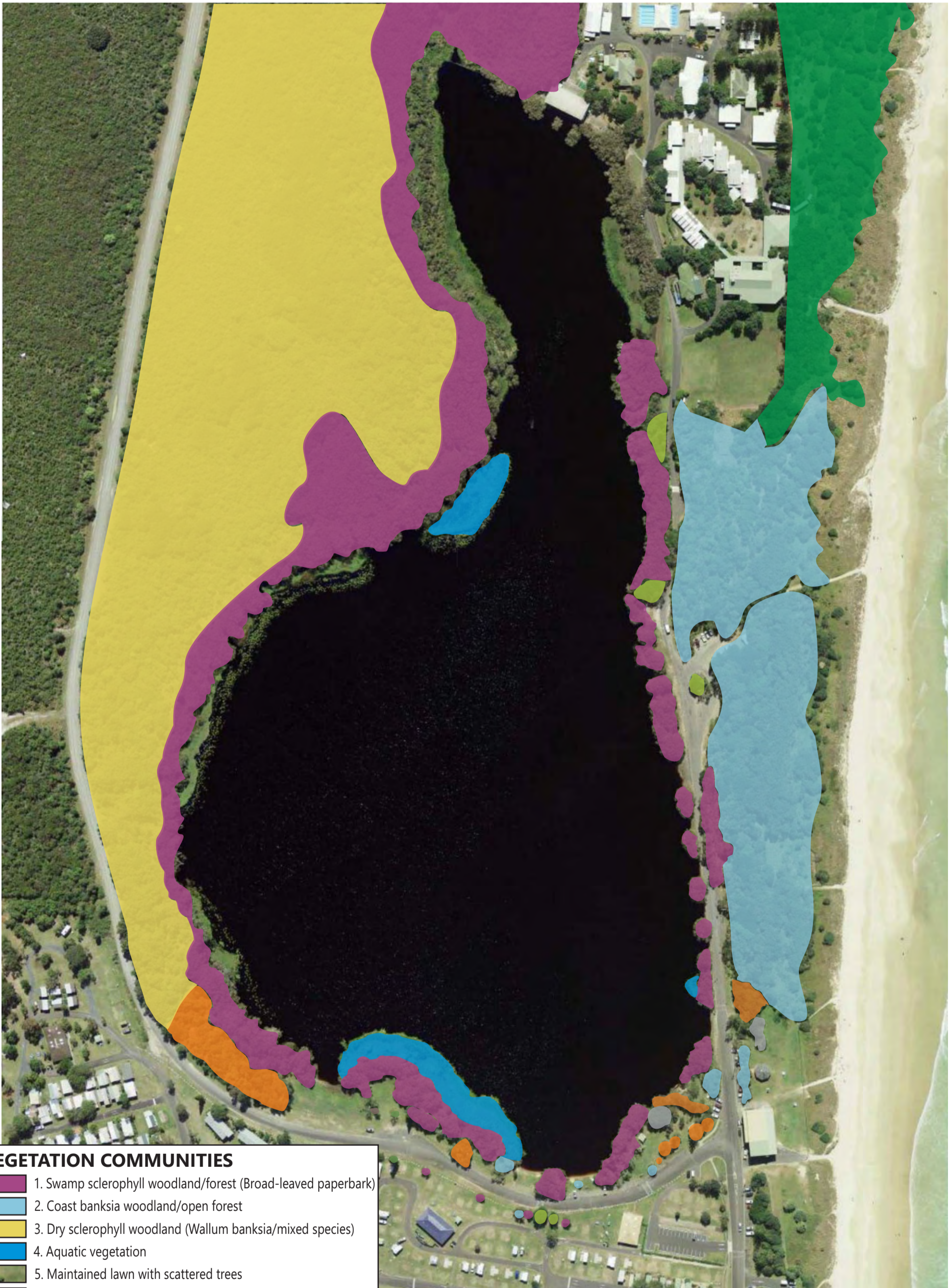
##### Description and Location

This community includes areas dominated by Broad-leaved paperbark and occurs around the perimeter of Lake Ainsworth within areas subject to inundation during heavy rainfall events. The community occurs in various degrees of condition and integrity. Within the Subject site this community occurs within areas subject to high pedestrian traffic and recreation use. Broad-leaved paperbark typically occurs as individual trees amongst grassland, in unfenced patches fringing the lake or in fenced vegetation areas. Unfenced patches of paperbark along the edge of Lake Ainsworth typically have limited groundcover and highly exposed root systems due to pedestrian traffic. Fenced areas comprise Broad-leaved paperbark with occasional Swamp oak and Tuckeroo, Coast wattle understorey and groundlayer dominated by Creeping wheat grass. Sporadic weeds noted within fenced areas along the eastern and southern shores include Coastal morning glory, Blue billy goat, Siratro, Alexander palm, exotic Pennywort and exotic grasses.

More intact examples of this community occur along the western shore of Lake Ainsworth and extend to the north within low lying areas. These areas are typically in good condition with a continuous paperbark canopy and Blechnum and rushes common in the understorey.

##### Conservation Status

Vegetation in this community is consistent with the description of the EEC *Swamp sclerophyll forest on coastal floodplains* which is listed under the TSC Act 1995 for the North Coast bioregion. Individual paperbark trees located amongst grassland/informal parking areas are included in this EEC, although a highly degraded/modified form of the EEC. High quality areas of this EEC occur around the perimeter of the lake and to the north along the drainage channel. In addition, vegetation surrounding the lake serves as an important buffer for the lake, filtering runoff and thus improving the water quality of the lake.



**VEGETATION COMMUNITIES**

- 1. Swamp sclerophyll woodland/forest (Broad-leaved paperbark)
- 2. Coast banksia woodland/open forest
- 3. Dry sclerophyll woodland (Wallum banksia/mixed species)
- 4. Aquatic vegetation
- 5. Maintained lawn with scattered trees
- Mixed coastal forest
- Tuckeroo dominated patches
- Regenerating littoral rainforest





**PLATE 1**  
Patches of  
Swamp  
sclerophyll  
forest fringe  
the lake edge.



**PLATE 2**  
Broad-leaved  
paperbark  
trees subject  
to ongoing  
pruning for  
powerline  
clearance.

### 2.3.2.2 Community 2 Coast banksia woodland to open forest

#### Description and Location

This community includes areas of woodland/forest dominated by Coast banksia and occurs on the foredune and backdune east of the Subject site. Foredune areas of this community typically have a wind sheared profile, while protected areas on the backdune comprise an open forest structure. Coast banksia dominates the canopy with occasional Pandanus and Horsetail oak along the foredune and Tuckeroo along the backdune. The mid-storey is generally open with patches of



Coastal wattle in exposed areas. Low patches of ferns occur in the protected interdune corridor while Flax lily dominates the ground layer of the dune crest and backdune. Additionally, there is prevalent natural regeneration of native littoral rainforest trees occurring within this community including Beach alectryon, Tuckeroo, Three-veined laurel and Beach acronychia.

Extensive works have been undertaken throughout the dunes in this area by landcare groups and weeds are generally confined to the groundlayer. Sporadic weeds noted include Ground asparagus, Coastal morning glory, Bitou bush, Turkey rhubarb, exotic grasses and annuals.

### Conservation Status

Due to the dominance of Coast banksia in the canopy, this community type does not meet the definition of the EEC *Littoral rainforest* which is listed under the TSC Act. However, given time and continued restoration some areas of this community are likely to develop into Littoral rainforest. This community is of high conservation value.



### PLATE 3

Areas of Coast Banksia forest on the hind dune with regenerating littoral rainforest species.

### 2.3.2.3 Community 3 Dry sclerophyll woodland (Wallum banksia dominant)

#### Description and Location

This community describes vegetation located on the western side of Lake Ainsworth, up to Camp Drewe Road. Vegetation in this area comprises dry sclerophyll woodland dominated by Wallum banksia with Coast banksia, Tuckeroo, Duboisia, Blueberry ash and groves of Pink bloodwood. Vegetation is in good condition with exotics generally restricted to the edge of Camp Drewe Rd and along walking tracks. Exotic species noted along Camp Drewe Road include Cocos palm, Lantana, Siratro, Coastal morning glory and exotic grasses.

#### Conservation Status

Vegetation within this area is of high quality with limited exotic weed presence and diverse structural integrity. This vegetation is not consistent with any EEC descriptions listed under the TSC or EPBC Acts.



**PLATE 4**  
Wallum  
banksia  
dominant  
vegetation  
along Camp  
Drewe  
Road.

#### **2.3.2.4 Community 4 Aquatic vegetation**

##### **Description and Location**

Aquatic vegetation is generally limited within the immediate vicinity of the Subject site due to frequent recreation and usage of this area by swimmers/watercraft. Aquatic species which may occur and are common in surrounding parts of the lake subject to less disturbance include Native reed, Cumbungi, Jointed twig-rush, Grey rush, Salvinia, Azolla, Mexican waterlily, Snowflake, *Persicaria* spp., Swamp hibiscus, Water ribbon and Water primrose. Lennox Head Landcare has been active with controlling the aquatic weed Water hyacinth throughout Lake Ainsworth.

##### **Conservation Status**

Lake Ainsworth is one of the few freshwater lowland dune lakes in northern NSW. Aquatic vegetation fringing the lake provides important fauna habitat.



**PLATE 5**  
Fringing  
aquatic  
vegetation  
along the  
southern  
shore.

#### **2.3.2.5 Community 5 Maintained lawn with scattered Pandanus/Coast banksia/Norfolk pine**

##### **Description and Location**

This community describes areas of maintained grassland which are regularly mown by Council and are typically utilised for recreation. It occurs around the eastern and southern edge of the lake. Trees occur singly or in clumps and consist mainly of Broad-leaved paperbark, Coast banksia, Tuckeroo, Pandanus and Norfolk Pine.

##### **Conservation Status**

Vegetation within this community type is highly modified and has limited conservation status.



**PLATE 6**  
Recreational  
areas of  
grassland with  
scattered trees.

### ***2.3.3 Endangered and Threatened Ecological Communities***

Vegetation communities on the Subject site were compared with descriptions of vegetation communities listed as Endangered Ecological Communities under the Threatened Species Conservation Act (1995) and Threatened Ecological Communities under the EPBC Act (1999).

Areas of Community 1 meet the description of the EEC *Swamp sclerophyll forest on coastal floodplains* which is listed under the TSC Act 1995 for the North Coast bioregion. High quality areas of this EEC occur around the perimeter of the lake and to the north along the drainage channel. These areas have an intact canopy dominated by Broad-leaved paperbark and a native understorey typically dominated by ferns and rushes. Moderate value areas of this EEC also occur along the eastern and southern shores in unfenced areas and typically contain an intact canopy of paperbark but limited understorey due to pedestrian traffic and erosion. Scattered paperbark trees within grassland and carparking areas are also included in this EEC but are considered to be a highly degraded form. These areas have little to no natural regeneration occurring and no structured vegetation surrounding the paperbark trees.

Given time and continued restoration some areas of Community 2, particularly on the hind dune, are likely to develop into Littoral rainforest which is listed as an EEC under the TSC Act and a TEC under the EPBC Act. However, at this stage areas of Community 2 adjacent to the proposed works are dominated by a Coast banksia canopy and are not considered to constitute this EEC. Dune vegetation east of the Sport and Recreation Camp (outside the scope of this project) is considered to constitute Littoral rainforest EEC due to the greater abundance and diversity of littoral species in the canopy.

### ***2.3.4 Significant species***

No Threatened (TSC Act 1995, Commonwealth EPBC Act 1999) or ROTAP flora species were recorded during the site surveys.



### ***2.3.5 Noxious weeds***

A number of noxious weeds listed for the Ballina Shire LGA have been recorded within the Study area and may occur within the Subject site at times. These include:

- Ground asparagus – Class 4
- Bitou bush – Class 4
- Groundsel bush - Class 3
- Lantana – Class 4
- Salvinia – Class 4
- Water hyacinth – Class 4

## 3 FAUNA

### 3.1 Introduction

This section discusses the methods used in the fauna assessment and presents the results of the assessment. Relevant databases and reports were reviewed to identify records of locally occurring Threatened fauna species, populations and communities.

The fauna assessment consisted of:

- A review of relevant databases and literature.
- An assessment of site fauna habitats.

Site habitats were assessed in terms of their value for native fauna species. A site assessment was undertaken on the 2<sup>nd</sup> May 2017 to assess the extent of proposed works and complete a detailed survey of site habitats. The assessment focused on identifying habitat features associated with Threatened species known from the locality. Particular attention was paid to habitat features such as:

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places.
- Presence of hollow logs/debris and areas of dense leaf litter.
- The presence of Grey-headed Flying Fox camps
- The presence of preferred Koala food tree species.
- The presence of preferred Glossy black cockatoo feed trees.
- Condition, flow and water quality of drainage lines and bodies of water.
- Areas of dense vegetation.
- Presence of fruiting flora species and blossoming flora species, particularly winter-flowering species.
- Vegetation connectivity and proximity to neighbouring areas of vegetation.
- Presence of caves, hollow trees and/or man-made structures suitable as microchiropteran bat roost sites.
- Potential nest sites for shorebirds and other coastal birds.

### 3.2 Database searches

#### 3.2.1 NPWS Database search

A search of the NPWS Database revealed records of 33 Threatened fauna species (excluding marine species) within 10km of the Subject site. These species are shown in **TABLE 4**.

**TABLE 4**  
**NPWS DATABASE RECORDS OF THREATENED FAUNA**  
**SPECIES WITHIN 10 KM OF THE SUBJECT SITE**

| Scientific name                        | Common name          | NSW Status |
|--|----------------------|------------|
| <i>Artamus cyanopterus cyanopterus</i> | Dusky Woodswallow    | V          |
| <i>Botaurus poiciloptilus</i>          | Australasian Bittern | E1         |
| <i>Carterornis leucotis</i>            | White-eared Monarch  | V          |
| <i>Circus assimilis</i>                | Spotted Harrier      | V          |
| <i>Crinia tinnula</i>                  | Wallum Froglet       | V          |
| <i>Dasyurus maculatus</i>              | Spotted-tailed Quoll | V          |

| Scientific name                            | Common name                                  | NSW Status |
|--|--|------------|
| <i>Ephippiorhynchus asiaticus</i>          | Black-necked Stork                           | E1         |
| <i>Grus rubicunda</i>                      | Brolga                                       | V          |
| <i>Gygis alba</i>                          | White Tern                                   | V          |
| <i>Haematopus fuliginosus</i>              | Sooty Oystercatcher                          | V          |
| <i>Haematopus longirostris</i>             | Pied Oystercatcher                           | E1         |
| <i>Haliaeetus leucogaster</i>              | White-bellied Sea-Eagle                      | V          |
| <i>Irediparra gallinacea</i>               | Comb-crested Jacana                          | V          |
| <i>Litoria aurea</i>                       | Green and Golden Bell Frog                   | E1         |
| <i>Litoria olongburensis</i>               | Olongburra Frog                              | V          |
| <i>Miniopterus australis</i>               | Little Bentwing-bat                          | V          |
| <i>Miniopterus schreibersii oceanensis</i> | Eastern Bentwing-bat                         | V          |
| <i>Mormopterus norfolkensis</i>            | Eastern Freetail-bat                         | V          |
| <i>Myotis macropus</i>                     | Southern Myotis                              | V          |
| <i>Nyctophilus bifax</i>                   | Eastern Long-eared Bat                       | V          |
| <i>Pandion cristatus</i>                   | Eastern Osprey                               | V          |
| <i>Pezoporus wallicus wallicus</i>         | Eastern Ground Parrot                        | V          |
| <i>Phascolarctos cinereus</i>              | Koala  | V          |
| <i>Planigale maculata</i>                  | Common Planigale                             | V          |
| <i>Pomatostomus temporalis temporalis</i>  | Grey-crowned Babbler<br>(eastern subspecies) | V          |
| <i>Pteropus poliocephalus</i>              | Grey-headed Flying-fox                       | V          |
| <i>Ptilinopus regina</i>                   | Rose-crowned Fruit-Dove                      | V          |
| <i>Scoteanax rueppellii</i>                | Greater Broad-nosed Bat                      | V          |
| <i>Sternula albifrons</i>                  | Little Tern                                  | E1         |
| <i>Syconycteris australis</i>              | Common Blossom-bat                           | V          |
| <i>Thersites mitchellae</i>                | Mitchell's Rainforest Snail                  | E1         |
| <i>Tyto longimembris</i>                   | Eastern Grass Owl                            | V          |
| <i>Tyto novaehollandiae</i>                | Masked Owl                                   | V          |

KEY

E1 Endangered

V Vulnerable

### 3.2.2 Commonwealth EPBC Act (1999) Database search

A search of the Commonwealth EPBC Act (1999) Database revealed potential suitable habitat for a number of Threatened fauna species within 5km of the Subject site. These species are shown in **TABLE 5**.

The Commonwealth EPBC Act Protected Matters Report is included in full in **APPENDIX B**.

**TABLE 5**  
**COMMONWEALTH EPBC ACT (1999) DATABASE RESULTS**  
**THREATENED FAUNA SPECIES WITH POTENTIAL HABITAT**  
**WITHIN 5KM OF THE SUBJECT SITE**

| Common Name                                    | Scientific name                          | Status |
|--|--|--------|
| <b>Invertebrates</b>                           |  |        |
| Mitchell's Rainforest snail                    | <i>Thersites mitchellae</i>              | CE     |
| <b>Birds</b>                                   |  |        |
| Coxen's Fig-Parrot                             | <i>Cyclopsitta diophthalma coxeni</i>    | E      |
| Swift Parrot                                   | <i>Lathamus discolor</i>                 | CE     |
| Regent Honeyeater                              | <i>Xanthomyza phrygia</i>                | CE     |
| Australasian bittern                           | <i>Botaurus poiciloptilus</i>            | E      |
| Red Goshawk                                    | <i>Erythrotriorchis radiatus</i>         | V      |
| White-bellied Storm-Petrel                     | <i>Fregatta grallaria grallaria</i>      | V      |
| Southern Giant-Petrel                          | <i>Macronectes giganteus</i>             | E      |
| Northern Giant-Petrel                          | <i>Macronectes halli</i>                 | V      |
| Kermadec Petrel (western)                      | <i>Pterodroma neglecta neglecta</i>      | V      |
| Campbell Albatross                             | <i>Thalassarche melanophris impavida</i> | V      |
| Australian Painted Snipe                       | <i>Rostratula australis</i>              | E      |
| Red knot                                       | <i>Calidris canutus</i>                  | E      |
| Curlew sandpiper                               | <i>Calidris ferruginea</i>               | CE     |
| Great knot                                     | <i>Calidris tenuirostris</i>             | CE     |
| Greater Sand Plover                            | <i>Charadrius leschenaultii</i>          | V      |
| Lesser Sand Plover                             | <i>Charadrius mongolus</i>               | E      |
| Antipodean Albatross                           | <i>Diomedea antipodensis</i>             | V      |
| Gibson's Albatross                             | <i>Diomedea antipodensis gibsoni</i>     | V      |
| Southern Royal Albatross                       | <i>Diomedea epomophora</i>               | V      |
| Wandering Albatross                            | <i>Diomedea exulans</i>                  | V      |
| Bar-tailed Godwit                              | <i>Limosa lapponica baueri</i>           | V      |
| Northern Siberian Bar-tailed Godwit            | <i>Limosa lapponica menzhieri</i>        | CE     |
| Eastern curlew                                 | <i>Numenius madagascariensis</i>         | CE     |
| Fairy Prion                                    | <i>Pachyptila turtur subantarctica</i>   | V      |
| Sooty Albatross                                | <i>Phoebastria fusca</i>                 | V      |
| Gould's Petrel                                 | <i>Pterodroma leucoptera leucoptera</i>  | E      |
| Shy Albatross                                  | <i>Thalassarche cauta cauta</i>          | V      |
| White-capped Albatross                         | <i>Thalassarche cauta stadi</i>          | V      |
| Chatham Albatross                              | <i>Thalassarche eremita</i>              | E      |
| Black-browed Albatross                         | <i>Thalassarche melanophris</i>          | V      |
| Salvin's Albatross                             | <i>Thalassarche salvini</i>              | V      |
| Black-breasted Button-quail                    | <i>Turnix melanogaster</i>               | V      |
| <b>Mammals</b>                                 |  |        |
| Large-eared Pied Bat                           | <i>Chalinolobus dryeri</i>               | V      |
| Spotted-tailed Quoll                           | <i>Dasyurus maculatus</i>                | E      |
| Koala (combined populations of Qld, NSW & ACT) | <i>Phascolarctos cinereus</i>            | V      |
| Long-nosed Potoroo (SE mainland)               | <i>Potorous tridactylus tridactylus</i>  | V      |
| New Holland mouse                              | <i>Pseudomys novaehollandiae</i>         | V      |
| Grey-headed Flying-fox                         | <i>Pteropus poliocephalus</i>            | V      |
| Water mouse                                    | <i>Xeromys myoides</i>                   | V      |
| Greater Glider                                 | <i>Petauroides volans</i>                | V      |
| <b>Amphibians</b>                              |  |        |



| Common Name         | Scientific name                       | Status |
|---------------------|---------------------------------------|--------|
| Wallum Sedge Frog   | <i>Litoria olongburensis</i>          | V      |
| <b>Fish</b>         |                                       |        |
| Black Rockcod       | <i>Epinephelus daemeli</i>            | V      |
| <b>Insects</b>      |                                       |        |
| Pink Underwing Moth | <i>Phyllodes imperialis smithersi</i> | E      |

**KEY**

- CE Critically endangered
- E Endangered
- V Vulnerable

### 3.3 Fauna assessment

#### 3.3.1 Introduction

This section discusses fauna habitat types within the Subject site. It includes a discussion of the ecological significance of these habitats including the potential for threatened and significant fauna species to occur in the Study area.

#### 3.3.2 Previous studies of Lake Ainsworth fauna

##### 3.3.2.1 Lake Ainsworth Management Plan (Geolink 2002)

The Lake Ainsworth Management Plan (Geolink 2002) outlines a number of fauna studies which have been undertaken at Lake Ainsworth over the years. Aquatic fauna previously recorded within the lake include firetailed gudgeons, freshwater catfish, bass and mosquito fish. Two species of freshwater turtle/tortoise have been recorded including saw-shelled turtle and eastern long-necked tortoise. Opportunistic or incidental fauna records from the Sport and Recreation Centre environs collected by Phil Buckland (staff member) include nine frog species, 21 lizards and snakes, eight mammals including the threatened Common planigale and 115 species of birds.

##### 3.3.2.2 Lake Ainsworth Sport and Recreation Centre – Multipurpose Sports Development (Geolink 2017)

Recent fauna surveys undertaken by Geolink in March 2017, as part of a development application within the Sport and Recreation Centre, recorded one threatened fauna species, the Little Bentwing-bat. Anabat results also indicated the potential presence of up to three other threatened microbat species, Eastern Freetail-bat, Eastern Long-eared Bat and Southern Myotis. In addition, one migratory species listed under the EPBC Act was recorded, Rainbow Bee-eater. This species is common in coastal landscapes within the area.

#### 3.3.3 Koala studies

The Ballina Koala Habitat Study (Biolink 2013) identifies three primary Koala feed tree species in the Ballina LGA, Forest red gum, Tallowwood and Swamp mahogany. The Ballina Koala Habitat Study did not record any active Koala sites in the Lennox Head locality, with the closest known population being at Tintenbar, approximately 5 km south-west of the site.

The Draft Ballina Shire Comprehensive Koala Plan of Management (Ballina Shire Council 2015) does not map the site as primary or secondary Koala habitat and the study area is not mapped as being within a designated Koala Management Precinct and does not lie within the Ballina Shire Koala Planning Area.

### **3.3.4 Terrestrial fauna habitats**

#### **3.3.4.1 Amphibians**

Lake Ainsworth and areas of low-lying heathy forest to the north and west provide quality habitat for many frog species. North of Lake Ainsworth, low lying wallum habitats provide high quality habitat for amphibians, particularly the acid frogs including the Threatened Wallum froglet (*Crinia tinnula*) and Wallum sedgefrog (*Litoria olongburensis*). Of the nine species previously recorded within the Sport and Recreation environs the exotic Cane toad was noted as being the most common.

#### **3.3.4.2 Reptiles**

Forested sandy dune systems east of Lake Ainsworth represent good quality habitat for reptiles, although fragmentation, past clearing and disturbance and roadkill are likely to be factors in limiting reptile diversity, with species highly sensitive to disturbance unlikely to occur. Extensive tracts of heathland and forest north and west of Lake Ainsworth provide high quality reptile habitat. Threatened reptile species are unlikely to occur, with likely common species including the Eastern water dragon, Eastern blue-tongued lizard, Land mullet, Robust ctenotus, Yellow-faced whip snake, Carpet python, Green tree snake, Red-bellied black snake, Brown snake, Small-eyed snake, Burton's legless lizard, Lace monitor, Bandy bandy, *Ramphotyphlops nigrescens* (blind snake) and various smaller skinks. Freshwater turtles may occasionally occur in terrestrial habitats.

#### **3.3.4.3 Birds**

The juxtaposition of habitat types within a relatively small area can be expected to contribute toward a high diversity of bird species over the course of the seasons. Birds known from the Study area or considered likely to occur include coastal and oceanic birds (e.g. Oystercatchers, cormorants, shorebirds, terns and gulls), raptors (Osprey, Brahminy kite, Whistling kite), grassbirds (e.g. wrens, finches, Golden-headed cisticola) wetland birds (ducks, grebes, Purple swamphen) and birds typical of closed forest habitats (e.g. monarchs, Varied triller, shrike-thrushes).

Birds requiring large tree hollows for nesting are unlikely to breed in the Study area. Additional nomadic and migratory species would be expected to occur at other times of the year, including shorebird species. The high levels of disturbance and limited extent of the dune system are likely to be limiting factors reducing the suitability of the area as potential nest sites for oystercatchers, Little tern and other beach-nesting birds.

The extensive area of heathland and paperbark habitats north of Lake Ainsworth are of high value to birds, especially nectarivorous species such as honeyeaters. The Threatened Ground parrot and Eastern grass owl may occur within these vegetation types.

#### **3.3.4.4 Mammals**

Habitat fragmentation and disturbance history is likely to limit mammal diversity as well, with mammals found in larger tracts of coastal vegetation, such as the Sugar glider and Eastern chestnut mouse, unlikely to occur south of Lake Ainsworth, with areas of heathland to the north providing potential habitat. Mammals relying on larger tree hollows are unlikely to breed in the area.

The threatened Common planigale may occur in forested habitats north and west of Lake Ainsworth (Geolink 2002). Mammal species considered likely to occur in or near to the Study area include the Bush rat, Black rat, Echidna, antechinus and Brushtail possum.

Additional mammal species considered likely to occur include the Mountain brushtail possum and Ringtail possum. Roadkill along The Coast Road is also likely to be a factor limiting mammal populations in the study area.

Paperbark forest provides suitable foraging habitat for a number of threatened microbats. Small cracks and hollows also provide suitable roosting habitat for certain species of microbats.

### ***3.3.5 Aquatic fauna habitats***

Studies of aquatic vertebrate fauna and invertebrates have indicated that Lake Ainsworth supports a moderate diversity of species, including common freshwater fish species and two species of freshwater turtle/tortoise (Geolink 2002). Lake Ainsworth is fed by heathland and paperbark areas to the north and west. In these habitats, pools within low lying swales expand during rainfall events and the low pH wallum waters provide habitat for suitably adapted aquatic invertebrates, fish and other species.

### ***3.3.6 Wildlife corridors and habitat connectivity***

Movement opportunities for fauna through the Study area are limited to the south and east as a result of the ocean and urban development. Vegetation along the dune system provides a partially intact north-south wildlife corridor although the lack of vegetation along much of the Lennox Head beachfront restricts movement for all but the more mobile fauna groups. Extensive areas of vegetation occur north and west of the lake and a partially intact corridor extends south-west to the Ballina Nature Reserve. The Coast Road represents the major obstacle through this largely vegetated landscape.

### ***3.3.7 Significant species***

No Threatened (TSC Act 1995, EPBC Act 1999) fauna species were recorded during the site survey.

### ***3.3.8 Potential occurrence of Threatened fauna***

**APPENDIX D** lists the threatened fauna species known from the locality and considers the likelihood of these species occurring on the site. This Table includes species from the NPWS and EPBC databases as well as several other species known from other sources. Some of these species, particularly birds and bats, may be occasional or regular visitors to the site depending on seasonal migrations, availability of forage resources and other factors. Based upon the assessment, a 7-part test (TSC Act) and Assessment of Significance (EPBC Act) has been undertaken for:

- Common blossom bat
- Eastern (common) bent-wing bat
- Eastern free-tailed bat
- Eastern long-eared bat
- Greater broad-nosed bat
- Grey-headed flying fox
- Little bent-wing bat
- Southern myotis

## 4 POTENTIAL IMPACTS AND AMELIORATION MEASURES

### 4.1 Introduction

This section discusses potential impacts associated with the proposed works. The proposed works involve:

- Establish site with necessary exclusion fencing and traffic to comply with Ballina Shire Council safe work methods.
- Install erosion and sediment controls.
- Undertake controlled vegetation removal.
- Profile redundant pavement and demolish redundant concrete structures.
- Lay and compact sub-base materials.
- Pour concrete kerbing, pathways and handicapped parking bays.
- Lay and compact pavements and wearing surfaces and hard landscaping.
- Install log revetments and replenish eroded areas with clean sand.
- Construct boardwalk along southern shore.
- Revegetation of disturbed areas.
- Installation of seating, linemarking and signage.
- Undertake ongoing maintenance of rehabilitation areas/ landscaping.
- Construction of pedestrian boardwalks through vegetation patches on the southern side of the lake.

Note, the list above provides a general list of construction activities and may not be undertaken in the order listed. For example, bank stabilisation works and construction of the boardwalk may be undertaken separately from the road rehabilitation works.

### 4.2 Potential ecological impacts

#### 4.2.1 Flora

The various activities associated with the foreshore improvement and road rehabilitation works have the potential to result in some impacts on site vegetation. These are detailed in this section.

##### 4.2.1.1 Direct removal of vegetation

The proposed works will require the removal of one small Tuckeroo and one small Swamp she-oak on the eastern side of the lake. The removal of these trees is required so that the new pathway can be aligned further to the east than the existing roadway. The small Tuckeroo and Swamp she-oak are of minimal ecological value given their immaturity, isolated location and position under the powerlines.

Details regarding these trees are provided below in **TABLE 6**. Photographs of each tree are provided in **APPENDIX E**.

**TABLE 6**  
**TREES PROPOSED FOR REMOVAL AS A RESULT OF THE PATHWAY CONSTRUCTION**

| Tree No. | Species       | DBH(cm) | Notes                            |
|----------|---------------|---------|----------------------------------|
| 1        | Tuckeroo      | 4/2.5   | located directly under powerline |
| 2        | Swamp she-oak | 10      | located directly under powerline |

Locating the proposed pathway further east of the existing road will allow for the widening of existing areas of riparian vegetation and an additional area of 300 square metres will be available for regeneration of fully structured vegetation communities along the lake banks (BSC 2016). Offset requirements for the removal of these trees are discussed further in Section 4.

The existing fence located along the western edge of dune vegetation is to be retained and no vegetation removal east of this fence will be required. In addition, no riparian vegetation would be removed as a result of bank stabilisation works.

Construction of the boardwalk along three sections of the southern lake shore will require the removal of some small trees and understorey vegetation. The exact locations of boardwalks have been designed so as to minimise any vegetation removal required. No mature trees would be removed and the boardwalk is to be constructed of composite mesh to minimise impacts on groundcover and aquatic vegetation.

**TABLE 7** provides details on vegetation removal associated with the construction of boardwalk sections along the southern lake shore. Vegetation removal has been calculated based on a 2m wide clearance corridor for construction. Photos of each boardwalk section are included in **APPENDIX E**.

**TABLE 7**  
**VEGETATION IMPACTS ASSOCIATED WITH SOUTHERN BOARDWALK SECTIONS**

| Boardwalk section      | Vegetation clearance  |
|------------------------|---|
| A<br>(Eastern section) | No tree removal required. Boardwalk located to avoid mature trunks of Broad-leaved paperbark within this patch. Vegetation removal consists of removal of Lomandra, several small Cheese tree saplings and Coast wattle shrubs and trimming of low and prostrate limbs of Broad-leaved paperbark  |
| B<br>(Central section) | No large tree removal required. Boardwalk located to avoid mature trunks of Broad-leaved paperbark within this patch. Boardwalk will pass through section of regrowth and embellishment plantings to about 3m high with removal of 3 Macaranga, 3 Three-veined cryptocarya, 2 Guioa and 1 Tuckeroo. All trees are less than 10cm dbh in girth.  |
| C<br>(Western section) | No large tree removal required. Boardwalk located to avoid mature trunks of Broad-leaved paperbark and Swamp mahogany within this patch. Boardwalk will pass through section of regrowth and embellishment plantings to about 4m high with removal of 4 Macaranga, 5 Three-veined cryptocarya, 1 Beach acronychia, 6 Coast wattle, 1 Yellow kamala and 5 Tuckeroo. All trees are less than 10cm dbh in girth. Some Lantana, Parsonsia vine and Climbing guinea flower also to be removed. |

In addition, some Coastal rosemary and other landscaping located in fenced vegetated areas on the northern side of the existing toilets (adjacent to surf club) would be removed. Existing Coast banksia and Pandanus located in this area are to be retained.

#### 4.2.1.2 Indirect physical effects on vegetation adjacent to the works area

There is some potential for areas adjacent to the work zone to be indirectly affected through damage to root systems and/or accidental damage from machinery. No stockpiling of spoil or other materials will be required, with excavated material for removal to be loaded directly onto trucks and transported off site and imported material to be delivered in place. There is some potential for aquatic/riparian vegetation within low-lying areas to be affected by sedimentation from loss of soils from adjacent disturbed areas, alteration to hydrological conditions and other factors. Sedimentation may occur from ground disturbance during construction and/or the importation of fill. Sedimentation has the potential to impact on the immediate environments as well as aquatic habitats by changing drainage patterns, smothering of aquatic vegetation and increased turbidity.

There is some potential that an increase in traffic along Camp Drewe Road may result in some increase in dust generation which could have potential impacts on adjacent vegetation. Vegetation along this road is in good condition and is not apparently adversely affected by current dust generation, although there is evidence of dust on the leaves of roadside plants. The density of the vegetation is also likely to preclude dust impacts beyond the edge. The Lennox Head (Coastal) VMP (Blackwood ES 2017) provides the following management recommendation regarding this issue:

*It may be worth leaving (existing) non-invasive exotics along the Eastern edge of Camp Drewe Road to buffer core areas of vegetation. Maintenance along the inside edge will be required periodically to ensure weeds do not encroach into these areas. Consider embellishment plantings where vegetation is sparse to bolster this buffer zone and deter informal access.*

#### 4.2.1.3 Creation of edge effects and introduction of weed species and/or contaminants to the Study area

Works will not fragment or isolate any areas of native vegetation. Exotic species are present throughout most community types to varying degrees, primarily herbaceous annuals and grasses and visitation to the site is very high. The movement of machinery and site personnel would be restricted to previously disturbed areas and is unlikely to increase the likelihood of exotic weeds becoming established. The proposed works would result in the long-term improvement of site vegetation through the rehabilitation and expansion of riparian vegetation. Reducing access points along the eastern shore will allow for restoration plantings to connect existing patches of riparian vegetation and reduce existing fragmentation. Ongoing maintenance and weed control works are proposed within rehabilitation areas to ensure the long-term success of revegetation works.

No storage of fuel, material or chemicals will be required on site for the works. The receiving environment is already subject to direct road runoff, but concentrated input of contaminants from construction activities has some potential to result in further degradation if not appropriately intercepted and managed with erosion and sediment controls. The Engineering Services Report discusses proposed erosion and sediment controls.

#### 4.2.1.4 Impacts on significant flora/communities

No threatened flora species were recorded within the Subject site at the time of the site survey. Construction activities would be restricted to previously disturbed areas and the removal of ten trees, none of which are listed as threatened. Specific amelioration measures would be implemented to ensure adjacent areas of riparian and dune vegetation are not impacted.

Vegetation dominated by Broad-leaved paperbark comprises the EEC Swamp Sclerophyll Forest and primarily occurs around the foreshore of the lake. No Broad-leaved paperbark trees will be removed. An assessment of significance for this EEC has been undertaken as part of this assessment (refer to Section 5).

## **4.2.2 Fauna**

### **4.2.2.1 Direct impacts on fauna**

Native fauna are highly unlikely to be killed or injured as a result of tree removal activities or other construction works. Some microbats may roost in hollows or under loose bark on paperbark trees to be retained. Assessments of significance have been undertaken for several microbat species (refer to Section 5).

There is potential for some increase in traffic along Camp Drewe Road once the eastern road is closed, primarily vehicles and coaches accessing the Sport & Recreation Centre and dog walkers accessing the off leash section of Seven Mile Beach. There is some potential that increased traffic may lead to an increase in road kill along this section of road. It is anticipated that the majority of traffic accessing the Sport and Recreation Centre would be during daylight hours and likewise for dog walkers accessing Seven Mile Beach. As such this increase in daytime traffic along Camp Drewe Road is unlikely to affect the majority of local wildlife species that are active after dark.

Freshwater turtles known from Lake Ainsworth may occasionally cross Camp Drewe Road, including to access inundated areas within heathland and Swamp sclerophyll forest to the west and may occasionally be struck by vehicles. This is highly unlikely to impact these turtles on a population scale.

Specific amelioration measures, including appropriate signage, are outlined in Section 4.3 below to minimise any potential impacts.

### **4.2.2.2 Loss of fauna habitat**

There would be a minor short-term loss of fauna habitat as a result of tree removal required. The removal of vegetation represents a negligible loss of fauna habitat values given the extent of high quality habitat in the immediate vicinity.

There would be a long-term gain in fauna habitat values as a result of proposed rehabilitation works including the expansion and improvement of riparian vegetation through compensatory plantings and weed control works. The removal of vehicles from the eastern road will further enhance opportunities for fauna movement between dune vegetation and the lake.

### **4.2.2.3 Indirect impacts to aquatic habitats**

Any potential impacts to aquatic habitats will be minimal and restricted to potential sedimentation or contamination by spills etc. Bank stabilisation works will be restricted to previously disturbed areas where erosion problems require remediation. The natural soil which will be exposed is sand which has a very low runoff potential. The proposed works will reduce the amount of runoff along the eastern shore by removing the road and positioning the path further east. Bioretention swales are also proposed to capture runoff from the path.

No chemicals or fuel will be stored on site. Specific erosion and sedimentation controls would be implemented throughout the duration of the works and until disturbed areas are rehabilitated. These are discussed further in Section 4.3.

#### **4.2.2.4 Degradation/disturbance to neighbouring areas of habitat**

Areas of fauna habitat adjacent to the works area may be affected by accidental damage, sedimentation, introduction of weeds and other indirect effects. Habitats along the lakes edge would not be further fragmented or isolated as a result of the works. Existing access points to the lake would be formalised to minimise erosion in these areas. Two smaller gaps in the existing riparian vegetation (at Ch160 and Ch240) would be regenerated and fenced to discourage informal access at these locations.

Closure of the eastern road will mean that dog owners wishing to utilise the dog exercise area along Seven Mile Beach will be required to leash their dogs and walk along the beach or path until they reach the off-leash area. This may result in an increase in dogs along Seven Mile Beach south of the off-leash area. Leashed dogs are already permitted along this section of beach which is subject to a high degree of disturbance from beach goers. This section of beach is likely to be utilised by common disturbance-adapted species and an increase in leashed dogs along this stretch is unlikely to affect local fauna utilising the area.

#### **4.2.2.5 Impacts on corridor values**

The proposed works are unlikely to have any significant adverse impact on fauna movement opportunities and would not sever any important wildlife corridors. Proposed rehabilitation works and closure of the eastern road will serve to improve movement opportunities for fauna between dune and lake environs.

#### **4.2.2.6 Disturbance from construction noise, vibration and activity**

The Study area is typically subject to a high degree of disturbance from cars, lake users and other visitors. Disturbance from construction noise and activity will result in a minor short term localised increase in disturbance. In the long-term, closure of the eastern road will reduce disturbance by vehicles and improve the quality of fauna habitats in this area.

### **4.3 Amelioration Measures**

Based on the assessment of potential impacts, a number of mitigation measures are proposed to manage ecological impacts associated with the proposed works. These are discussed below:

#### **Vegetation management**

- Trees to be removed or trimmed as a result of the proposed development should be clearly marked prior to construction. Trimming to be undertaken in accordance with the Australian Standard “Pruning of Amenity Trees”.
- High Value vegetation to be retained, including areas of riparian and dune vegetation, is to have parawebbing placed around it during construction to avoid accidental disturbance where it occurs close to the proposed works. No vehicles or stockpiles are to be placed within the drip line of trees within these areas.
- Best practice weed management practices should be in place to prevent transfer of weed seeds and vegetative materials, including washdown of vehicles entering or leaving the worksite.
- Vegetation removed from the construction area should be taken to an appropriate green waste facility or mulched and used in rehabilitation works.



- Ongoing weed control and rehabilitation works should be undertaken in consultation with Lennox Head Landcare.

### **Fauna Management**

- All reasonable practical steps shall be undertaken to reduce noise and disturbance from the site.
- Appropriate signage should be installed along Camp Drewe Road to inform road users they are travelling through an area utilised by native wildlife. Speed limit signage should also be clearly installed.
- Ongoing monitoring of dogs should continue to ensure dogs are kept on a leash outside the designated off-leash zone.

### **Management of soils and disturbed areas**

- Erosion and sediment control measures would be implemented (in accordance with the Landcoms Managing Urban Stormwater; Soils and Construction Guidelines) and maintained to prevent sediment moving off-site and sediment laden water entering any watercourse.
- Bank stabilisation works are to use a floating boom in the lake encompassing the limit of disturbance for the installation of the log revetment.
- Works are to be staged to limit the length of bank stabilising works to short sections in order to reduce the exposed area and habitat disruption.
- Imported material should be sourced from areas which are weed seed, acid sulphate soils, and chemical and contaminant free.

### **Management of water quality**

- No fuel or chemicals is to be stored onsite.
- A spill response kit is to be available at all times in the area of works
- No materials or machinery are to be stored within areas of riparian or aquatic vegetation and all stockpiles are to have silt fencing around them.

## **4.4 Proposed offset works**

The Ballina Shire Development Control Plan (2012) notes that where development is unable to be sited, designed and managed to avoid potential adverse impacts on natural areas (as identified on the Natural Areas and Habitat Map), a proposal to remove habitat may be considered. Council typically applies a compensatory planting ratio of 3:1, with a higher rate of compensatory planting required in some circumstances.

The Subject site occurs within land mapped as Natural Habitat (Map ID DCP2012\_NH\_001\_080\_20140806). The loss of the two trees east of the Lake and some vegetation within southern boardwalk sections should be compensated for by the planting of 93 native species typical of Swamp Sclerophyll Forest (i.e. a ratio of 3:1).

Compensatory plantings should be planted into the area allocated for riparian rehabilitation. It is understood that an additional 300 metres square would be made available for riparian regeneration as a result of the proposed works (BSC 2016). Consultation with Lennox Head Landcare should be undertaken as part of the revegetation works. All planting and weed control works should be undertaken by suitably qualified Council environmental officers, bush regenerators and/or landcare groups guided by a qualified supervisor.



Current plans for the proposed works also include the planting of 56 trees within newly established grassland areas.

## 5 STATUTORY AND PLANNING ASSESSMENT

### 5.1 Introduction

This section includes assessments of the impacts of the Proposed development with regard to:

- Section 5A of the Environment Protection & Assessment Act (1979) (7 part tests).
- the Commonwealth Environment Protection and Biodiversity Conservation Act (1999).
- State Environmental Planning Policies (SEPP) No. 44 – Koala Habitat Protection, No. 14 (Coastal wetlands), No. 26 (Littoral rainforests) and SEPP No. 71 – Coastal Protection.
- Fisheries Management Act 1994 (FM Act).

### 5.2 Section 5A Assessment of Significance

Section 5A of the NSW Environmental Planning and Assessment Act (1979) requires a number of factors to be taken into account in determining the significance of impact of a development on threatened species, populations or ecological communities, or their habitats. The seven factors to be taken into account under the Assessment of Significance are known as the Seven Part Test.

Assessments of Significance are provided in **APPENDIX F** and have been completed for the following species/communities:

- Common blossom bat
- Eastern (common) bent-wing bat
- Eastern free-tailed bat
- Eastern long-eared bat
- Greater broad-nosed bat
- Grey-headed flying fox
- Large-eared pied bat
- Little bent-wing bat
- Southern myotis
- Swamp Sclerophyll Forest EEC.

Based upon the Assessments of Significance and with the adoption of the amelioration measures discussed in this report, the proposed development is unlikely to result in a significant impact on any Threatened (TSC Act 1995) species, population or ecological community. A Species Impact Statement is not required.

### 5.3 Commonwealth EPBC Act (1999)

#### 5.3.1 Introduction

Under the environmental assessment provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of National Environmental Significance are subject to a rigorous assessment and approval process. An action includes a project, development, undertaking, activity, or series of activities. An action will require approval from the Minister if the action has, will have, or is likely to have, a significant impact on a matter of national environmental significance.

The Act identifies seven matters of national environmental significance:

- World Heritage properties
- National heritage places
- Wetlands of international importance (Ramsar wetlands)
- Threatened species and ecological communities

- Migratory species
- Commonwealth marine areas
- Nuclear actions (including uranium mining)

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines (DEH 2006) outline an assessment process, including detailed criteria, to assist in deciding whether or not referral to the Minister is required. These guidelines replace the EPBC Act Administrative Guidelines of July 2000.

An assessment following the guidelines and definitions set out in the EPBC Act Policy Statement 1.1 is provided in **APPENDIX E**.

Based upon this assessment and with the implementation of the amelioration measures discussed in this report, the proposed development is unlikely to result in a significant impact on any matters of National Environmental Significance (NES) as listed under the EPBC Act 1999.

#### **5.4 SEPP 14 Coastal Wetlands**

The Subject site does not occur within or directly adjacent to any areas of SEPP 14 Coastal Wetland. The nearest SEPP 14 Coastal Wetland occurs on the western side of the North Lennox Head Heath trail (north-south oriented trail west of Camp Drewe Road). The proposed development will not have any impact on this area.

#### **5.5 SEPP 26 Littoral Rainforests**

The Subject site does not occur within or adjacent to any areas of SEPP 26 Littoral Rainforests. Small patches of Littoral rainforest vegetation in the Study area have not been mapped under SEPP 26. The closest mapped SEPP26 area occurs at Boulder Beach, south of Lennox Head. The proposed development will not have any impact on this area.

#### **5.6 SEPP 44 Koala Habitat Protection**

The SEPP 44 Koala Habitat Protection Policy aims to “encourage the proper conservation and management of area of natural vegetation that provide habitat for Koalas, to ensure permanent free-living populations over their present range and to reverse the current trend of population decline.”

SEPP 44 consists of a series of questions to provide a basis for the assessment of lands as potential and/or core Koala habitat.

**1. Does the policy apply?**

*Does the subject land occur in an LGA identified in Schedule 1?*

The Subject site occurs in the Ballina LGA, which is listed under Schedule 1.

*Is the landholding to which the DA applies greater than 1 hectare in area?*

Yes.

**2. Is the land potential Koala habitat?**

*Does the site contain areas of native vegetation where the trees of types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component?*

No. One Swamp mahogany tree was recorded within an area of open grassland along the southern side of the lake, opposite the caravan park and outside of the extent of proposed works. Potential Koala habitat does not occur within the Subject site.

**3. Is there core Koala habitat on the subject land?**

The site does not support core Koala habitat.

**4. Is there a requirement for the preparation of a Plan of Management for identified core Koala habitat?**

No.

## **5.7 SEPP 71 – Coastal Protection**

This SEPP controls development occurring within the coastal zone which includes land within 1km of the coast, 1km landward around any bay, estuary, coastal lake or lagoon as well as 1km along either bank of a coastal river. The proposal site is located within this area. Conditions of the SEPP typically apply to property developments along the coast and require that the following be taken into account as part of their assessment:

- retaining public access to and along the coastal foreshore for pedestrians;
- providing opportunities for new public access on the foreshore;
- any detrimental impact that development may have on the amenity of the coastal foreshore, including overshadowing and significant loss of views from a public place;
- the scenic qualities of the NSW coast;
- measures to conserve threatened animals, plants and fish;
- protecting existing wildlife corridors; and
- the likely impact of coastal processes and coastal hazards on development.

All applicable points above, relevant to ecological impacts, have been taken into account including the impact of the proposal on threatened species and wildlife corridors. The proposed works are for the purposes of improving ecological values of the area, stabilising the foreshore of the lake, improving water quality as well as recreational areas and open spaces.

## **5.8 Fisheries Management Act**

The FM Act requires an assessment of significance when there may be potential to impact on any species, populations and communities listed in the FM Act. Based on the habitat at the site and records within the locality, it is unlikely that the Proposal would impact on any species, populations or communities; as such an assessment of significance is not required.

## 6 SUMMARY AND CONCLUSIONS

Blackwood Ecological Services have been engaged by Ballina Shire Council (BSC) to complete a Flora and Fauna Assessment for proposed foreshore improvement works at Lake Ainsworth, Pacific Parade, Lennox Head, NSW. The Flora and Fauna Assessment report is to be assessed under Part V of the Environmental Planning and Assessment Act 1979 (the EP&A Act). The works are on Crown Land for which the Council is the trust manager. The area is also subject to the Lake Ainsworth Management Plan (2002).

The proposed works involve improvements along the eastern and south eastern foreshore of Lake Ainsworth and adjacent recreational spaces. The eastern road rehabilitation involves profiling the existing road pavement and removing concrete footpaths and kerb and gutter. The roadway will be closed to public vehicles and the road way will be replaced with a concrete footpath which will provide a wearing surface for pedestrians and emergency vehicles. The surrounding landscaping of the eastern road rehabilitation will be an extension of the existing passive recreational area comprising of seating, turfed areas, tree planting and embellishment of existing riparian vegetation. The proposed works also include undertaking measures to manage foot traffic accessing the lake and protect the banks against ongoing erosion. Three short sections of boardwalk are proposed to be located within clumps of lakeside paperbark forest on the southern bank of the lake. The purpose is to allow for pedestrian access round the southern bank without requiring visitors to use the roadway. Boardwalks are to be located so as to avoid loss of established paperbark trees and will be constructed of composite mesh to minimise impacts on groundcover and aquatic vegetation.

Surveys of site vegetation were undertaken on the 2<sup>nd</sup> May and 9<sup>th</sup> of August 2017. A total of 67 flora species were recorded during the surveys including 19 (28% of the total) exotic species. Five vegetation communities were identified within the Subject site. Areas of Broad-leaved paperbark forest generally meet the description of the EEC *Swamp sclerophyll forest on coastal floodplains* which is listed under the TSC Act 1995 for the North Coast bioregion. High quality areas of this EEC occur around the perimeter of the lake and to the north along the drainage channel. These areas have an intact canopy dominated by Broad-leaved paperbark and a native understorey typically dominated by ferns and rushes. Moderate value areas of this EEC also occur along the eastern and southern shores in unfenced areas and typically contain an intact canopy of paperbark but limited understorey due to pedestrian traffic and erosion. Scattered paperbark trees within grassland and carparking areas are also included in this EEC but are considered to be a highly degraded form. These areas have little to no natural regeneration occurring and no structured vegetation surrounding the paperbark trees.

No Threatened (TSC Act 1995, Commonwealth EPBC Act 1999) or ROTAP flora species were recorded during the site surveys.

The Lake Ainsworth area provides a variety of fauna habitat types, including aquatic habitats, swamp sclerophyll forest, developing littoral rainforest and areas of Coast banksia. Movement opportunities for fauna through the Study area are limited to the south and east as a result of the ocean and urban development. Vegetation along the dune system provides a partially intact north-south wildlife corridor although the lack of vegetation along much of the Lennox Head beachfront restricts movement for all but the more mobile fauna groups. Extensive areas of vegetation occur north and west of the lake and a partially intact corridor extends south-west to the Ballina Nature Reserve.

The various activities associated with the foreshore improvement and road rehabilitation works have the potential to result in some impacts on site vegetation. The proposed works will require the removal of one small Tuckeroo and one small Swamp she-oak on the eastern side of the lake. The removal of these trees is required so that the new pathway can be aligned further to the east than the existing roadway. Locating the proposed pathway further east of the existing road will allow for the widening of existing areas of riparian vegetation and an additional area of 300 square metres will be available for regeneration of fully structured vegetation communities along the lake banks (BSC 2016). Construction of the boardwalk along three sections of the southern lake shore will require the removal of some small trees and understorey vegetation. The exact locations of boardwalks have been designed so as to minimise any vegetation removal required. No mature trees would be removed and the boardwalk is to be constructed of composite mesh to minimise impacts on groundcover and aquatic vegetation.

There is potential for some increase in traffic along Camp Drewe Road once the eastern road is closed, primarily vehicles and coaches accessing the Sport & Recreation Centre and dog walkers accessing the off leash section of Seven Mile Beach. There is some potential that increased traffic may lead to an increase in road kill along this section of road. It is anticipated that the majority of traffic accessing the Sport and Recreation Centre would be during daylight hours and likewise for dog walkers accessing Seven Mile Beach. As such this increase in daytime traffic along Camp Drewe Road is unlikely to affect the majority of local wildlife species that are active after dark.

Freshwater turtles known from Lake Ainsworth may occasionally cross Camp Drewe Road, including to access inundated areas within heathland and Swamp sclerophyll forest to the west and may occasionally be struck by vehicles. This is highly unlikely to impact these turtles on a population scale.

There would be a long-term gain in fauna habitat values as a result of proposed rehabilitation works including the expansion and improvement of riparian vegetation through compensatory plantings and weed control works. The removal of vehicles from the eastern road will further enhance opportunities for fauna movement between dune vegetation and the lake. The Ballina Shire Development Control Plan (2012) notes that where development is unable to be sited, designed and managed to avoid potential adverse impacts on natural areas, a proposal to remove habitat may be considered. The loss of the two trees east of the Lake and some vegetation within southern boardwalk sections should be compensated for by the planting of 93 native species typical of Swamp Sclerophyll Forest (i.e. a ratio of 3:1).

The Subject site does not occur within or adjacent to any areas of SEPP 14 Coastal wetlands or SEPP 26 Littoral Rainforests and the proposed development will not have any impact on any of these areas in the locality.

Assessments of significance (7 part tests) were completed for a number of species of Threatened fauna recorded on the site or considered possible occurrences on the site over time. The proposed development is unlikely to result in a significant impact on any Threatened (TSC Act 1995) species, population or ecological community. A Species Impact Statement is not required. The proposed development is unlikely to result in a significant impact on any matters of National Environmental Significance as defined under the Commonwealth EPBC Act 1999.



## 7 REFERENCES

- Ballina Shire Council (2016) Review of Environmental Factors (REF 2016/003) Lake Ainsworth Foreshore Improvement Works Lennox Head NSW.
- Ballina Shire Council (2017) Draft Engineering Services Report. Lake Ainsworth Foreshore Improvement Works Lennox Head NSW.
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- Blackwood Ecological Services (2017) Lennox Head (Coastal) Vegetation Management Plan. A Report to Ballina Shire Council.
- Envite (2007) Lake Ainsworth Vegetation Management Plan. A Report to Ballina Shire Council.
- Geolink (2002) Lake Ainsworth Management Plan.
- Geolink (2007) Ballina Shire Coastline Management Study and Management Plan. A Report to Ballina Shire Council.
- Geolink (2017) Ecological Assessment – Lake Ainsworth Sport and Recreation Centre – Multipurpose Sports Development.
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- Higgins, P.J. (Ed.) (1999) **Handbook of Australian, New Zealand and Antarctic Birds**. Oxford University Press, Melbourne.
- Morand, D.T (1994). *Soil landscapes of the Lismore-Ballina 1:100 000 Sheet* Report, Soil Conservation Service of NSW, Sydney.
- Office of Environment and Heritage (2017). **Threatened species, populations and ecological communities**. <http://www.environment.nsw.gov.au/threatenedspecies/index.htm>
- NPWS (2002) Threatened Species of the Upper North Coast of NSW – Flora. NPWS Northern Directorate, Coffs Harbour.
- Sheringham and Westaway (1995). **Significant vascular plants of northern NSW**. A report to the NSW NPWS and Northern Region Audit Council.





## APPENDIX A

## DESIGN PLANS



# FORESHORE IMPROVEMENT WORKS LAKE AINSWORTH, LENNOX HEAD

DRAWING No: LHR30.061

NOVEMBER 2017

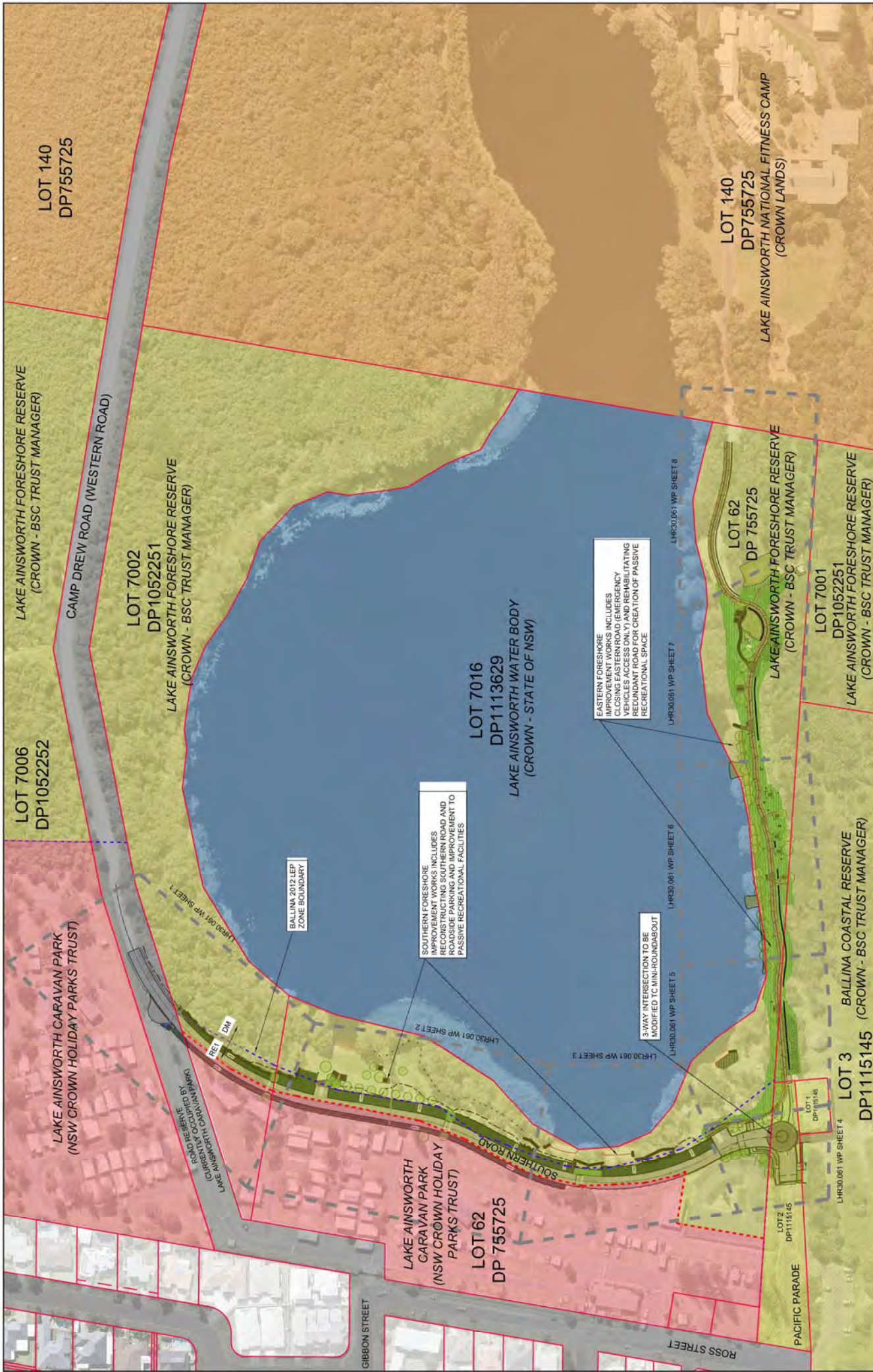
GENERAL WORKS DRAWINGS

DRAWING REGISTER

| DRAWING      | SHEET  | ISSUE | DATE      | TITLE  |
|--------------|--------|-------|-----------|--|
| LHR30.061/OP | 1 OF 1 | B     | 3/11/2017 | OVERALL PLAN   |
| LHR30.061/WP | 1 OF 8 | B     | 3/11/2017 | SOUTHERN FORESHORE GENERAL WORKS PLAN (CH0 TO CH105)                           |
| LHR30.061/WP | 2 OF 8 | B     | 3/11/2017 | SOUTHERN FORESHORE GENERAL WORKS PLAN (CH105 TO CH255)                         |
| LHR30.061/WP | 3 OF 8 | B     | 3/11/2017 | SOUTHERN FORESHORE GENERAL WORKS PLAN (CH255 TO CH380)                         |
| LHR30.061/WP | 4 OF 8 | B     | 3/11/2017 | INTERSECTION GENERAL WORKS PLAN  |
| LHR30.061/WP | 5 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH0 TO CH120)   |
| LHR30.061/WP | 6 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH120 TO CH240) |
| LHR30.061/WP | 7 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH240 TO CH360) |
| LHR30.061/WP | 8 OF 8 | B     | 3/11/2017 | EASTERN FORESHORE GENERAL WORKS PLAN AND LONGITUDINAL SECTION (CH360 TO CH440) |
| LHR30.061/LS | 1 OF 2 | B     | 3/11/2017 | SOUTHERN ROAD ALIGNMENT PLAN AND LONGITUDINAL SECTION (CH0 TO CH300)           |
| LHR30.061/LS | 2 OF 2 | B     | 3/11/2017 | SOUTHERN ROAD ALIGNMENT PLAN AND LONGITUDINAL SECTION (CH300 TO CH380)         |
| LHR30.061/DT | 1 OF 1 | B     | 3/11/2017 | LOG RETENTION AND BEACH ACCESS RAMP TYPICAL DETAIL                             |

LOCALITY PLAN






EASTERN FORESHORE IMPROVEMENT WORKS INCLUDES IMPROVING EASTERN ROAD, CLOSING EASTERN ROAD (EMERGENCY VEHICLES ACCESS ONLY) AND REHABILITATING REDUNDANT ROAD FOR CREATION OF PASSIVE RECREATIONAL SPACE

SOUTHERN FORESHORE INCLUDES RECONSTRUCTING SOUTHERN ROAD AND ROADSIDE PARKING AND IMPROVEMENT TO PASSIVE RECREATIONAL FACILITIES

BALLINA 2012 LEP ZONE BOUNDARY

3-WAY INTERSECTION TO BE MODIFIED TO MINI-ROUNDABOUT



| SURVEY  | BSC                                | DESIGNED | PJB |
|---------|------------------------------------|----------|-----|
| DATE    | JULY 2017                          | DRAWN    | PJB |
| F.B.    | L.B.                               | CHECKED  |     |
| DATUM   | AHD                                | APPROVED |     |
| DRAWING | LHR_30_061 LAKE A FORESHORE DA.dwg |          |     |

ISSUED FOR PART V ASSESSMENT  
DRAFT FOR REVIEW

| No. | Date     | By  | Change |
|-----|----------|-----|--------|
| B   | 31/11/17 | PJB |        |
| A   | 27/10/17 | PJB |        |

Amendments

| No. | Date | By | Change |
|-----|------|----|--------|
|     |      |    |        |

**LEGEND**

- PRIVATE PROPERTY
- ROAD RESERVE
- LAKE AINSWORTH FORESHORE RESERVE (BSC TRUST MANAGER)
- LAKE AINSWORTH FORESHORE RESERVE (NSW CROWN HOLIDAY PARKS TRUST)
- 500M MILE BEACH (FORESHORE RESERVE) (BSC TRUST MANAGER)
- LAKE AINSWORTH COASTAL RESERVE (LAKE AINSWORTH COASTAL RESERVE) (NSW CROWN HOLIDAY PARKS TRUST)
- LAKE AINSWORTH NATIONAL FITNESS CAMP (AND OTHER STATE OF NSW)
- PROPERTY BOUNDARY
- CROWN TRUST BOUNDARY
- ZONE BOUNDARY
- CROWN RESERVE
- NSW CROWN HOLIDAY PARKS TRUST
- CROWN RESERVE
- LAKE AINSWORTH NATIONAL FITNESS CAMP

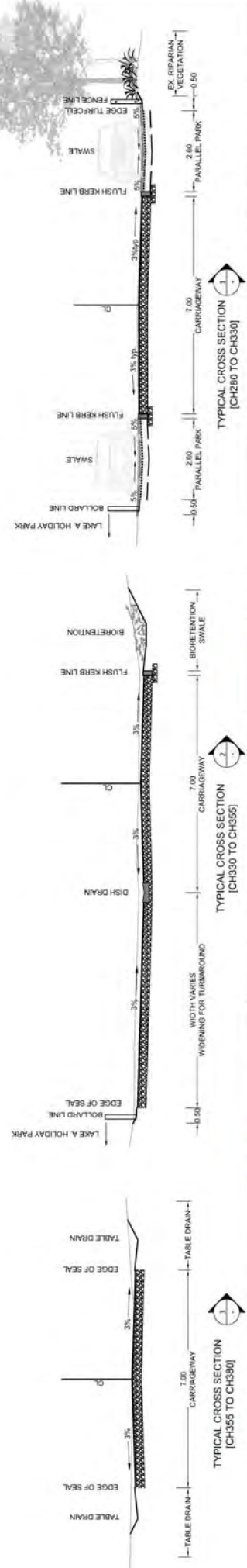
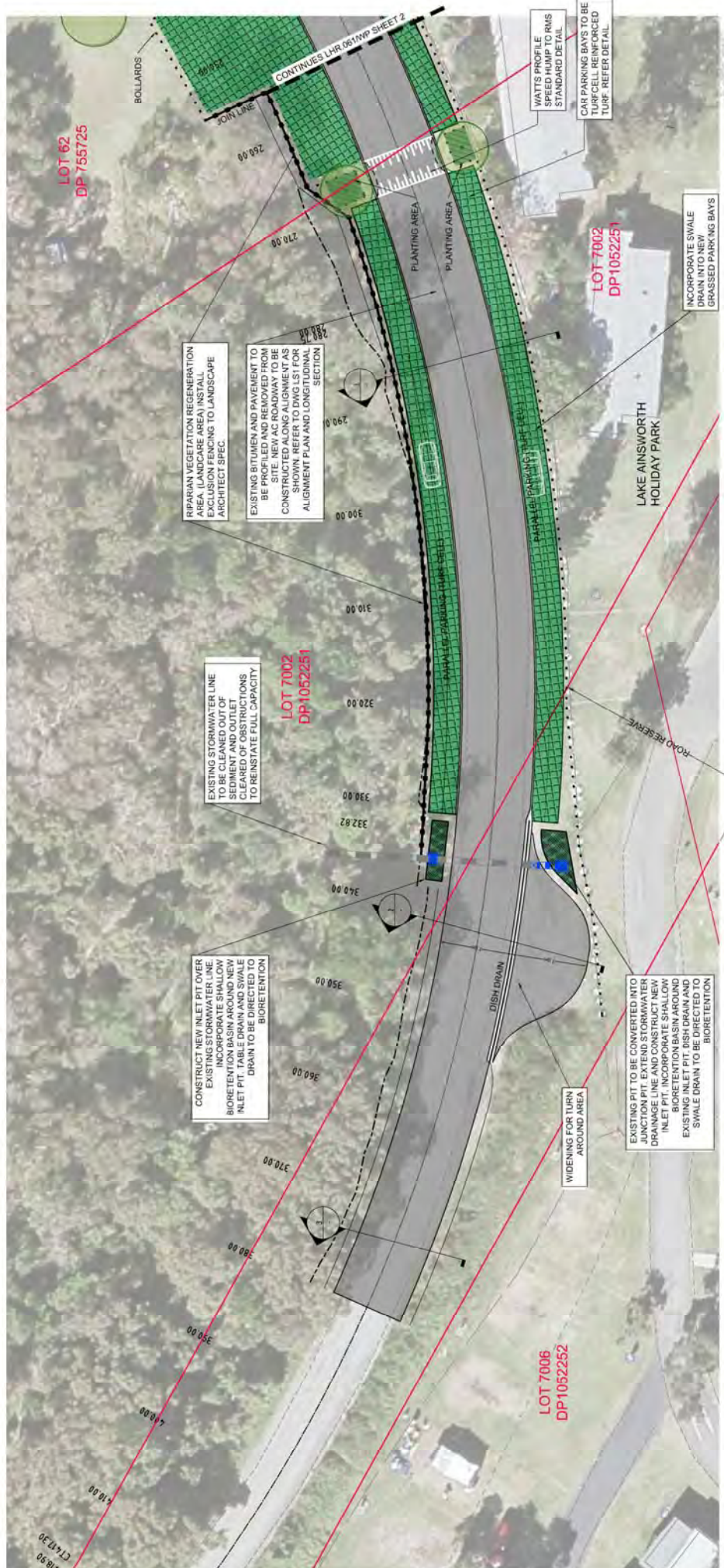
**BALLINA SHIRE COUNCIL**

**LAKE AINSWORTH FORESHORE WORKS OVERALL PLAN**

Scale: 1:1000

Plan No: LHR30.061/OP

SHEET 1 OF 1



**LEGEND**

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- WATER (EX)
- FENCE (EX)
- EDGE OF BITUMEN (EX)
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STINGIN
- SM/PM
- STORMWATER PIPE (NEW)
- LANDSCAPE FENCE (NEW)
- LANDSCAPE FENCE (EXISTING)
- BOLLARD LINE (EXISTING)
- BOUNDARY
- FK 4.95 FINISHED SURFACE RL
- BIORETENTION
- TURFCCELL
- CAR PARKING
- AC SEAL

**ISSUED FOR PART V ASSESSMENT DRAFT FOR REVIEW**

| No. | Date     | By  | Change | Amendments |
|-----|----------|-----|--------|------------|
| B   | 31/11/17 | PJB |        | XU         |
| A   | 27/10/17 | PJB |        |            |

**DESIGNED** PJB

**DRAWN** PJB

**CHECKED**

**APPROVED**

DRAWING LHR\_30\_061 LAKE A FORESHORE DA.dwg

**DESIGNED** PJB

**DRAWN** PJB

**CHECKED**

**APPROVED**

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**BALLINA SHIRE COUNCIL**

**LAKE AINSWORTH FORESHORE WORKS**

**SOUTHERN FORESHORE GENERAL WORKS PLAN**

**AND TYPICAL DETAILS**

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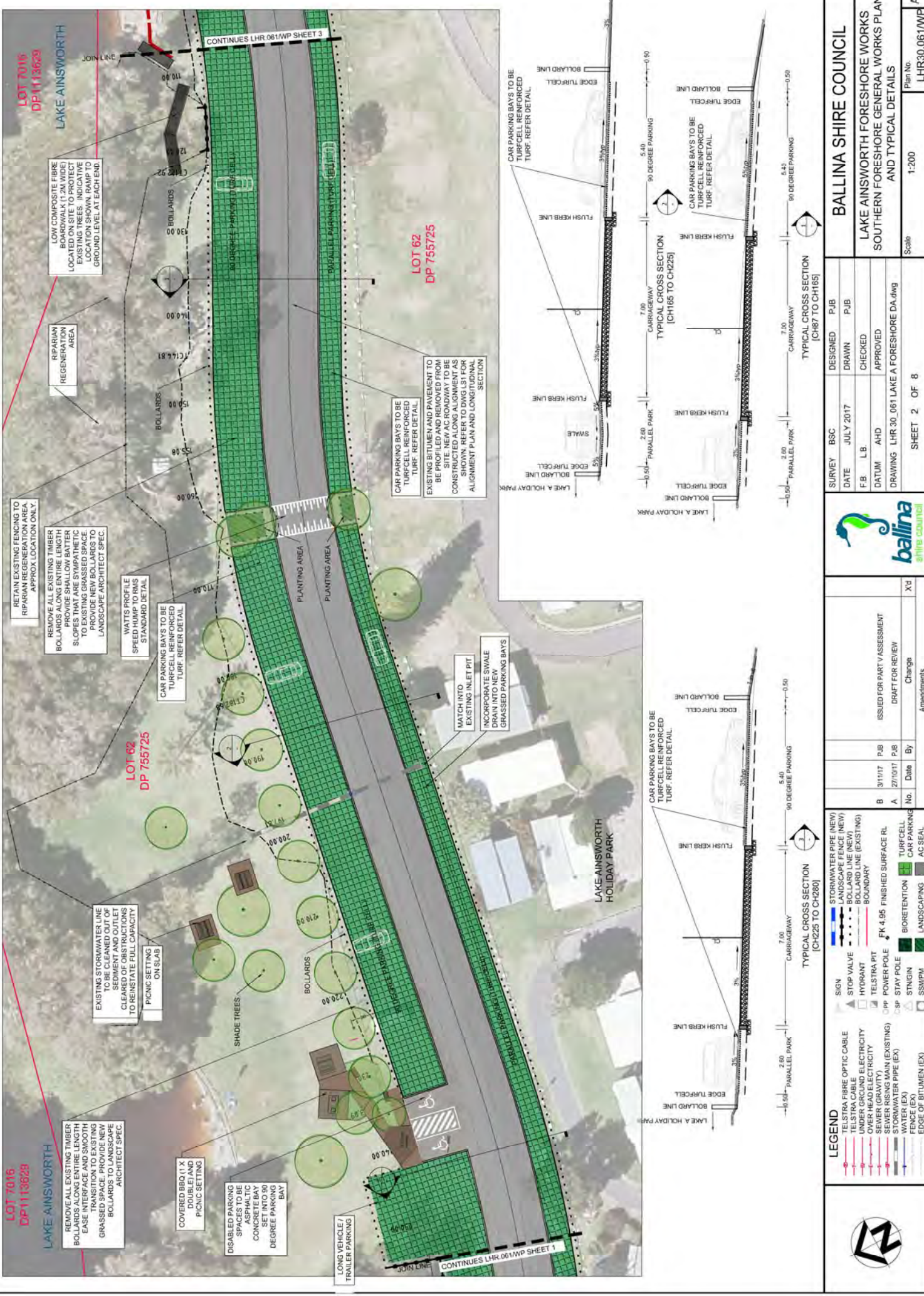
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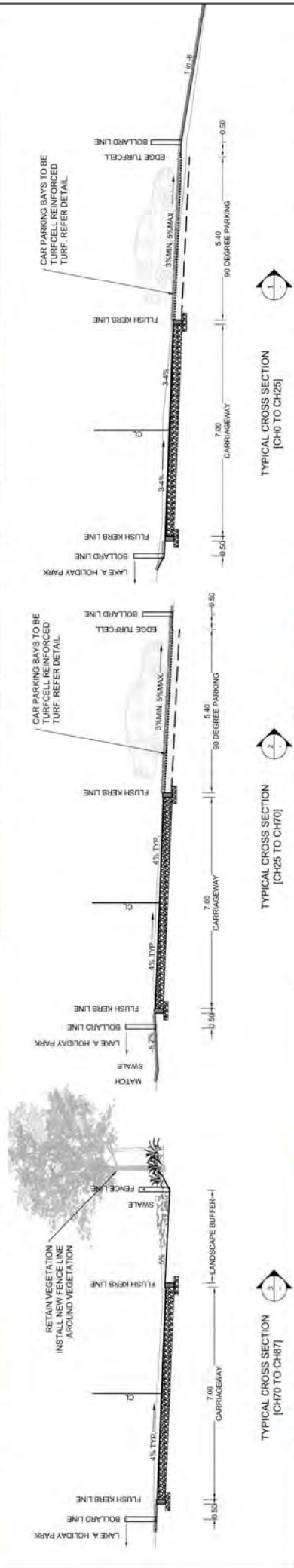
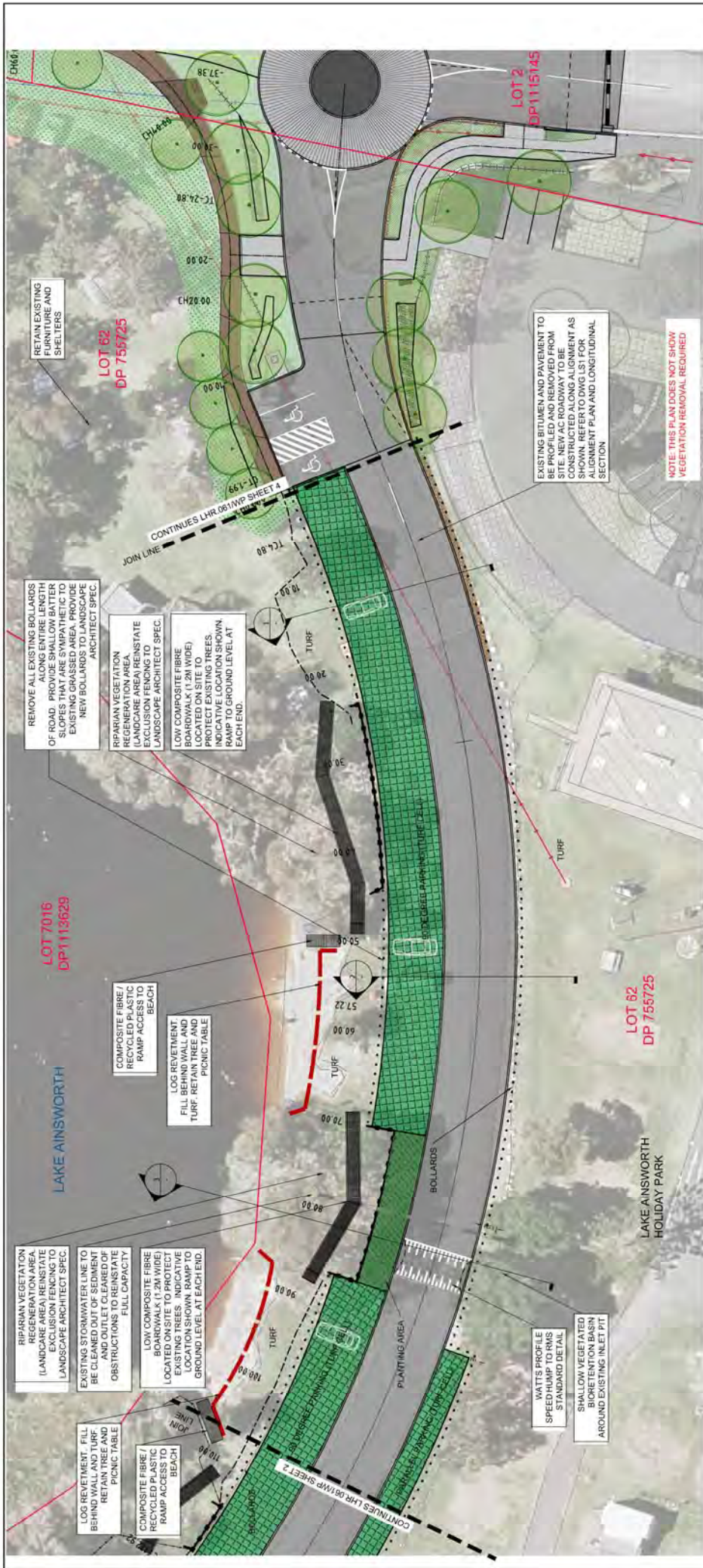
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| TELSTRA FIBRE OPTIC CABLE    | STOP VALVE    | STORMWATER PIPE (NEW)      | LANDSCAPE FENCE (NEW) | LANDSCAPE FENCE (EXISTING) | BOUNDARY    | HYDRANT     | TELSTRA PIT | TELSTRA PIT | POWER POLE | STAY POLE    | STINGIN      | SSNMP        | TURFCELL    | BIORETENTION | LANDSCAPING | AC SEAL |
| UNDER GROUND ELECTRICITY     | TELSTRA CABLE | LANDSCAPE FENCE (EXISTING) | BOUNDARY              | HYDRANT                    | TELSTRA PIT | TELSTRA PIT | POWER POLE  | STAY POLE   | STINGIN    | SSNMP        | TURFCELL     | BIORETENTION | LANDSCAPING | AC SEAL      |             |         |
| OVER HEAD ELECTRICITY        | TELSTRA CABLE | BOUNDARY                   | HYDRANT               | TELSTRA PIT                | TELSTRA PIT | POWER POLE  | STAY POLE   | STINGIN     | SSNMP      | TURFCELL     | BIORETENTION | LANDSCAPING  | AC SEAL     |              |             |         |
| SEWER RISING MAIN (EXISTING) | TELSTRA CABLE | HYDRANT                    | TELSTRA PIT           | TELSTRA PIT                | POWER POLE  | STAY POLE   | STINGIN     | SSNMP       | TURFCELL   | BIORETENTION | LANDSCAPING  | AC SEAL      |             |              |             |         |
| STORMWATER PIPE (EX)         | TELSTRA CABLE | HYDRANT                    | TELSTRA PIT           | TELSTRA PIT                | POWER POLE  | STAY POLE   | STINGIN     | SSNMP       | TURFCELL   | BIORETENTION | LANDSCAPING  | AC SEAL      |             |              |             |         |
| WATER (EX)                   | TELSTRA CABLE | HYDRANT                    | TELSTRA PIT           | TELSTRA PIT                | POWER POLE  | STAY POLE   | STINGIN     | SSNMP       | TURFCELL   | BIORETENTION | LANDSCAPING  | AC SEAL      |             |              |             |         |
| FENCE (EX)                   | TELSTRA CABLE | HYDRANT                    | TELSTRA PIT           | TELSTRA PIT                | POWER POLE  | STAY POLE   | STINGIN     | SSNMP       | TURFCELL   | BIORETENTION | LANDSCAPING  | AC SEAL      |             |              |             |         |
| EDGE OF BITUMEN (EX)         | TELSTRA CABLE | HYDRANT                    | TELSTRA PIT           | TELSTRA PIT                | POWER POLE  | STAY POLE   | STINGIN     | SSNMP       | TURFCELL   | BIORETENTION | LANDSCAPING  | AC SEAL      |             |              |             |         |

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| CHECKED  |                                    |
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| F.B      | LB                                 | DATUM    | AHD       |
| DESIGNED | PJB                                | DRAWN    | PJB       |
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| <b>BALLINA SHIRE COUNCIL</b>                              |                          |
| LAKE AINSWORTH FORESHORE WORKS                            |                          |
| SOUTHERN FORESHORE GENERAL WORKS PLAN AND TYPICAL DETAILS |                          |
| SHEET 2 OF 8  | Plan No. LHR30.061/MP A1 |





**LEGEND**

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER (SISING MAIN) (EXISTING)
- STORMWATER PIPE (EX)
- WATER (EX)
- FENCE (EX)
- EDGE OF BITUMEN (EX)
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STINGIN
- SSNMP
- STORMWATER PIPE (NEW)
- LANDSCAPE FENCE (NEW)
- BOLLARD LINE (EXISTING)
- BOUNDARY
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STINGIN
- SSNMP
- BIORETENTION
- LANDSCAPING
- TURFCELL
- CAR PARKING
- AC SEAL

**BALLINA SHIRE COUNCIL**

LAKE AINSWORTH FORESHORE WORKS  
SOUTHERN FORESHORE GENERAL WORKS PLAN  
AND TYPICAL DETAILS

Scale 1:200

Sheet 3 OF 8

DESIGNED PJB  
DRAWN PJB  
CHECKED  
APPROVED

DATE JULY 2017  
F.B. L.B.  
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ISSUED FOR PART V ASSESSMENT  
DRAFT FOR REVIEW

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A 27/10/17 PJB

No. Date By Change

Amendments

Plan No. LHR30.061/MP A1



**LOT 1**  
DP1115145

**LOT 2**  
DP1115145

**LOT 3**  
DP1115145

**LOT 62**  
DP 755725

**WARNING**  
1KV OVERHEAD  
ELECTRICAL CABLES

DEMOLISH DRIVEWAY  
LAYBACK AND REINSTATE  
DRIVEWAY WITH DISH DRAIN  
INTO 4 MIN  
ROUNDABOUT

MINI ROUNDABOUT TO  
INCORPORATE SPECIALTY  
PAVEMENT TREATMENT  
AS SPECIFIED BY  
LANDSCAPE ARCHITECT

DEMOLISH EXISTING BRAM  
RAMP KERB AND GUTTER  
AND REPLACE AS SHOWN

NEW SOAK WELL  
(REFER DETAIL)  
SLS.15  
IL 4.00

DEMOLISH EXISTING DISH  
DRAIN AND FORM BLISTER  
KERB TO INCORPORATE A  
BLOCK OUT TO ALLOW  
DRAINAGE TO RAINGARDEN.

REFER TO LHR.061/WP SHEETS 5

DEMOLISH EXISTING KERB  
AND GUTTER REPLACE WITH  
NEW RECESSED BIORETENTION  
SWALE

TURFCELL TO BE PROVIDED AS  
MATCHED FOR EMERGENCY  
VEHICLE ACCESS (OPTIONAL)

DEMOLISH EXISTING SWALE  
AND REPLACE WITH  
NEW RECESSED BIORETENTION  
SWALE

DEMOLISH EXISTING CONCRETE  
DRIVEWAY  
EXTEND UPRIGHT KERB  
ALONG TO FORM CAR  
SPACES

FORM GRASSSED SWALE TO  
FORM CAR SPACES  
RUNOFF TO RAINGARDEN

**WARNING**  
TELSTRA FIBRE OPTIC CABLES  
TO BE LOCATED AND LEVELLED  
PRIOR TO COMMENCEMENT  
OF WORKS

DEMOLISH EXISTING  
CONCRETE DRIVEWAY  
EXTEND UPRIGHT KERB  
ALONG TO FORM CAR  
SPACES

PAVED SURFACES TO BE GENERALLY  
GRADE TOWARDS DEPRESSED  
RAINGARDENS

CONSTRUCT FOOTING  
AND RELOCATE AND  
PERMIT FOR  
MACHINE

COLOURED CONCRETE  
PATHWAY INCORPORATING  
ANGLED JOINTS

BIN SET (RECYCLE  
AND GENERAL  
WASTE)

PAVED SURFACES TO BE GENERALLY  
GRADE TOWARDS DEPRESSED  
RAINGARDENS

DEMOLISH EXISTING SWALE  
AND REPLACE WITH  
NEW RECESSED BIORETENTION  
SWALE

DEMOLISH EXISTING CONCRETE  
DRIVEWAY  
EXTEND UPRIGHT KERB  
ALONG TO FORM CAR  
SPACES

FORM GRASSSED SWALE TO  
FORM CAR SPACES  
RUNOFF TO RAINGARDEN

**WARNING**  
TELSTRA FIBRE OPTIC CABLES  
TO BE LOCATED AND LEVELLED  
PRIOR TO COMMENCEMENT  
OF WORKS

DEMOLISH EXISTING  
CONCRETE DRIVEWAY  
EXTEND UPRIGHT KERB  
ALONG TO FORM CAR  
SPACES

PAVED SURFACES TO BE GENERALLY  
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CONSTRUCT FOOTING  
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COLOURED CONCRETE  
PATHWAY INCORPORATING  
ANGLED JOINTS

BIN SET (RECYCLE  
AND GENERAL  
WASTE)

DEMOLISH EXISTING SWALE  
AND REPLACE WITH  
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SWALE

DEMOLISH EXISTING CONCRETE  
DRIVEWAY  
EXTEND UPRIGHT KERB  
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FORM GRASSSED SWALE TO  
FORM CAR SPACES  
RUNOFF TO RAINGARDEN

**WARNING**  
TELSTRA FIBRE OPTIC CABLES  
TO BE LOCATED AND LEVELLED  
PRIOR TO COMMENCEMENT  
OF WORKS

DEMOLISH EXISTING  
CONCRETE DRIVEWAY  
EXTEND UPRIGHT KERB  
ALONG TO FORM CAR  
SPACES

PAVED SURFACES TO BE GENERALLY  
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RAINGARDENS

CONSTRUCT FOOTING  
AND RELOCATE AND  
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MACHINE

COLOURED CONCRETE  
PATHWAY INCORPORATING  
ANGLED JOINTS

BIN SET (RECYCLE  
AND GENERAL  
WASTE)

**LEGEND**

- LANDSCAPING - TURF
- BIORETENTION
- RIPIARIAN VEGETATION  
REHABILITATION AREA
- PAVEMENT REPAIR  
AND REGRADING
- TELSTRA FIBRE OPTIC CABLE
- UNDER GROUND ELECTRICITY
- SEWER (RISING MAIN) (EXISTING)
- STORM WATER PIPE (EX)
- STORM WATER PIPE (NEW)
- FENCE (EXISTING)
- EXISTING EDGE OF BITUMEN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STINGIN
- SSMPP
- SIGN
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FINISHED SURFACE RL
- EMERGENCY ACCESS
- FK - FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH DRAIN
- FK - TOP OF KERB
- FS FINISHED SURFACE
- BITUMEN (NEW)
- COLOURED CONCRETE PATH
- COBBLE GRANITE (GREY)
- COBBLE GRANITE (BLACK)
- BENCH SEAT
- TREE (EXISTING (RETAIN))
- TREE (EXISTING (REMOVE))
- TREE (NEW)

**DESIGNED** PJB

**DRAWN** PJB

**CHECKED**

**APPROVED**

**DATE** JULY 2017

**F.B.** LB

**DATUM** AHD

**DRAWING** LHR\_30\_061 LAKE A FORESHORE DA.dwg

**Scale** SCALE 1:100

**Sheet No.** SHEET 4 OF 8

**Plan No.** LHR30.061/WP A1

**BALLINA SHIRE COUNCIL**

**LAKE AINSWORTH FORESHORE WORKS**

**PACIFIC PDE & SOUTHERN RD INTERSECTION**

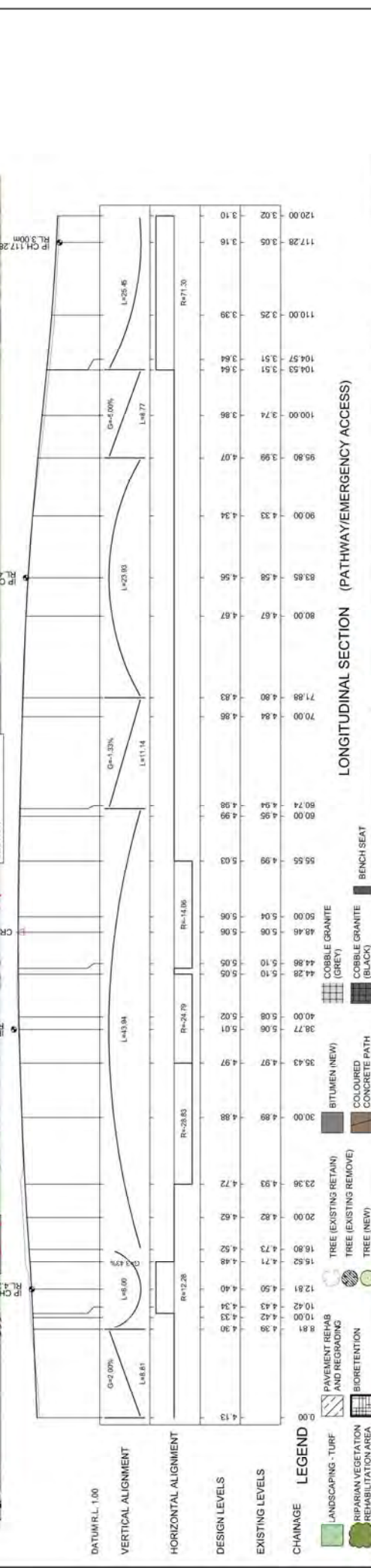
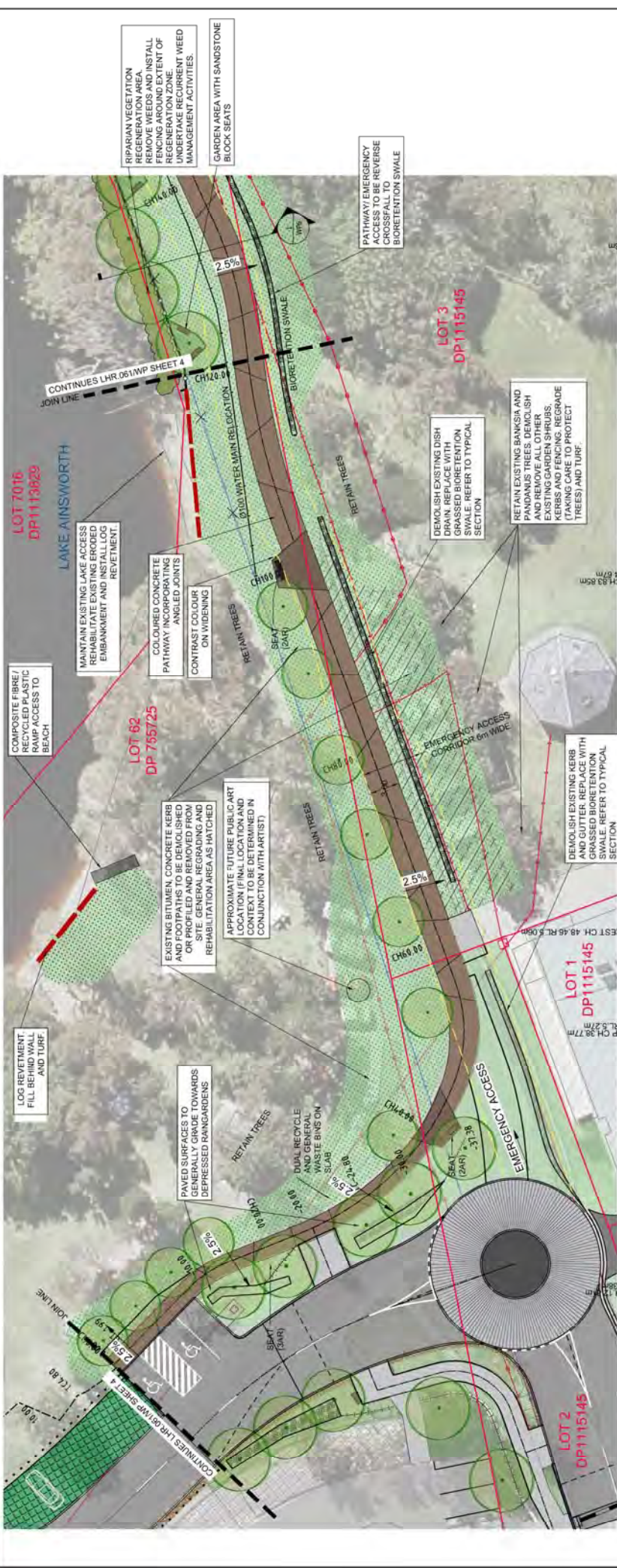
**GENERAL WORKS PLAN**

**ballina**  
shire council

ISSUED FOR PART V ASSESSMENT  
DRAFT FOR REVIEW

No. Date By Change

Amendments



**LEGEND**

- TELSTRA FIBRE OPTIC CABLE
- UNDER GROUND ELECTRICITY
- SEWER (GRAVITY)
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- STORMWATER PIPE (NEW)
- FENCE (EXISTING)
- FENCE (NEW)
- EXISTING EDGE OF BITUMEN
- PAVEMENT REPAIR AND REGRADING
- BIORETENTION
- LANDSCAPING - TURF
- RIPARIAN VEGETATION REHABILITATION AREA
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- PP POWER POLE
- OSP STAY POLE
- STINGER
- SSMPP
- SIGN
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FK 4.95 FINISHED SURFACE RL
- EMERGENCY ACCESS
- FK - FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH BRAIN
- FK - TOP OF KERB
- P3 FINISHED SURFACE

**LEGEND**

- BITUMEN (NEW)
- COBBLE GRANITE (GREY)
- COBBLE GRANITE (BLACK)
- COLOURED CONCRETE PATH
- CONCRETE
- COLOURED GRANITE
- BENCH SEAT
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FK 4.95 FINISHED SURFACE RL
- EMERGENCY ACCESS
- FK - FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH BRAIN
- FK - TOP OF KERB
- P3 FINISHED SURFACE

**DESIGNED** PJB

**DRAWN** PJB

**CHECKED**

**APPROVED**

DRAWING LHR\_30\_061 LAKE A FORESHORE DA.dwg

**DATE** JULY 2017

**F.B.** L.B.

**DATUM** AHD

**SCALE** 1:200 [H]  
1:100 [V]

**LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)**

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DRAWING LHR\_30\_061 LAKE A FORESHORE DA.dwg

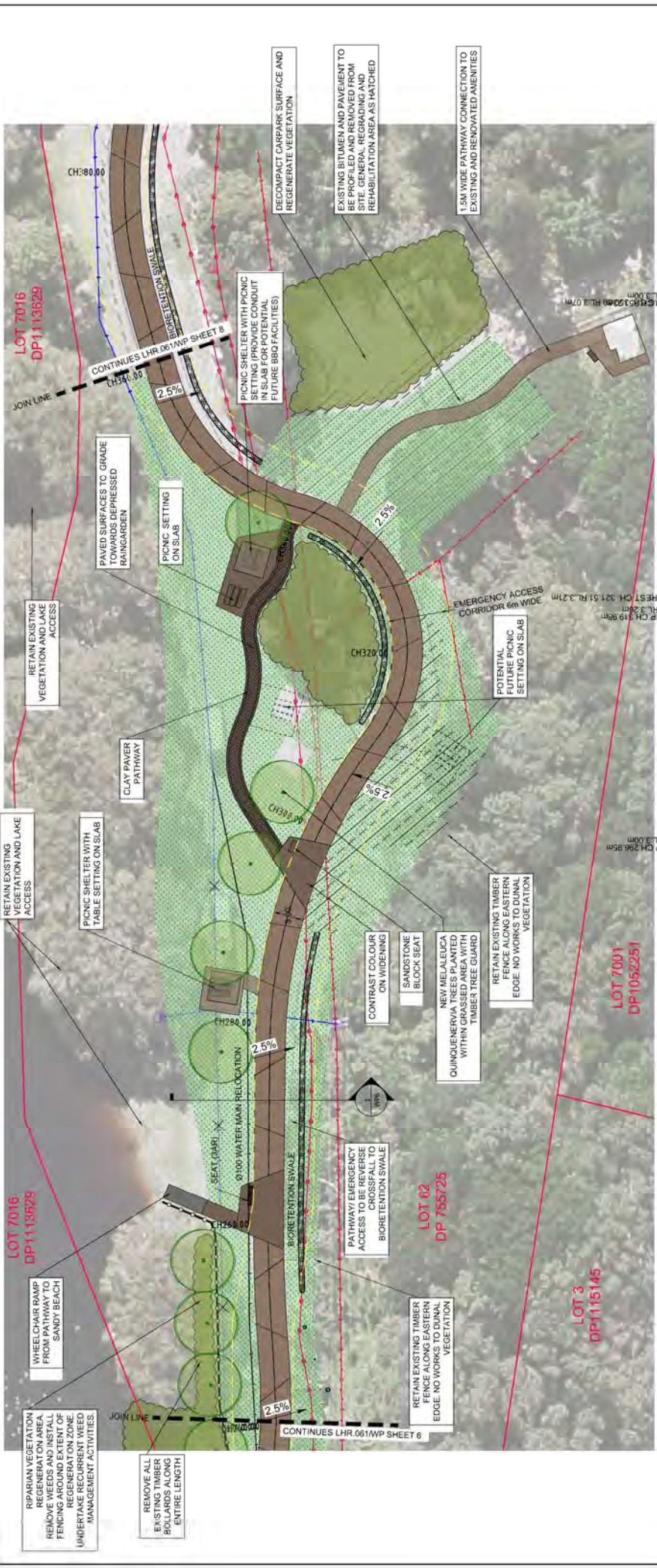
**DATE** JULY 2017

**F.B.** L.B.

**DATUM**







DATUM R.L. 1.00

VERTICAL ALIGNMENT

HORIZONTAL ALIGNMENT

DESIGN LEVELS

EXISTING LEVELS

CHAINAGE

LEGEND

LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)

| CHAINAGE | EXISTING LEVELS | DESIGN LEVELS | VERTICAL CURVE DATA | HORIZONTAL CURVE DATA |
|----------|-----------------|---------------|---------------------|-----------------------|
| 240.00   | 247.29          | 250.00        |                     |                       |
| 250.00   | 250.00          | 250.00        |                     |                       |
| 260.00   | 260.00          | 260.00        |                     |                       |
| 270.00   | 270.00          | 270.00        |                     |                       |
| 280.00   | 280.00          | 280.00        |                     |                       |
| 290.00   | 290.00          | 290.00        |                     |                       |
| 300.00   | 300.00          | 300.00        |                     |                       |
| 310.00   | 310.00          | 310.00        |                     |                       |
| 320.00   | 320.00          | 320.00        |                     |                       |
| 330.00   | 330.00          | 330.00        |                     |                       |
| 340.00   | 340.00          | 340.00        |                     |                       |
| 350.00   | 350.00          | 350.00        |                     |                       |
| 360.00   | 360.00          | 360.00        |                     |                       |
| 370.00   | 370.00          | 370.00        |                     |                       |
| 380.00   | 380.00          | 380.00        |                     |                       |
| 390.00   | 390.00          | 390.00        |                     |                       |
| 400.00   | 400.00          | 400.00        |                     |                       |
| 410.00   | 410.00          | 410.00        |                     |                       |
| 420.00   | 420.00          | 420.00        |                     |                       |
| 430.00   | 430.00          | 430.00        |                     |                       |
| 440.00   | 440.00          | 440.00        |                     |                       |
| 450.00   | 450.00          | 450.00        |                     |                       |
| 460.00   | 460.00          | 460.00        |                     |                       |
| 470.00   | 470.00          | 470.00        |                     |                       |
| 480.00   | 480.00          | 480.00        |                     |                       |
| 490.00   | 490.00          | 490.00        |                     |                       |
| 500.00   | 500.00          | 500.00        |                     |                       |
| 510.00   | 510.00          | 510.00        |                     |                       |
| 520.00   | 520.00          | 520.00        |                     |                       |
| 530.00   | 530.00          | 530.00        |                     |                       |
| 540.00   | 540.00          | 540.00        |                     |                       |
| 550.00   | 550.00          | 550.00        |                     |                       |
| 560.00   | 560.00          | 560.00        |                     |                       |
| 570.00   | 570.00          | 570.00        |                     |                       |
| 580.00   | 580.00          | 580.00        |                     |                       |
| 590.00   | 590.00          | 590.00        |                     |                       |
| 600.00   | 600.00          | 600.00        |                     |                       |
| 610.00   | 610.00          | 610.00        |                     |                       |
| 620.00   | 620.00          | 620.00        |                     |                       |
| 630.00   | 630.00          | 630.00        |                     |                       |
| 640.00   | 640.00          | 640.00        |                     |                       |
| 650.00   | 650.00          | 650.00        |                     |                       |
| 660.00   | 660.00          | 660.00        |                     |                       |
| 670.00   | 670.00          | 670.00        |                     |                       |
| 680.00   | 680.00          | 680.00        |                     |                       |
| 690.00   | 690.00          | 690.00        |                     |                       |
| 700.00   | 700.00          | 700.00        |                     |                       |
| 710.00   | 710.00          | 710.00        |                     |                       |
| 720.00   | 720.00          | 720.00        |                     |                       |
| 730.00   | 730.00          | 730.00        |                     |                       |
| 740.00   | 740.00          | 740.00        |                     |                       |
| 750.00   | 750.00          | 750.00        |                     |                       |
| 760.00   | 760.00          | 760.00        |                     |                       |
| 770.00   | 770.00          | 770.00        |                     |                       |
| 780.00   | 780.00          | 780.00        |                     |                       |
| 790.00   | 790.00          | 790.00        |                     |                       |
| 800.00   | 800.00          | 800.00        |                     |                       |
| 810.00   | 810.00          | 810.00        |                     |                       |
| 820.00   | 820.00          | 820.00        |                     |                       |
| 830.00   | 830.00          | 830.00        |                     |                       |
| 840.00   | 840.00          | 840.00        |                     |                       |
| 850.00   | 850.00          | 850.00        |                     |                       |
| 860.00   | 860.00          | 860.00        |                     |                       |
| 870.00   | 870.00          | 870.00        |                     |                       |
| 880.00   | 880.00          | 880.00        |                     |                       |
| 890.00   | 890.00          | 890.00        |                     |                       |
| 900.00   | 900.00          | 900.00        |                     |                       |
| 910.00   | 910.00          | 910.00        |                     |                       |
| 920.00   | 920.00          | 920.00        |                     |                       |
| 930.00   | 930.00          | 930.00        |                     |                       |
| 940.00   | 940.00          | 940.00        |                     |                       |
| 950.00   | 950.00          | 950.00        |                     |                       |
| 960.00   | 960.00          | 960.00        |                     |                       |
| 970.00   | 970.00          | 970.00        |                     |                       |
| 980.00   | 980.00          | 980.00        |                     |                       |
| 990.00   | 990.00          | 990.00        |                     |                       |
| 1000.00  | 1000.00         | 1000.00       |                     |                       |

**BALLINA SHIRE COUNCIL**

**LAKE AINSWORTH FORESHORE WORKS**  
STAGE 1 - EASTERN FORESHORE  
PLAN AND LONGSECTION (CH240 TO CH360)

Scale: 1:200 [H] 1:100 [V]

Plot No: LHR30.061/WP A1

SURVEY: BSC  
DATE: JULY 2017  
DESIGNED: PJB  
DRAWN: PJB  
CHECKED: PJB  
APPROVED: PJB

DRAWING: LHR\_30\_061 LAKE A FORESHORE DA.dwg

SHEET 7 OF 8

**ballina** shire council

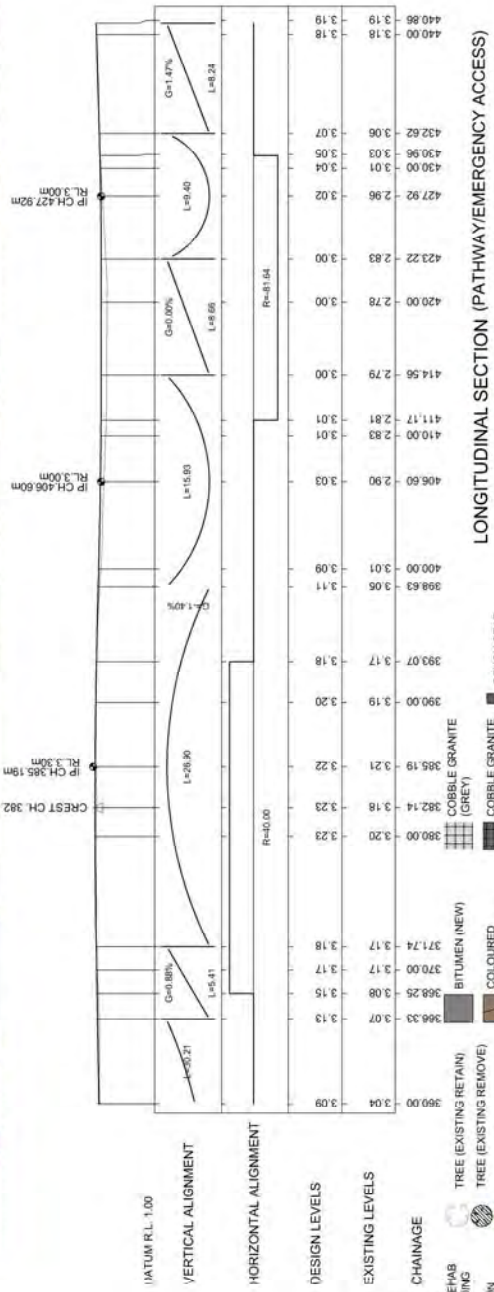
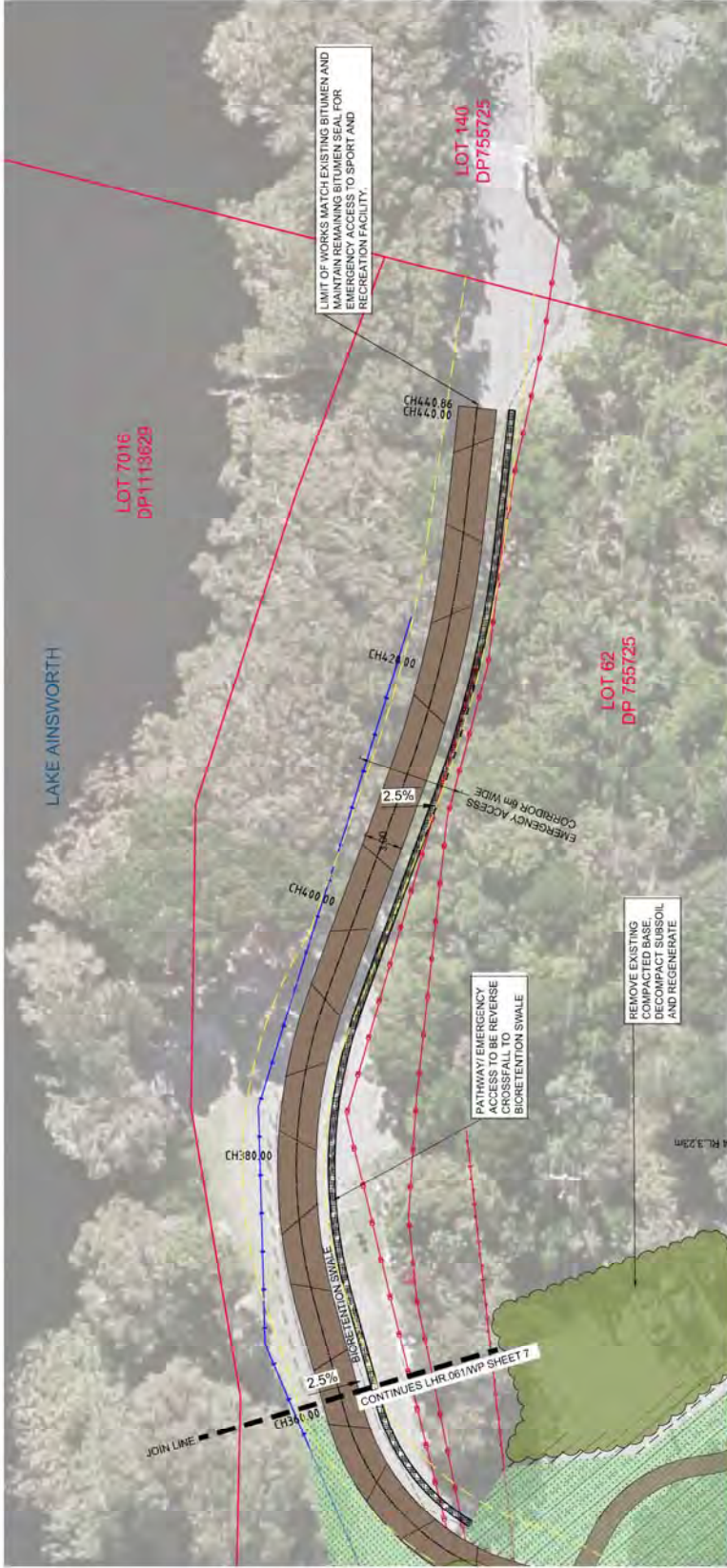
ISSUED FOR PART V ASSESSMENT  
DRAFT FOR REVIEW

No. Date By

Change Amendments

LEGEND

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER (GRAVITY)
- SEWER RISING MAIN (EXISTING)
- STORMWATER MAIN (EXISTING)
- STORMWATER PIPE (EX)
- STORMWATER PIPE (NEW)
- FENCE (EXISTING)
- FENCE (NEW)
- EXISTING EDGE OF BITUMEN
- PAVEMENT REPAIRS AND REGRADING
- BIORETENTION
- LANDSCAPING - TURF
- RIPIARIAN VEGETATION REHABILITATION AREA
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FK 4.95 FINISHED SURFACE
- EMERGENCY ACCESS
- FK - FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH BRAN
- FK - TOP OF KERB
- P5 FINISHED SURFACE
- SSM/MP
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- CPP POWER POLE
- OSP STAY POLE
- STINGIN
- SSM/MP
- COBBLE GRANITE (GREY)
- COBBLE GRANITE (BLACK)
- CONCRETE PATH
- COLOURED
- BITUMEN (NEW)
- BITUMEN (EXISTING)
- TREE (EXISTING RETAIN)
- TREE (EXISTING REMOVE)
- TREE (NEW)
- COBBLE GRANITE
- BENCH SEAT



LONGITUDINAL SECTION (PATHWAY/EMERGENCY ACCESS)

**LEGEND**

- LANDSCAPING - TURF
- RIPARIAN VEGETATION REHABILITATION AREA
- PAVEMENT REPAIR AND REGRADING
- BIOTRENTION
- TELSTRA FIBRE OPTIC CABLE
- TELSTRA COAXIAL CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER (GRAVITY)
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- STORMWATER PIPE (NEW)
- FENCE (EXISTING)
- FENCE (NEW)
- EXISTING EDGE OF BITUMEN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STINGIN
- SSMPPM
- SIGN
- WATER MAIN (NEW)
- WATER MAIN (EXISTING)
- FINISHED SURFACE RL
- EMERGENCY ACCESS
- FK - FLUSH KERB
- K&G - KERB AND GUTTER
- DISH - DISH DRAIN
- FK - TOP OF KERB
- PS FINISHED SURFACE
- COBBLER GRANITE (GREY)
- COBBLER GRANITE (BLACK)
- COLOURED CONCRETE PATH
- BITUMEN (NEW)
- COLOURED CONCRETE
- COBBLER GRANITE
- BENCH SEAT
- ISSUED FOR PART V ASSESSMENT DRAFT FOR REVIEW

**DESIGNED** PJB

**DRAWN** PJB

**CHECKED**

**APPROVED**

**DATUM** AHD

**DRAWING** LHR.30\_061 LAKE A FORESHORE DA.dwg

Scale: 1:200 [H]  
1:100 [V]

**SURVEY** BSC

**DATE** JULY 2017

**F.B.** L.B.

**DATUM** AHD

**DRAWING** LHR.30\_061 LAKE A FORESHORE DA.dwg

**Scale** 1:200 [H]  
1:100 [V]

**SHEET** 8 OF 8

**Plan No.** LHR30.061/WP

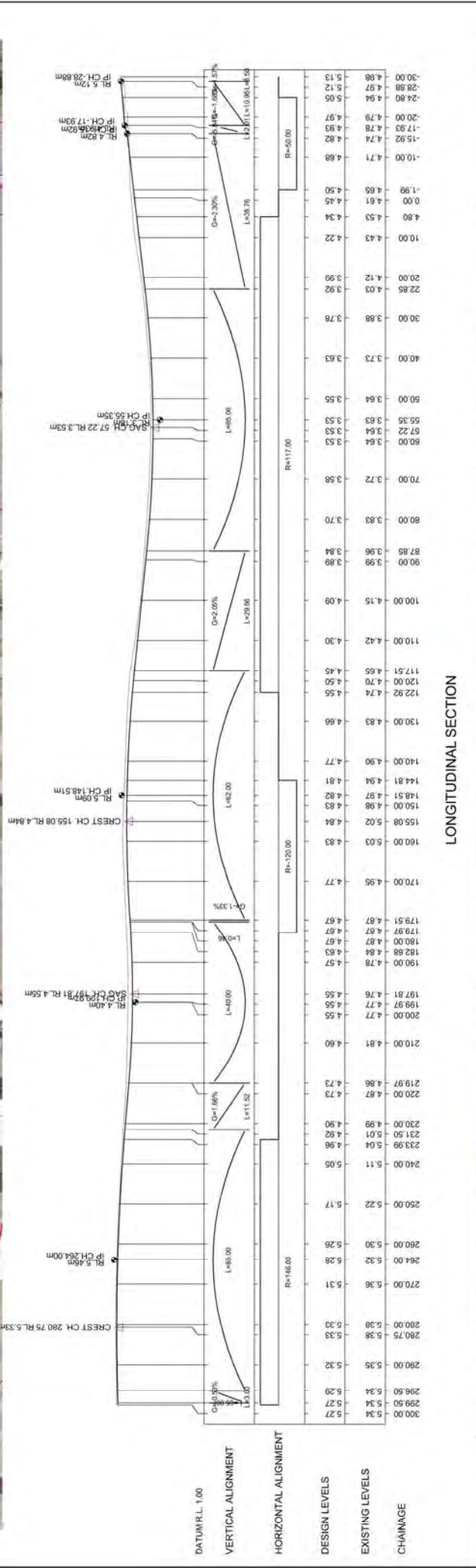
**ballina shire council**

**BALLINA SHIRE COUNCIL**

**LAKE AINSWORTH FORESHORE WORKS**

**EASTERN FORESHORE GENERAL WORKS**

**PLAN AND LONGSECTION (CH360 TO CH440)**



### LONGITUDINAL SECTION

**LEGEND**

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- WATER (EX)
- FENCE (EX)
- EDGE OF BITUMEN (EX)
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- PP POWER POLE
- SSP STAY POLE
- TELSTRA FENCE (NEW)
- LANDSCAPE FENCE (NEW)
- BOUNDARY
- BOUNDARY
- BIOTRETION
- LANDSCAPING
- AC SEAL

**ISSUED FOR PART 4 ASSESSMENT  
DRAFT FOR REVIEW**

**DATE** 3/11/17 **PUB** B  
27/10/17 **PUB** A

**NO.** Change **BY** Amendments

**DESIGNED** PJB  
**DRAWN** PJB  
**CHECKED**  
**APPROVED**

**DATE** JULY 2017  
**F.B.** L.B.  
**DATUM** AHD

**SURVEY** BSC  
**BSC** JULY 2017  
**DRAWING** LHR\_30\_061 LAKE A FORESHORE DA.dwg

**SCALE** 1:500 [H]  
1:100 [V]

**SHEET** 1 OF 2

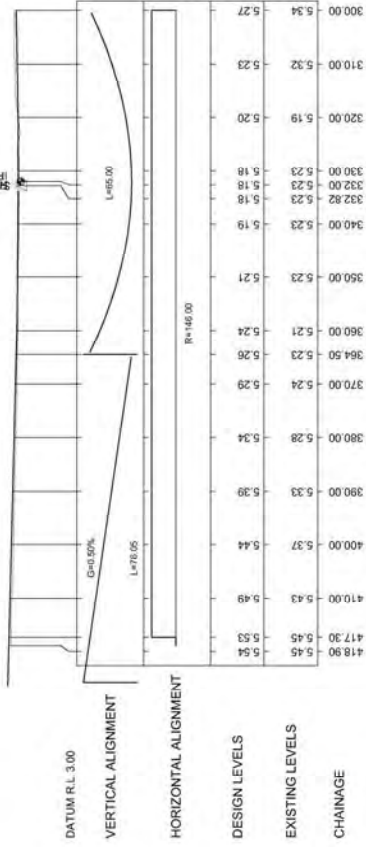
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**FILE NO.** A1

**BALLINA SHIRE COUNCIL**

**LAKE SOUTHWEST FORESHORE WORKS**

**SOUTHERN ROAD ALIGNMENT**

**PLAN AND LONGSECTION (CHD - 300)**



LONGITUDINAL SECTION

**LEGEND**

- TELSTRA FIBRE OPTIC CABLE
- TELSTRA CABLE
- UNDER GROUND ELECTRICITY
- OVER HEAD ELECTRICITY
- SEWER RISING MAIN (EXISTING)
- STORMWATER PIPE (EX)
- WATER (EX)
- FENCE (EX)
- EDGE OF BITUMEN (EX)
- SIGN
- STOP VALVE
- HYDRANT
- TELSTRA PIT
- POWER POLE
- STAY POLE
- STINGN
- SSNPM
- STORMWATER PIPE (NEW)
- LANDSCAPE FENCE (NEW)
- POST AND RAIL FENCE (EXISTING)
- BOUNDARY
- BIORETENTION
- LANDSCAPING
- TURFCELL
- CAR PARKING
- AC SEAL

**DESIGNED** PJB  
**DRAWN** PJB  
**CHECKED**  
**APPROVED**

**DATE** JULY 2017  
**F.B.** L.B.  
**DATUM** AHD  
**DRAWING** LHR30\_061 LAKE A FORESHORE DA.dwg

**ISSUED FOR PART V ASSESSMENT**  
**DRAFT FOR REVIEW**

**DATE** 3/11/17 PJB  
**DATE** 27/10/17 PJB

**NO.** B  
**NO.** A

**Change**  
**Amendments**

**Scale** 1:500 [H]  
1:100 [V]

**Plot No.** LHR30.061/LS

**SHEET 2 OF 2**

**BALLINA SHIRE COUNCIL**  
**LAKE AINSWORTH FORESHORE WORKS**  
**SOUTHERN ROAD ALIGNMENT**  
**PLAN AND LONGSECTION (CH900 - 380)**





## **APPENDIX B**

### **EPBC PROTECTED MATTERS DATABASE SEARCH RESULTS**



# 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: 24/04/17 19:12:04

## [Summary](#)

### [Details](#)

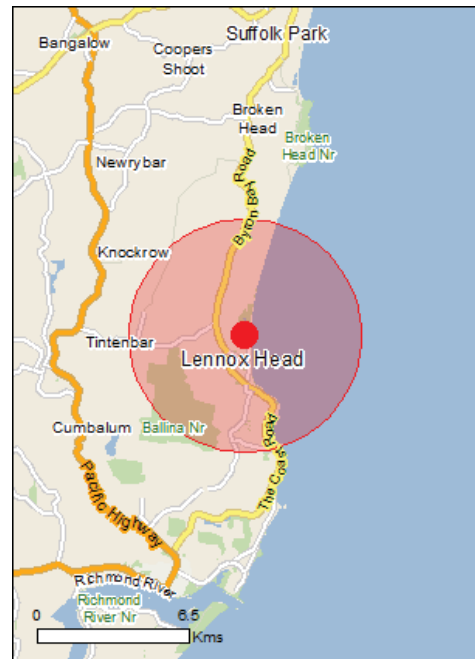
[Matters of NES](#)

[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: 5.0Km





# 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](#).

|   |      |
|---|------|
| <a href="#">World Heritage Properties:</a>                | None |
| <a href="#">National Heritage Places:</a>                 | None |
| <a href="#">Wetlands of International Importance:</a>     | None |
| <a href="#">Great Barrier Reef Marine Park:</a>           | None |
| <a href="#">Commonwealth Marine Area:</a>                 | None |
| <a href="#">Listed Threatened Ecological Communities:</a> | 2    |
| <a href="#">Listed Threatened Species:</a>                | 76   |
| <a href="#">Listed Migratory Species:</a>                 | 72   |

## 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.

|  |      |
|--|------|
| <a href="#">Commonwealth Land:</a>                 | 1    |
| <a href="#">Commonwealth Heritage Places:</a>      | None |
| <a href="#">Listed Marine Species:</a>             | 110  |
| <a href="#">Whales and Other Cetaceans:</a>        | 13   |
| <a href="#">Critical Habitats:</a>                 | None |
| <a href="#">Commonwealth Reserves Terrestrial:</a> | None |
| <a href="#">Commonwealth Reserves Marine:</a>      | None |

## Extra Information

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

|  |      |
|--|------|
| <a href="#">State and Territory Reserves:</a>    | 1    |
| <a href="#">Regional Forest Agreements:</a>      | 1    |
| <a href="#">Invasive Species:</a>                | 38   |
| <a href="#">Nationally Important Wetlands:</a>   | None |
| <a href="#">Key Ecological Features (Marine)</a> | 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                      |
|--|-----------------------|---------------------------------------|
| <a href="#">Littoral Rainforest and Coastal Vine Thickets of Eastern Australia</a> | Critically Endangered | Community likely to occur within area |
| <a href="#">Lowland Rainforest of Subtropical Australia</a>                        | Critically Endangered | Community may occur within area       |

### Listed Threatened Species [ [Resource Information](#) ]

| Name   | Status                | Type of Presence   |
|--|-----------------------|--|
| <b>Birds</b>   |                       |  |
| <a href="#">Anthochaera phrygia</a><br>Regent Honeyeater [82338]                         | Critically Endangered | Foraging, feeding or related behaviour likely to occur within area |
| <a href="#">Botaurus poiciloptilus</a><br>Australasian Bittern [1001]                    | Endangered            | Species or species habitat known to occur within area              |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]                                 | Endangered            | Species or species habitat known to occur within area              |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                            | Critically Endangered | Species or species habitat known to occur within area              |
| <a href="#">Calidris tenuirostris</a><br>Great Knot [862]                                | Critically Endangered | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Charadrius leschenaultii</a><br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable            | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Charadrius mongolus</a><br>Lesser Sand Plover, Mongolian Plover [879]        | Endangered            | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Cyclopsitta diophthalma coxeni</a><br>Coxen's Fig-Parrot [59714]             | Endangered            | Species or species habitat may occur within area                   |
| <a href="#">Diomedea antipodensis</a><br>Antipodean Albatross [64458]                    | Vulnerable            | Species or species habitat may occur within area                   |
| <a href="#">Diomedea antipodensis gibsoni</a><br>Gibson's Albatross [82270]              | Vulnerable            | Species or species habitat may occur within area                   |

| Name   | Status                | Type of Presence   |
|--|-----------------------|--|
| <a href="#">Diomedea epomophora</a><br>Southern Royal Albatross [89221]  | Vulnerable            | Species or species habitat may occur within area                   |
| <a href="#">Diomedea exulans</a><br>Wandering Albatross [89223]  | Vulnerable            | Species or species habitat may occur within area                   |
| <a href="#">Erythrotriorchis radiatus</a><br>Red Goshawk [942]   | Vulnerable            | Species or species habitat likely to occur within area             |
| <a href="#">Fregetta grallaria grallaria</a><br>White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438] | Vulnerable            | Species or species habitat likely to occur within area             |
| <a href="#">Lathamus discolor</a><br>Swift Parrot [744]  | Critically Endangered | Species or species habitat likely to occur within area             |
| <a href="#">Limosa lapponica baueri</a><br>Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]                           | Vulnerable            | Species or species habitat known to occur within area              |
| <a href="#">Limosa lapponica menzbieri</a><br>Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]                   | Critically Endangered | Species or species habitat may occur within area                   |
| <a href="#">Macronectes giganteus</a><br>Southern Giant-Petrel, Southern Giant Petrel [1060]   | Endangered            | Species or species habitat may occur within area                   |
| <a href="#">Macronectes halli</a><br>Northern Giant Petrel [1061]  | Vulnerable            | Species or species habitat may occur within area                   |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]  | Critically Endangered | Species or species habitat known to occur within area              |
| <a href="#">Pachyptila turtur subantarctica</a><br>Fairy Prion (southern) [64445]  | Vulnerable            | Species or species habitat known to occur within area              |
| <a href="#">Phoebastria fusca</a><br>Sooty Albatross [1075]  | Vulnerable            | Species or species habitat may occur within area                   |
| <a href="#">Pterodroma leucoptera leucoptera</a><br>Gould's Petrel, Australian Gould's Petrel [26033]                                      | Endangered            | Species or species habitat may occur within area                   |
| <a href="#">Pterodroma neglecta neglecta</a><br>Kermadec Petrel (western) [64450]  | Vulnerable            | Foraging, feeding or related behaviour may occur within area       |
| <a href="#">Rostratula australis</a><br>Australian Painted Snipe [77037]   | Endangered            | Species or species habitat likely to occur within area             |
| <a href="#">Thalassarche cauta cauta</a><br>Shy Albatross, Tasmanian Shy Albatross [82345]   | Vulnerable            | Species or species habitat may occur within area                   |
| <a href="#">Thalassarche cauta steadi</a><br>White-capped Albatross [82344]  | Vulnerable            | Foraging, feeding or related behaviour likely to occur within area |
| <a href="#">Thalassarche eremita</a><br>Chatham Albatross [64457]  | Endangered            | Species or species habitat may occur within area                   |

| Name  | Status     | Type of Presence  |
|---|------------|---|
| <a href="#">Thalassarche impavida</a><br>Campbell Albatross, Campbell Black-browed Albatross [64459]  | Vulnerable | Species or species habitat may occur within area                  |
| <a href="#">Thalassarche melanophris</a><br>Black-browed Albatross [66472]  | Vulnerable | Species or species habitat may occur within area                  |
| <a href="#">Thalassarche salvini</a><br>Salvin's Albatross [64463]  | Vulnerable | Species or species habitat may occur within area                  |
| <a href="#">Turnix melanogaster</a><br>Black-breasted Button-quail [923]  | Vulnerable | Species or species habitat may occur within area                  |
| <b>Fish</b>   |            |   |
| <a href="#">Epinephelus daemeli</a><br>Black Rockcod, Black Cod, Saddled Rockcod [68449]  | Vulnerable | Species or species habitat likely to occur within area            |
| <b>Frogs</b>  |            |   |
| <a href="#">Litoria olongburensis</a><br>Wallum Sedge Frog [1821]   | Vulnerable | Species or species habitat known to occur within area             |
| <b>Insects</b>  |            |   |
| <a href="#">Phyllodes imperialis smithersi</a><br>Pink Underwing Moth [86084]   | Endangered | Species or species habitat may occur within area                  |
| <b>Mammals</b>  |            |   |
| <a href="#">Balaenoptera musculus</a><br>Blue Whale [36]  | Endangered | Species or species habitat may occur within area                  |
| <a href="#">Chalinolobus dwyeri</a><br>Large-eared Pied Bat, Large Pied Bat [183]   | Vulnerable | Species or species habitat likely to occur within area            |
| <a href="#">Dasyurus maculatus maculatus (SE mainland population)</a><br>Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]                            | Endangered | Species or species habitat likely to occur within area            |
| <a href="#">Eubalaena australis</a><br>Southern Right Whale [40]  | Endangered | Species or species habitat likely to occur within area            |
| <a href="#">Megaptera novaeangliae</a><br>Humpback Whale [38]   | Vulnerable | Species or species habitat known to occur within area             |
| <a href="#">Petauroides volans</a><br>Greater Glider [254]  | Vulnerable | Species or species habitat may occur within area                  |
| <a href="#">Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)</a><br>Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Vulnerable | Species or species habitat known to occur within area             |
| <a href="#">Potorous tridactylus tridactylus</a><br>Long-nosed Potoroo (SE mainland) [66645]  | Vulnerable | Species or species habitat likely to occur within area            |
| <a href="#">Pseudomys novaehollandiae</a><br>New Holland Mouse, Pookila [96]  | Vulnerable | Species or species habitat likely to occur within area            |
| <a href="#">Pteropus poliocephalus</a><br>Grey-headed Flying-fox [186]  | Vulnerable | Foraging, feeding or related behaviour known to occur within area |

| Name  | Status                | Type of Presence                                       |
|---|-----------------------|--|
| <a href="#">Xeromys myoides</a><br>Water Mouse, False Water Rat, Yirrkoo [66]   | Vulnerable            | Species or species habitat may occur within area       |
| <b>Other</b>  |                       |  |
| <a href="#">Thersites mitchellae</a><br>Mitchell's Rainforest Snail [66774]   | Critically Endangered | Species or species habitat known to occur within area  |
| <b>Plants</b>   |                       |  |
| <a href="#">Acronychia littoralis</a><br>Scented Acronychia [8582]  | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Allocasuarina defungens</a><br>Dwarf Heath Casuarina [21924]  | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Arthraxon hispidus</a><br>Hairy-joint Grass [9338]  | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Baloghia marmorata</a><br>Marbled Balogia, Jointed Baloghia [8463]  | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Bulbophyllum globuliforme</a><br>Miniature Moss-orchid, Hoop Pine Orchid [6649]   | Vulnerable            | Species or species habitat may occur within area       |
| <a href="#">Cryptocarya foetida</a><br>Stinking Cryptocarya, Stinking Laurel [11976]  | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Cryptostylis hunteriana</a><br>Leafless Tongue-orchid [19533]   | Vulnerable            | Species or species habitat may occur within area       |
| <a href="#">Davidsonia jerseyana</a><br>Davidson's Plum [67219]   | Endangered            | Species or species habitat may occur within area       |
| <a href="#">Davidsonia johnsonii</a><br>Smooth Davidsonia, Smooth Davidson's Plum, Small-leaved Davidson's Plum [67178]                     | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Diploglottis campbellii</a><br>Small-leaved Tamarind [21484]  | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Floydia praealta</a><br>Ball Nut, Possum Nut, Big Nut, Beefwood [15762]   | Vulnerable            | Species or species habitat likely to occur within area |
| <a href="#">Fontainea oraria</a><br>Coastal Fontainea [24038]   | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Gossia fragrantissima</a><br>Sweet Myrtle, Small-leaved Myrtle [78867]  | Endangered            | Species or species habitat likely to occur within area |
| <a href="#">Macadamia integrifolia</a><br>Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]            | Vulnerable            | Species or species habitat may occur within area       |
| <a href="#">Macadamia tetraphylla</a><br>Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581] | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Owenia cepiodora</a><br>Onionwood, Bog Onion, Onion Cedar [11344]   | Vulnerable            | Species or species habitat likely to occur             |

| Name  | Status     | Type of Presence                                       |
|---|------------|--|
| <a href="#">Phaius australis</a><br>Lesser Swamp-orchid [5872]  | Endangered | Species or species habitat likely to occur within area |
| <a href="#">Randia moorei</a><br>Spiny Gardenia [10577]   | Endangered | Species or species habitat likely to occur within area |
| <a href="#">Syzygium hodgkinsoniae</a><br>Smooth-bark Rose Apple, Red Lilly Pilly [3539]                              | Vulnerable | Species or species habitat likely to occur within area |
| <a href="#">Syzygium moorei</a><br>Rose Apple, Coolamon, Robby, Durobby, Watermelon Tree, Coolamon Rose Apple [12284] | Vulnerable | Species or species habitat likely to occur within area |
| <a href="#">Thesium australe</a><br>Austral Toadflax, Toadflax [15202]  | Vulnerable | Species or species habitat may occur within area       |

## Reptiles

|  |            |   |
|--|------------|---|
| <a href="#">Caretta caretta</a><br>Loggerhead Turtle [1763]                              | Endangered | Breeding known to occur within area                   |
| <a href="#">Chelonia mydas</a><br>Green Turtle [1765]                                    | Vulnerable | Species or species habitat known to occur within area |
| <a href="#">Dermochelys coriacea</a><br>Leatherback Turtle, Leathery Turtle, Luth [1768] | Endangered | Breeding known to occur within area                   |
| <a href="#">Eretmochelys imbricata</a><br>Hawksbill Turtle [1766]                        | Vulnerable | Species or species habitat known to occur within area |
| <a href="#">Natator depressus</a><br>Flatback Turtle [59257]                             | Vulnerable | Species or species habitat known to occur within area |

## Sharks

|   |                       |  |
|---|-----------------------|--|
| <a href="#">Carcharias taurus (east coast population)</a><br>Grey Nurse Shark (east coast population) [68751] | Critically Endangered | Species or species habitat likely to occur within area |
| <a href="#">Carcharodon carcharias</a><br>White Shark, Great White Shark [64470]                              | Vulnerable            | Species or species habitat known to occur within area  |
| <a href="#">Rhincodon typus</a><br>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                                       |
|---|------------|--|
| <b>Migratory Marine Birds</b>   |            |  |
| <a href="#">Anous stolidus</a><br>Common Noddy [825]                    |            | Species or species habitat likely to occur within area |
| <a href="#">Apus pacificus</a><br>Fork-tailed Swift [678]               |            | Species or species habitat likely to occur within area |
| <a href="#">Calonectris leucomelas</a><br>Streaked Shearwater [1077]    |            | Species or species habitat may occur within area       |
| <a href="#">Diomedea epomophora</a><br>Southern Royal Albatross [89221] | Vulnerable | Species or species                                     |

| Name   | Threatened  | Type of Presence  |
|--|-------------|---|
| <a href="#">Diomedea exulans</a><br>Wandering Albatross [89223]                                | Vulnerable  | habitat may occur within area<br>Species or species habitat may occur within area |
| <a href="#">Fregata ariel</a><br>Lesser Frigatebird, Least Frigatebird [1012]                  |             | Species or species habitat known to occur within area                             |
| <a href="#">Fregata minor</a><br>Great Frigatebird, Greater Frigatebird [1013]                 |             | Species or species habitat known to occur within area                             |
| <a href="#">Macronectes giganteus</a><br>Southern Giant-Petrel, Southern Giant Petrel [1060]   | Endangered  | Species or species habitat may occur within area                                  |
| <a href="#">Macronectes halli</a><br>Northern Giant Petrel [1061]                              | Vulnerable  | Species or species habitat may occur within area                                  |
| <a href="#">Phoebetria fusca</a><br>Sooty Albatross [1075]                                     | Vulnerable  | Species or species habitat may occur within area                                  |
| <a href="#">Puffinus carneipes</a><br>Flesh-footed Shearwater, Fleshy-footed Shearwater [1043] |             | Species or species habitat likely to occur within area                            |
| <a href="#">Sterna albifrons</a><br>Little Tern [813]  |             | Species or species habitat may occur within area                                  |
| <a href="#">Thalassarche cauta</a><br>Tasmanian Shy Albatross [89224]                          | Vulnerable* | Species or species habitat may occur within area                                  |
| <a href="#">Thalassarche melanophris</a><br>Black-browed Albatross [66472]                     | Vulnerable  | Species or species habitat may occur within area                                  |
| <b>Migratory Marine Species</b>  |             |   |
| <a href="#">Balaenoptera edeni</a><br>Bryde's Whale [35]                                       |             | Species or species habitat may occur within area                                  |
| <a href="#">Balaenoptera musculus</a><br>Blue Whale [36]                                       | Endangered  | Species or species habitat may occur within area                                  |
| <a href="#">Carcharodon carcharias</a><br>White Shark, Great White Shark [64470]               | Vulnerable  | Species or species habitat known to occur within area                             |
| <a href="#">Caretta caretta</a><br>Loggerhead Turtle [1763]                                    | Endangered  | Breeding known to occur within area   |
| <a href="#">Chelonia mydas</a><br>Green Turtle [1765]  | Vulnerable  | Species or species habitat known to occur within area                             |
| <a href="#">Dermochelys coriacea</a><br>Leatherback Turtle, Leathery Turtle, Luth [1768]       | Endangered  | Breeding known to occur within area   |
| <a href="#">Dugong dugon</a><br>Dugong [28]  |             | Species or species habitat may occur within area                                  |
| <a href="#">Eretmochelys imbricata</a><br>Hawksbill Turtle [1766]                              | Vulnerable  | Species or species habitat known to occur within area                             |

| Name   | Threatened | Type of Presence                                       |
|--|------------|--|
| <a href="#">Eubalaena australis</a><br>Southern Right Whale [40]   | Endangered | Species or species habitat likely to occur within area |
| <a href="#">Lagenorhynchus obscurus</a><br>Dusky Dolphin [43]  |            | Species or species habitat may occur within area       |
| <a href="#">Lamna nasus</a><br>Porbeagle, Mackerel Shark [83288]   |            | Species or species habitat may occur within area       |
| <a href="#">Manta alfredi</a><br>Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994] |            | Species or species habitat known to occur within area  |
| <a href="#">Manta birostris</a><br>Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995] |            | Species or species habitat may occur within area       |
| <a href="#">Megaptera novaeangliae</a><br>Humpback Whale [38]  | Vulnerable | Species or species habitat known to occur within area  |
| <a href="#">Natator depressus</a><br>Flatback Turtle [59257]   | Vulnerable | Species or species habitat known to occur within area  |
| <a href="#">Orcinus orca</a><br>Killer Whale, Orca [46]  |            | Species or species habitat may occur within area       |
| <a href="#">Rhincodon typus</a><br>Whale Shark [66680]   | Vulnerable | Species or species habitat may occur within area       |
| <a href="#">Sousa chinensis</a><br>Indo-Pacific Humpback Dolphin [50]  |            | Species or species habitat likely to occur within area |
| <b>Migratory Terrestrial Species</b>   |            |  |
| <a href="#">Cuculus optatus</a><br>Oriental Cuckoo, Horsfield's Cuckoo [86651]   |            | Species or species habitat may occur within area       |
| <a href="#">Hirundapus caudacutus</a><br>White-throated Needletail [682]   |            | Species or species habitat known to occur within area  |
| <a href="#">Monarcha melanopsis</a><br>Black-faced Monarch [609]   |            | Species or species habitat known to occur within area  |
| <a href="#">Monarcha trivirgatus</a><br>Spectacled Monarch [610]   |            | Species or species habitat known to occur within area  |
| <a href="#">Motacilla flava</a><br>Yellow Wagtail [644]  |            | Species or species habitat likely to occur within area |
| <a href="#">Myiagra cyanoleuca</a><br>Satin Flycatcher [612]   |            | Species or species habitat known to occur within area  |
| <a href="#">Rhipidura rufifrons</a><br>Rufous Fantail [592]  |            | Species or species habitat known to occur within area  |
| <b>Migratory Wetlands Species</b>  |            |  |
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309]   |            | Species or species habitat known to occur              |



| Name   | Threatened            | Type of Presence   |
|--|-----------------------|--|
| <a href="#">Arenaria interpres</a><br>Ruddy Turnstone [872]                              |                       | within area<br><br>Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874]                       |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Calidris alba</a><br>Sanderling [875]  |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]                                 | Endangered            | Species or species habitat known to occur within area                                |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                            | Critically Endangered | Species or species habitat known to occur within area                                |
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858]                           |                       | Species or species habitat known to occur within area                                |
| <a href="#">Calidris ruficollis</a><br>Red-necked Stint [860]                            |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Calidris subminuta</a><br>Long-toed Stint [861]                              |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Calidris tenuirostris</a><br>Great Knot [862]                                | Critically Endangered | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Charadrius bicinctus</a><br>Double-banded Plover [895]                       |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Charadrius leschenaultii</a><br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable            | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Charadrius mongolus</a><br>Lesser Sand Plover, Mongolian Plover [879]        | Endangered            | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Charadrius veredus</a><br>Oriental Plover, Oriental Dotterel [882]           |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Gallinago hardwickii</a><br>Latham's Snipe, Japanese Snipe [863]             |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Gallinago megala</a><br>Swinhoe's Snipe [864]                                |                       | Foraging, feeding or related behaviour likely to occur within area                   |
| <a href="#">Gallinago stenura</a><br>Pin-tailed Snipe [841]                              |                       | Foraging, feeding or related behaviour likely to occur within area                   |
| <a href="#">Heteroscelus brevipes</a><br>Grey-tailed Tattler [59311]                     |                       | Foraging, feeding or related behaviour known to occur within area                    |
| <a href="#">Heteroscelus incanus</a><br>Wandering Tattler [59547]                        |                       | Foraging, feeding or related behaviour known to occur within area                    |

| Name  | Threatened            | Type of Presence  |
|---|-----------------------|---|
| <a href="#">Limicola falcinellus</a><br>Broad-billed Sandpiper [842]                  |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Limosa lapponica</a><br>Bar-tailed Godwit [844]                           |                       | Species or species habitat known to occur within area             |
| <a href="#">Limosa limosa</a><br>Black-tailed Godwit [845]                            |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat known to occur within area             |
| <a href="#">Numenius minutus</a><br>Little Curlew, Little Whimbrel [848]              |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Numenius phaeopus</a><br>Whimbrel [849]                                   |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Pandion haliaetus</a><br>Osprey [952]                                     |                       | Breeding known to occur within area                               |
| <a href="#">Philomachus pugnax</a><br>Ruff (Reeve) [850]                              |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Pluvialis fulva</a><br>Pacific Golden Plover [25545]                      |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Pluvialis squatarola</a><br>Grey Plover [865]                             |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Tringa glareola</a><br>Wood Sandpiper [829]                               |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Tringa nebularia</a><br>Common Greenshank, Greenshank [832]               |                       | Species or species habitat known to occur within area             |
| <a href="#">Tringa stagnatilis</a><br>Marsh Sandpiper, Little Greenshank [833]        |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Xenus cinereus</a><br>Terek Sandpiper [59300]                             |                       | Foraging, feeding or related behaviour known to occur within area |

## Other Matters Protected by the EPBC Act

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

| Name   |
|--|
| Commonwealth Land - Australian Telecommunications Commission |

| 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 |

| Name   | Threatened            | Type of Presence  |
|--|-----------------------|---|
| <b>Birds</b>   |                       |   |
| <a href="#">Actitis hypoleucos</a><br>Common Sandpiper [59309]                           |                       | Species or species habitat known to occur within area             |
| <a href="#">Anous stolidus</a><br>Common Noddy [825]                                     |                       | Species or species habitat likely to occur within area            |
| <a href="#">Apus pacificus</a><br>Fork-tailed Swift [678]                                |                       | Species or species habitat likely to occur within area            |
| <a href="#">Ardea alba</a><br>Great Egret, White Egret [59541]                           |                       | Breeding known to occur within area                               |
| <a href="#">Ardea ibis</a><br>Cattle Egret [59542]                                       |                       | Species or species habitat may occur within area                  |
| <a href="#">Arenaria interpres</a><br>Ruddy Turnstone [872]                              |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calidris acuminata</a><br>Sharp-tailed Sandpiper [874]                       |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calidris alba</a><br>Sanderling [875]  |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calidris canutus</a><br>Red Knot, Knot [855]                                 | Endangered            | Species or species habitat known to occur within area             |
| <a href="#">Calidris ferruginea</a><br>Curlew Sandpiper [856]                            | Critically Endangered | Species or species habitat known to occur within area             |
| <a href="#">Calidris melanotos</a><br>Pectoral Sandpiper [858]                           |                       | Species or species habitat known to occur within area             |
| <a href="#">Calidris ruficollis</a><br>Red-necked Stint [860]                            |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calidris subminuta</a><br>Long-toed Stint [861]                              |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calidris tenuirostris</a><br>Great Knot [862]                                | Critically Endangered | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Calonectris leucomelas</a><br>Streaked Shearwater [1077]                     |                       | Species or species habitat may occur within area                  |
| <a href="#">Catharacta skua</a><br>Great Skua [59472]                                    |                       | Species or species habitat may occur within area                  |
| <a href="#">Charadrius bicinctus</a><br>Double-banded Plover [895]                       |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Charadrius leschenaultii</a><br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable            | Foraging, feeding or related behaviour known to occur within area |

| Name  | Threatened  | Type of Presence   |
|---|-------------|--|
| <a href="#">Charadrius mongolus</a><br>Lesser Sand Plover, Mongolian Plover [879] | Endangered  | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Charadrius ruficapillus</a><br>Red-capped Plover [881]                |             | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Charadrius veredus</a><br>Oriental Plover, Oriental Dotterel [882]    |             | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Cuculus saturatus</a><br>Oriental Cuckoo, Himalayan Cuckoo [710]      |             | Species or species habitat may occur within area                   |
| <a href="#">Diomedea antipodensis</a><br>Antipodean Albatross [64458]             | Vulnerable  | Species or species habitat may occur within area                   |
| <a href="#">Diomedea epomophora</a><br>Southern Royal Albatross [89221]           | Vulnerable  | Species or species habitat may occur within area                   |
| <a href="#">Diomedea exulans</a><br>Wandering Albatross [89223]                   | Vulnerable  | Species or species habitat may occur within area                   |
| <a href="#">Diomedea gibsoni</a><br>Gibson's Albatross [64466]                    | Vulnerable* | Species or species habitat may occur within area                   |
| <a href="#">Fregata ariel</a><br>Lesser Frigatebird, Least Frigatebird [1012]     |             | Species or species habitat known to occur within area              |
| <a href="#">Fregata minor</a><br>Great Frigatebird, Greater Frigatebird [1013]    |             | Species or species habitat known to occur within area              |
| <a href="#">Gallinago hardwickii</a><br>Latham's Snipe, Japanese Snipe [863]      |             | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Gallinago megala</a><br>Swinhoe's Snipe [864]                         |             | Foraging, feeding or related behaviour likely to occur within area |
| <a href="#">Gallinago stenura</a><br>Pin-tailed Snipe [841]                       |             | Foraging, feeding or related behaviour likely to occur within area |
| <a href="#">Haliaeetus leucogaster</a><br>White-bellied Sea-Eagle [943]           |             | Species or species habitat known to occur within area              |
| <a href="#">Heteroscelus brevipes</a><br>Grey-tailed Tattler [59311]              |             | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Heteroscelus incanus</a><br>Wandering Tattler [59547]                 |             | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Himantopus himantopus</a><br>Black-winged Stilt [870]                 |             | Foraging, feeding or related behaviour known to occur within area  |
| <a href="#">Hirundapus caudacutus</a><br>White-throated Needletail [682]          |             | Species or species habitat known to occur within area              |

| Name   | Threatened            | Type of Presence  |
|--|-----------------------|---|
| <a href="#">Lathamus discolor</a><br>Swift Parrot [744]                                      | Critically Endangered | Species or species habitat likely to occur within area            |
| <a href="#">Limicola falcinellus</a><br>Broad-billed Sandpiper [842]                         |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Limosa lapponica</a><br>Bar-tailed Godwit [844]                                  |                       | Species or species habitat known to occur within area             |
| <a href="#">Limosa limosa</a><br>Black-tailed Godwit [845]                                   |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Macronectes giganteus</a><br>Southern Giant-Petrel, Southern Giant Petrel [1060] | Endangered            | Species or species habitat may occur within area                  |
| <a href="#">Macronectes halli</a><br>Northern Giant Petrel [1061]                            | Vulnerable            | Species or species habitat may occur within area                  |
| <a href="#">Merops ornatus</a><br>Rainbow Bee-eater [670]                                    |                       | Species or species habitat may occur within area                  |
| <a href="#">Monarcha melanopsis</a><br>Black-faced Monarch [609]                             |                       | Species or species habitat known to occur within area             |
| <a href="#">Monarcha trivirgatus</a><br>Spectacled Monarch [610]                             |                       | Species or species habitat known to occur within area             |
| <a href="#">Motacilla flava</a><br>Yellow Wagtail [644]                                      |                       | Species or species habitat likely to occur within area            |
| <a href="#">Myiagra cyanoleuca</a><br>Satin Flycatcher [612]                                 |                       | Species or species habitat known to occur within area             |
| <a href="#">Numenius madagascariensis</a><br>Eastern Curlew, Far Eastern Curlew [847]        | Critically Endangered | Species or species habitat known to occur within area             |
| <a href="#">Numenius minutus</a><br>Little Curlew, Little Whimbrel [848]                     |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Numenius phaeopus</a><br>Whimbrel [849]  |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Pachyptila turtur</a><br>Fairy Prion [1066]                                      |                       | Species or species habitat known to occur within area             |
| <a href="#">Pandion haliaetus</a><br>Osprey [952]  |                       | Breeding known to occur within area                               |
| <a href="#">Philomachus pugnax</a><br>Ruff (Reeve) [850]                                     |                       | Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Phoebastria fusca</a><br>Sooty Albatross [1075]                                  | Vulnerable            | Species or species habitat may occur within area                  |
| <a href="#">Pluvialis fulva</a><br>Pacific Golden Plover [25545]                             |                       | Foraging, feeding or  |

| Name   | Threatened  | Type of Presence  |
|--|-------------|---|
| <a href="#">Pluvialis squatarola</a><br>Grey Plover [865]  |             | related behaviour known to occur within area<br><br>Foraging, feeding or related behaviour known to occur within area |
| <a href="#">Puffinus carneipes</a><br>Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]       |             | Species or species habitat likely to occur within area  |
| <a href="#">Rhipidura rufifrons</a><br>Rufous Fantail [592]  |             | Species or species habitat known to occur within area   |
| <a href="#">Rostratula benghalensis (sensu lato)</a><br>Painted Snipe [889]                          | Endangered* | Species or species habitat likely to occur within area  |
| <a href="#">Sterna albifrons</a><br>Little Tern [813]  |             | Species or species habitat may occur within area  |
| <a href="#">Thalassarche cauta</a><br>Tasmanian Shy Albatross [89224]                                | Vulnerable* | Species or species habitat may occur within area  |
| <a href="#">Thalassarche eremita</a><br>Chatham Albatross [64457]                                    | Endangered  | Species or species habitat may occur within area  |
| <a href="#">Thalassarche impavida</a><br>Campbell Albatross, Campbell Black-browed Albatross [64459] | Vulnerable  | Species or species habitat may occur within area  |
| <a href="#">Thalassarche melanophris</a><br>Black-browed Albatross [66472]                           | Vulnerable  | Species or species habitat may occur within area  |
| <a href="#">Thalassarche salvini</a><br>Salvin's Albatross [64463]                                   | Vulnerable  | Species or species habitat may occur within area  |
| <a href="#">Thalassarche steadi</a><br>White-capped Albatross [64462]                                | Vulnerable* | Foraging, feeding or related behaviour likely to occur within area  |
| <a href="#">Tringa glareola</a><br>Wood Sandpiper [829]  |             | Foraging, feeding or related behaviour known to occur within area   |
| <a href="#">Tringa nebularia</a><br>Common Greenshank, Greenshank [832]                              |             | Species or species habitat known to occur within area   |
| <a href="#">Tringa stagnatilis</a><br>Marsh Sandpiper, Little Greenshank [833]                       |             | Foraging, feeding or related behaviour known to occur within area   |
| <a href="#">Xenus cinereus</a><br>Terek Sandpiper [59300]  |             | Foraging, feeding or related behaviour known to occur within area   |
| <b>Fish</b>  |             |   |
| <a href="#">Acentronura tentaculata</a><br>Shortpouch Pygmy Pipehorse [66187]                        |             | Species or species habitat may occur within area  |
| <a href="#">Campichthys tryoni</a><br>Tryon's Pipefish [66193]                                       |             | Species or species habitat may occur within area  |
| <a href="#">Corythoichthys amplexus</a><br>Fijian Banded Pipefish, Brown-banded Pipefish             |             | Species or species  |

| Name   | Threatened | Type of Presence                                 |
|--|------------|--|
| [66199]  |            | habitat may occur within area                    |
| <a href="#">Corythoichthys ocellatus</a>                               |            |  |
| Orange-spotted Pipefish, Ocellated Pipefish [66203]                    |            | Species or species habitat may occur within area |
| <a href="#">Festucalex cinctus</a>                                     |            |  |
| Girdled Pipefish [66214]   |            | Species or species habitat may occur within area |
| <a href="#">Filicampus tigris</a>                                      |            |  |
| Tiger Pipefish [66217]   |            | Species or species habitat may occur within area |
| <a href="#">Halicampus grayi</a>                                       |            |  |
| Mud Pipefish, Gray's Pipefish [66221]                                  |            | Species or species habitat may occur within area |
| <a href="#">Hippichthys cyanospilos</a>                                |            |  |
| Blue-speckled Pipefish, Blue-spotted Pipefish [66228]                  |            | Species or species habitat may occur within area |
| <a href="#">Hippichthys heptagonus</a>                                 |            |  |
| Madura Pipefish, Reticulated Freshwater Pipefish [66229]               |            | Species or species habitat may occur within area |
| <a href="#">Hippichthys penicillus</a>                                 |            |  |
| Beady Pipefish, Steep-nosed Pipefish [66231]                           |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus kelloggi</a>                                   |            |  |
| Kellogg's Seahorse, Great Seahorse [66723]                             |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus kuda</a>                                       |            |  |
| Spotted Seahorse, Yellow Seahorse [66237]                              |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus planifrons</a>                                 |            |  |
| Flat-face Seahorse [66238]   |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus trimaculatus</a>                               |            |  |
| Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720] |            | Species or species habitat may occur within area |
| <a href="#">Hippocampus whitei</a>                                     |            |  |
| White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]            |            | Species or species habitat may occur within area |
| <a href="#">Lissocampus runa</a>                                       |            |  |
| Javelin Pipefish [66251]   |            | Species or species habitat may occur within area |
| <a href="#">Maroubra perserrata</a>                                    |            |  |
| Sawtooth Pipefish [66252]  |            | Species or species habitat may occur within area |
| <a href="#">Micrognathus andersonii</a>                                |            |  |
| Anderson's Pipefish, Shortnose Pipefish [66253]                        |            | Species or species habitat may occur within area |
| <a href="#">Micrognathus brevirostris</a>                              |            |  |
| thorntail Pipefish, Thorn-tailed Pipefish [66254]                      |            | Species or species habitat may occur within area |
| <a href="#">Microphis manadensis</a>                                   |            |  |
| Manado Pipefish, Manado River Pipefish [66258]                         |            | Species or species habitat may occur within area |
| <a href="#">Solegnathus dunckeri</a>                                   |            |  |
| Duncker's Pipehorse [66271]  |            | Species or species habitat may occur within      |

| Name  | Threatened | Type of Presence area                                 |
|---|------------|---|
| <a href="#">Solegnathus hardwickii</a><br>Pallid Pipehorse, Hardwick's Pipehorse [66272]                                |            | Species or species habitat may occur within area      |
| <a href="#">Solegnathus spinosissimus</a><br>Spiny Pipehorse, Australian Spiny Pipehorse [66275]                        |            | Species or species habitat may occur within area      |
| <a href="#">Solenostomus cyanopterus</a><br>Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]                   |            | Species or species habitat may occur within area      |
| <a href="#">Solenostomus paegnius</a><br>Rough-snout Ghost Pipefish [68425]   |            | Species or species habitat may occur within area      |
| <a href="#">Solenostomus paradoxus</a><br>Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184] |            | Species or species habitat may occur within area      |
| <a href="#">Stigmatopora nigra</a><br>Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]                   |            | Species or species habitat may occur within area      |
| <a href="#">Syngnathoides biaculeatus</a><br>Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]   |            | Species or species habitat may occur within area      |
| <a href="#">Trachyrhamphus bicoarctatus</a><br>Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]   |            | Species or species habitat may occur within area      |
| <a href="#">Urocampus carinirostris</a><br>Hairy Pipefish [66282]   |            | Species or species habitat may occur within area      |
| <a href="#">Vanacampus margaritifer</a><br>Mother-of-pearl Pipefish [66283]   |            | Species or species habitat may occur within area      |
| <b>Mammals</b>  |            |   |
| <a href="#">Dugong dugon</a><br>Dugong [28]   |            | Species or species habitat may occur within area      |
| <b>Reptiles</b>   |            |   |
| <a href="#">Astrotia stokesii</a><br>Stokes' Seasnake [1122]  |            | Species or species habitat may occur within area      |
| <a href="#">Caretta caretta</a><br>Loggerhead Turtle [1763]   | Endangered | Breeding known to occur within area                   |
| <a href="#">Chelonia mydas</a><br>Green Turtle [1765]   | Vulnerable | Species or species habitat known to occur within area |
| <a href="#">Dermochelys coriacea</a><br>Leatherback Turtle, Leathery Turtle, Luth [1768]                                | Endangered | Breeding known to occur within area                   |
| <a href="#">Eretmochelys imbricata</a><br>Hawksbill Turtle [1766]   | Vulnerable | Species or species habitat known to occur within area |
| <a href="#">Hydrophis elegans</a><br>Elegant Seasnake [1104]  |            | Species or species habitat may occur within area      |
| <a href="#">Natator depressus</a><br>Flatback Turtle [59257]  | Vulnerable | Species or species habitat known to occur within area |



| Name   | Threatened | Type of Presence                                 |
|--|------------|--|
| <a href="#">Pelamis platurus</a><br>Yellow-bellied Seasnake [1091] |            | Species or species habitat may occur within area |

## Whales and other Cetaceans [ Resource Information ]

| Name | Status | Type of Presence |
|------|--------|------------------|
|------|--------|------------------|

### Mammals

|  |  |  |
|--|--|--|
| <a href="#">Balaenoptera acutorostrata</a> |  |  |
|--|--|--|

|                  |  |  |
|------------------|--|--|
| Minke Whale [33] |  | Species or species habitat may occur within area |
|------------------|--|--|

|  |  |  |
|--|--|--|
| <a href="#">Balaenoptera edeni</a><br>Bryde's Whale [35] |  | Species or species habitat may occur within area |
|--|--|--|

|  |            |  |
|--|------------|--|
| <a href="#">Balaenoptera musculus</a><br>Blue Whale [36] | Endangered | Species or species habitat may occur within area |
|--|------------|--|

|   |  |  |
|---|--|--|
| <a href="#">Delphinus delphis</a><br>Common Dolphin, Short-beaked Common Dolphin [60] |  | Species or species habitat may occur within area |
|---|--|--|

|  |            |  |
|--|------------|--|
| <a href="#">Eubalaena australis</a><br>Southern Right Whale [40] | Endangered | Species or species habitat likely to occur within area |
|--|------------|--|

|  |  |  |
|--|--|--|
| <a href="#">Grampus griseus</a><br>Risso's Dolphin, Grampus [64] |  | Species or species habitat may occur within area |
|--|--|--|

|   |  |  |
|---|--|--|
| <a href="#">Lagenorhynchus obscurus</a><br>Dusky Dolphin [43] |  | Species or species habitat may occur within area |
|---|--|--|

|   |            |   |
|---|------------|---|
| <a href="#">Megaptera novaeangliae</a><br>Humpback Whale [38] | Vulnerable | Species or species habitat known to occur within area |
|---|------------|---|

|   |  |  |
|---|--|--|
| <a href="#">Orcinus orca</a><br>Killer Whale, Orca [46] |  | Species or species habitat may occur within area |
|---|--|--|

|   |  |  |
|---|--|--|
| <a href="#">Sousa chinensis</a><br>Indo-Pacific Humpback Dolphin [50] |  | Species or species habitat likely to occur within area |
|---|--|--|

|   |  |  |
|---|--|--|
| <a href="#">Stenella attenuata</a><br>Spotted Dolphin, Pantropical Spotted Dolphin [51] |  | Species or species habitat may occur within area |
|---|--|--|

|   |  |  |
|---|--|--|
| <a href="#">Tursiops aduncus</a><br>Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418] |  | Species or species habitat likely to occur within area |
|---|--|--|

|  |  |  |
|--|--|--|
| <a href="#">Tursiops truncatus s. str.</a><br>Bottlenose Dolphin [68417] |  | Species or species habitat may occur within area |
|--|--|--|

## Extra Information

### State and Territory Reserves [\[ Resource Information \]](#)

| Name    | State |
|---------|-------|
| Ballina | NSW   |

### Regional Forest Agreements [\[ Resource Information \]](#)

Note that all areas with completed RFAs have been included.

| Name                               | State           |
|------------------------------------|-----------------|
| <a href="#">North East NSW RFA</a> | 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 Resources Audit, 2001.

| Name | Status | Type of Presence |
|------|--------|------------------|
|------|--------|------------------|

#### Birds

|  |  |  |
|--|--|--|
| Acridotheres tristis<br>Common Myna, Indian Myna [387] |  | Species or species habitat likely to occur within area |
|--|--|--|

|                                     |  |  |
|-------------------------------------|--|--|
| Anas platyrhynchos<br>Mallard [974] |  | Species or species habitat likely to occur within area |
|-------------------------------------|--|--|

|   |  |  |
|---|--|--|
| Carduelis carduelis<br>European Goldfinch [403] |  | Species or species habitat likely to occur within area |
|---|--|--|

|  |  |  |
|--|--|--|
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] |  | Species or species habitat likely to occur within area |
|--|--|--|

|  |  |  |
|--|--|--|
| Lonchura punctulata<br>Nutmeg Mannikin [399] |  | Species or species habitat likely to occur within area |
|--|--|--|

|  |  |  |
|--|--|--|
| Passer domesticus<br>House Sparrow [405] |  | Species or species habitat likely to occur within area |
|--|--|--|

|   |  |  |
|---|--|--|
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] |  | Species or species habitat likely to occur within area |
|---|--|--|

|   |  |  |
|---|--|--|
| Sturnus vulgaris<br>Common Starling [389] |  | Species or species habitat likely to occur within area |
|---|--|--|

#### Frogs

|                                      |  |  |
|--------------------------------------|--|--|
| Rhinella marina<br>Cane Toad [83218] |  | Species or species habitat likely to occur within area |
|--------------------------------------|--|--|

#### Mammals

|                                    |  |  |
|------------------------------------|--|--|
| Bos taurus<br>Domestic Cattle [16] |  | Species or species habitat likely to occur within area |
|------------------------------------|--|--|

|  |  |  |
|--|--|--|
| Canis lupus familiaris<br>Domestic Dog [82654] |  | Species or species habitat likely to occur within area |
|--|--|--|

|  |  |  |
|--|--|--|
| Felis catus<br>Cat, House Cat, Domestic Cat [19] |  | Species or species habitat likely to occur within area |
|--|--|--|

|   |  |                    |
|---|--|--------------------|
| Feral deer<br>Feral deer species in Australia [85733] |  | Species or species |
|---|--|--------------------|

| Name   | Status | Type of Presence  |
|--|--------|---|
| Lepus capensis<br>Brown Hare [127]   |        | habitat likely to occur within area<br><br>Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120]  |        | Species or species habitat likely to occur within area  |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128]   |        | Species or species habitat likely to occur within area  |
| Rattus norvegicus<br>Brown Rat, Norway Rat [83]  |        | Species or species habitat likely to occur within area  |
| Rattus rattus<br>Black Rat, Ship Rat [84]  |        | Species or species habitat likely to occur within area  |
| Sus scrofa<br>Pig [6]  |        | Species or species habitat likely to occur within area  |
| Vulpes vulpes<br>Red Fox, Fox [18]   |        | Species or species habitat likely to occur within area  |
| <b>Plants</b>  |        |   |
| Alternanthera philoxeroides<br>Alligator Weed [11620]  |        | Species or species habitat likely to occur within area  |
| Anredera cordifolia<br>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<br>Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]   |        | Species or species habitat likely to occur within area  |
| Asparagus plumosus<br>Climbing Asparagus-fern [48993]  |        | Species or species habitat likely to occur within area  |
| Cabomba caroliniana<br>Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]                            |        | Species or species habitat likely to occur within area  |
| Chrysanthemoides monilifera<br>Bitou Bush, Boneseed [18983]  |        | Species or species habitat likely to occur within area  |
| Chrysanthemoides monilifera subsp. rotundata<br>Bitou Bush [16332]   |        | Species or species habitat likely to occur within area  |
| Eichhornia crassipes<br>Water Hyacinth, Water Orchid, Nile Lily [13466]  |        | Species or species habitat likely to occur within area  |
| Genista sp. X Genista monspessulana<br>Broom [67538]   |        | Species or species habitat may occur within area  |
| Lantana camara<br>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  |

| Name  | Status | Type of Presence                                       |
|---|--------|--|
| Opuntia spp.<br>Prickly Pears [82753]   |        | Species or species habitat likely to occur within area |
| Pinus radiata<br>Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]      |        | Species or species habitat may occur within area       |
| Protasparagus densiflorus<br>Asparagus Fern, Plume Asparagus [5015]                   |        | Species or species habitat likely to occur within area |
| Protasparagus plumosus<br>Climbing Asparagus-fern, Ferny Asparagus [11747]            |        | Species or species habitat likely to occur within area |
| Sagittaria platyphylla<br>Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]       |        | Species or species habitat likely to occur within area |
| Salvinia molesta<br>Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] |        | Species or species habitat likely to occur within area |
| Senecio madagascariensis<br>Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] |        | Species or species habitat likely to occur within area |
| <b>Reptiles</b>   |        |  |
| Hemidactylus frenatus<br>Asian House Gecko [1708]                                     |        | Species or species habitat likely to occur 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.

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

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

-28.78485 153.59247

# Acknowledgements

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

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.



## APPENDIX C

### FLORA SPECIES LIST

## Lake Ainsworth Foreshore Improvement Works Flora species list

### Notes:

\* Introduced species

**Noxious weeds** declared for the Ballina Shire Council control area under the *Noxious Weeds Act 1993* are indicated with a 'C' followed by their control class:

- (3) Regionally controlled weeds
- (4) Locally controlled weeds
- (5) Restricted plants

Where uncertainty exists due to the unavailability of reproductive material, the taxon is preceded by a question mark, or plants are identified to genus level only. Botanical nomenclature follows G.J. Harden (ed) (1990-2002) *Flora of New South Wales*, UNSW Press, except where recent changes have occurred.

| Family                       | Botanical Name                                      | Common Name           |
|------------------------------|---|-----------------------|
| <b>Ferns and Fern Allies</b> |   |                       |
| Blechnaceae                  | <i>Blechnum indicum</i>                             | Swamp water fern      |
| Dennstaedtiaceae             | <i>Pteridium esculentum</i>                         | Bracken fern          |
| Salviniaceae                 | <i>Azolla</i> sp.                                   | Azolla                |
|                              | <i>Salvinia molesta</i> *                           | Salvinia              |
| <b>Gymnosperms</b>           |   |                       |
| Araucariaceae                | <i>Araucaria heterophylla</i> *                     | Norfolk pine          |
| <b>Monocotyledons</b>        |   |                       |
| Arecaceae                    | <i>Archontophoenix cunninghamiana</i>               | Bangalow palm         |
|                              | <i>Livistona australis</i>                          | Cabbage palm          |
| Asparagaceae                 | <i>Asparagus aethiopicus</i> *                      | Ground asparagus fern |
| Commelinaceae                | <i>Commelina benghalensis</i> *                     | Hairy commelina       |
|                              | <i>Commelina cyanea</i>                             | Native commelina      |
| Cyperaceae                   | <i>Cyperus</i> sp.                                  |                       |
|                              | <i>Gabnia</i> sp.                                   |                       |
| Lomandraceae                 | <i>Lomandra longifolia</i>                          | Spiny-headed matrush  |
| Pandanaceae                  | <i>Pandanus tectorius</i> var. <i>australiannus</i> | Screw Pine            |
| Phormiaceae                  | <i>Dianella caerulea</i>                            | Flax lily             |
| Poaceae                      | <i>Chloris gayana</i> *                             | Rhodes grass          |
|                              | <i>Cynodon dactylon</i>                             | Couch grass           |
|                              | <i>Imperata cylindrica</i>                          | Blady grass           |
|                              | <i>Ischaemum triticeum</i>                          | Creeping wheat grass  |
|                              | <i>Paspalum dilatatum</i> *                         | Paspalum              |
|                              | <i>Phragmites australis</i>                         | Common reed           |
| Smilacaceae                  | <i>Smilax australis</i>                             | Austral sarsparilla   |
| Typhaceae                    | <i>Typha</i> sp.                                    | Cumbungi              |
| <b>Dicotyledons</b>          |   |                       |
| Apiaceae                     | <i>Centella asiatica</i>                            | Centella              |
|                              | <i>Hydrocotyle bonariensis</i> *                    |                       |
| Araliaceae                   | <i>Schefflera actinophylla</i> *                    | Umbrella tree         |
| Asclepiadaceae               | <i>Marsdenia lloydii</i>                            | Corky marsdenia       |
| Asteraceae                   | <i>Ageratum houstonianum</i> *                      | Blue billygoat weed   |
|                              | <i>Hypochoeris radicata</i> *                       | Cats ear              |





| Family         | Botanical Name   | Common Name              |
|----------------|--|--------------------------|
|                | <i>Taraxacum officinale</i> *                            | Dandelion                |
| Casuarinaceae  | <i>Casuarina glauca</i>                                  | Swamp oak                |
| Convolvulaceae | <i>Ipomoea cairica</i> *                                 | Coastal morning glory    |
| Dilleniaceae   | <i>Hibbertia scandens</i>                                | Climbing guinea flower   |
| Elaeocarpaceae | <i>Elaeocarpus reticulatus</i>                           | Blueberry ash            |
| Euphorbiaceae  | <i>Macaranga tanarius</i>                                | Macaranga                |
| Fabaceae       | <i>Macropitilium atropurpureum</i> *                     | Siratro                  |
| Lauraceae      | <i>Cryptocarya triplinervis</i> var. <i>triplinervis</i> | Three-veined Cryptocarya |
| Luzuriagaceae  | <i>Geitonoplesium cymosum</i>                            | Scrambling lily          |
| Malvaceae      | <i>Hibiscus diversifolius</i>                            | Swamp hibiscus           |
|                | <i>Hibiscus tiliaceus</i>                                | Cottonwood               |
| Menispermaceae | <i>Stephania japonica</i> var. <i>discolor</i>           | Snake vine               |
| Mimosaceae     | <i>Acacia longifolia</i> subsp. <i>sophorae</i>          | Coastal wattle           |
| Moraceae       | <i>Ficus fraseri</i>                                     | Sandpaper fig            |
|                | <i>Ficus obliqua</i>                                     | Small-leaved fig         |
| Musaceae       | <i>Musa paradisiaca</i> *                                | Banana                   |
| Myrsinaceae    | <i>Myrsine variabilis</i>                                | Muttonwood               |
| Myrtaceae      | <i>Callistemon salignus</i>                              | Willow bottlebrush       |
|                | <i>Corymbia intermedia</i>                               | Pink bloodwood           |
|                | <i>Eucalyptus robusta</i>                                | Swamp mahogany           |
|                | <i>Gossia</i> sp.*                                       | Crepe myrtle             |
|                | <i>Melaleuca quinquinervia</i>                           | Broad-leaved Paperbark   |
|                | <i>Syzygium luehmannii</i>                               | Riberry                  |
|                | <i>Syzygium oleosum</i>                                  | Blue lilly pilly         |
| Nymphaeaceae   | <i>Nymphaea mexicana</i> *                               | Yellow waterlily         |
| Onagraceae     | <i>Ludwigia peploides</i>                                | Water primrose           |
| Oxalidaceae    | <i>Oxalis debilis</i> var. <i>corymbosa</i> *            | Pink oxalis              |
| Phyllanthaceae | <i>Glochidion sumatranum</i>                             | Umbrella cheese tree     |
| Polygonaceae   | <i>Persicaria</i> sp.                                    | Smartweed                |
| Primulaceae    | <i>Ardisia elliptica</i> *                               | Shoebuttan ardisia       |
| Proteaceae     | <i>Banksia integrifolia</i> subsp. <i>integrifolia</i>   | Coast banksia            |
|                | <i>Macadamia integrifolia</i>                            | Queensland nut           |
| Rutaceae       | <i>Acronychia imperforata</i>                            | Beach acronychia         |
| Sapindaceae    | <i>Alectryon coriaceous</i>                              | Beach alectryon          |
|                | <i>Cupaniopsis anacardioides</i>                         | Tuckeroo                 |
|                | <i>Guioa semiglauc</i>                                   | Guioa                    |
| Solanaceae     | <i>Duboisia myoporoides</i>                              | Duboisia                 |
| Verbenaceae    | <i>Lantana camara</i> *                                  | Lantana                  |



## **APPENDIX D**

### **LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA**



**TABLE D1  
LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES\***

| Species                          | Notes   | Likelihood of occurrence on site   | Potential to be impacted |
|----------------------------------|---|--|--------------------------|
| <b>Amphibians</b>                |   |  |                          |
| Green and Golden bell frog       | The species is associated with semi-permanent or permanent water including marshes, dams and stream-sides as well as disturbed sites such as disused industrial sites, brick pits, mines, recently cleared bushland or council tips. There are no recent records of this species in the Study area.   | One record of this species from the lake in 1977.  | Low                      |
| Wallum froglet                   | The Wallum froglet is found in Wallum habitats such as Paperbark swamps and coastal heath as well as adjacent grassland and drains with low pH waters.  | Species known to occur in heathland west of lake near The Coast Road.  | Low                      |
| Wallum sedge frog                | The Wallum sedge frog occurs in permanent or semi-permanent ponds and pools in Wallum habitats such as Paperbark swamps and coastal heath.  | Species known to occur in heathland west of lake near The Coast Road.  | Low                      |
| <b>Forest and woodland birds</b> |   |  |                          |
| Black-breasted Button-quail      | The ground-dwelling Black-breasted Button-quail inhabits subtropical rainforest, other moist forest, dry rainforest (vine thicket) and grassy edges, with a closed canopy and deep litter layer. It is restricted to coastal south-east Queensland (north to Fraser Island), and the Border Ranges and Big Scrub areas of extreme north-east NSW. | Unlikely. Species has not been recorded within 10km of the site and suitable habitat is not present within the Subject site. | Low                      |
| Coxen's Fig parrot               | This very rare species occurs in the canopy of rainforests, including dry rainforest and cool subtropical rainforest.   | Unlikely. Species has not been recorded within 10km of the site.   | Low                      |
| Dusky Woodswallow                | The Dusky Woodswallow is often reported in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests                     | Unlikely, suitable habitat is not present within the Subject site.   | Low                      |

| Species                                   | Notes   | Likelihood of occurrence on site  | Potential to be impacted                    |
|---|---|---|---|
| Eastern ground parrot                     | The Ground Parrot occurs in high rainfall coastal and near coastal low heathlands and sedgeland, generally below one metre in height and very dense (up to 90% projected foliage cover). These habitats provide a high abundance and diversity of food, adequate cover and suitable roosting and nesting opportunities for the Ground Parrot, which spends most of its time on or near the ground. The species is found in small numbers on the north coast (Broadwater, Bundjalung, Yuraygir NPs). | Unlikely, given the lack of foliage cover within the site and high level of pedestrian/vehicle traffic. | Low   |
| Grass owl                                 | Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.   | Unlikely, given the urbanised nature of the study area and lack of suitable habitat.                    | Low   |
| Grey-crowned Babbler (eastern subspecies) | Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains.  | Unlikely, suitable habitat is not present within the Study area.  | Low   |
| Masked owl                                | Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Pairs have a large home-range of 500 to 1000 hectares. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.  | Unlikely, given the urbanised nature of the study area and lack of suitable roosting/foraging habitat.  | Low   |
| Red Goshawk                               | Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.  | Unlikely. Species has not been recorded within 10km of the site.  | Low, no suitable habitat would be impacted. |
| Regent honeyeater                         | The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. In NSW the distribution is very patchy and mainly confined to the two main breeding areas (at Capertee Valley and the Bundarra-Barraba region) and surrounding fragmented woodlands. In some years non-breeding flocks converge on flowering coastal woodlands and forests where they prefer Swamp mahogany and Spotted gum forests.                                       | Unlikely. Species has not been recorded within 10km of the site.  | Low   |

| Species                           | Notes   | Likelihood of occurrence on site  | Potential to be impacted                    |
|-----------------------------------|---|---|---|
| Rose-crowned fruit-dove           | The Rose-crowned fruit dove prefers tall tropical and subtropical evergreen or semi-deciduous rainforest, especially with a dense regrowth of vines.  | Unlikely, given the urbanised nature of the study area and lack of suitable foraging habitat. | Low   |
| Spotted harrier                   | Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. | Possible occurrence foraging throughout Study area.   | Low, no suitable habitat would be impacted. |
| Swift parrot                      | This migratory species is very rarely recorded in the locality.   | Unlikely. Species has not been recorded within 10km of the site.                              | Low   |
| White-eared monarch               | This species occurs in rainforest, particularly the edges of subtropical rainforest and contiguous wet sclerophyll forest. It is also occasionally found in mangrove swamps or streamside vegetation in Eucalypt woodland.  | Unlikely, given the urbanised nature of the study area and lack of suitable habitat.          | Low   |
| <b>Oceanic and coastal birds</b>  |   |   |   |
| Little tern<br>Pied oystercatcher | These birds occur on open beaches, estuarine mudflats and sandflats and/or rocky shore habitats.  | Possible, species may occur occasionally along Seven Mile Beach.                              | Low, no suitable habitat would be impacted. |
| Osprey                            | Ospreys forage in coastal rivers and streams. They prefer to nest closer to coastal waterbodies.  | Possible  | Low, no suitable habitat would be impacted. |
| White-bellied Sea-Eagle           | The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas  | Possible  | Low, no suitable habitat would be impacted. |
| <b>Wetland birds</b>              |   |   |   |
| Australasian bittern              | The Australasian bittern generally prefers freshwater habitats although it may also use dense saltmarsh vegetation in estuaries and flooded grasslands.   | Low. This species would be unlikely to occur in areas near to the proposed works.             | Low.  |

| Species                    | Notes   | Likelihood of occurrence on site  | Potential to be impacted |
|----------------------------|---|---|--------------------------|
| Australian Painted Snipe   | This species prefers the fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.   | Unlikely  | Low                      |
| Black-necked stork         | The Black-necked stork is an occasional visitor to the area uses grassland and wetland habitats in the locality during periods of inundation.   | Low. This species would be unlikely to occur in areas near to the proposed works. | Low                      |
| Brolga                     | Found in shallow swamps, dry grassland or ploughed paddocks and desert claypans.  | Low. This species would be unlikely to occur in areas near to the proposed works. | Low                      |
| Comb-crested jacana        | Found in dams, still or slow-flowing wetlands and other waterbodies with floating waterlilies or other floating or dense fringing vegetation.   | Low. This species would be unlikely to occur in areas near to the proposed works. | Low                      |
| <b>Terrestrial mammals</b> |   |   |                          |
| Common planigale           | This species occupies a wide range of habitats including rainforest, sclerophyll forest, grasslands, marshlands, rocky areas and even some suburban areas. Species has been recorded within rainforest plantings at Lennox Head and was previously recorded within the Sport and Rec grounds. | Low. Subject site is located on an urbanised edge and is highly disturbed.        | Low                      |
| Greater Glider             | The Greater Glider is largely restricted to eucalypt forests and woodlands with a diversity of eucalypt species.  | Unlikely  | Low                      |
| Koala                      | No Koala food trees are located within the Subject site.  | Unlikely, given the urbanised nature of the site and lack of food trees.          | Low                      |
| Long-nosed potoroo         | This species occurs in coastal heathland habitats at several locations along the Far North Coast.   | Unlikely. Species has not been recorded within 10km of the site.                  | Low                      |
| New Holland Mouse          | Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey, and vegetated sand dunes. Species has not been recorded within 10km of the Subject site.  | Unlikely. Species has not been recorded within 10km of the site.                  | Low                      |
| Spotted-tail quoll         | Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls are rarely recorded in the locality.   | Unlikely. Subject site is located on an urbanised edge and is highly disturbed.   | Low                      |

| Species                       | Notes  | Likelihood of occurrence on site  | Potential to be impacted |
|-------------------------------|--|---|--------------------------|
| Water mouse                   | It is found in coastal wetlands such as lagoons, swamps and sedge lakes close to fore dunes. It forages amongst the mangroves at night when the tide is low, and when the tide rises it returns to the adjacent sedgeland for shelter.   | Unlikely. This species was not recorded on the NSW Wildlife Atlas search and is not known from the locality.                                | Low                      |
| <b>Bats</b>                   |  |   |                          |
| Common blossom bat            | Common Blossom-bats often roost in littoral rainforest and feed on nectar and pollen from flowers in adjacent heathland and paperbark swamps.  | Possible  | <b>Possible</b>          |
| Eastern (common) bentwing bat | This species generally occupies caves and tunnels during the day and, at night, forages for small insects beneath the canopy of well timbered habitats.  | Possible  | <b>Possible</b>          |
| Eastern free-tailed bat       | This bat occurs in dry sclerophyll forest and woodland east of the Great Dividing Range.   | <b>Possible.</b> This species was potentially recorded by Geolink recently in the Sport and Rec Centre.                                     | <b>Possible</b>          |
| Eastern long-eared bat        | This species typically roosts in old growth trees with hollows. It may occasionally roost in dense forested vegetation and dead rainforest foliage. The Study area may be used for foraging or roosting by this species.   | <b>Possible.</b> This species was potentially recorded by Geolink recently in the Sport and Rec Centre.                                     | <b>Possible</b>          |
| Greater broad-nosed bat       | This species forages over a range of habitats, including rainforest and moist forests.   | Possible  | <b>Possible</b>          |
| Grey-headed flying fox        | This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps. Urban gardens and cultivated fruit crops also provide habitat for this species.   | Possible  | <b>Possible</b>          |
| Large-eared pied bat          | This species is found in well-timbered areas containing gullies. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin, frequenting low to mid-elevation dry open forest and woodland close to these features. | Unlikely. This species was not recorded on the Atlas of NSW Wildlife and the site contains no roost sites and only marginal forage habitat. | Low                      |



| Species                     | Notes   | Likelihood of occurrence on site  | Potential to be impacted |
|-----------------------------|---|---|--------------------------|
| Little bent-wing bat        | This species generally roosts in caves and tunnels during the day and forages for insects beneath the canopy of forested habitats at night.   | <b>Possible.</b> This species was recently recorded by Geolink within the Sport and Rec Centre.         | <b>Possible</b>          |
| Southern myotis             | This species forages over fresh and saline waterbodies and roosts in caves, tree hollows, culverts, tunnels and other man-made structures.  | <b>Possible.</b> This species was potentially recorded by Geolink recently in the Sport and Rec Centre. | <b>Possible</b>          |
| <b>Invertebrates</b>        |   |   |                          |
| Mitchell's rainforest snail | This snail is restricted to remnant areas of lowland subtropical rainforest and swamp sclerophyll forest with a rainforest understorey on alluvial soils with a basaltic influence on the coastal plain between the Richmond and Tweed Rivers. It is known from the Suffolk Park area but the site does not provide any suitable habitat. | Unlikely, suitable habitat is not present within the Subject site.                                      | Low                      |
| <b>Insects</b>              |   |   |                          |
| Pink Underwing Moth         | The Southern Pink Underwing Moth is found in subtropical rainforest below about 600 m elevation. Potential breeding habitat is restricted to areas where the caterpillar's food plant, a native rainforest vine, <i>Carronia multiseppalea</i> , occurs in subtropical rainforest.  | Unlikely  | Low                      |

\* Species restricted to marine environments have not been included in this assessment as no impacts will occur to marine habitats due to the nature of the proposed works.





## **APPENDIX E**

### **PHOTOGRAPHS OF TREES TO BE REMOVED**



Tree No 1 Tucker



Tree No 2 Swamp oak



Boardwalk Section A  
(Eastern section)



Boardwalk Section B  
(Central section)



Boardwalk Section C  
(Western section)



## **APPENDIX F**

### **ASSESSMENTS OF SIGNIFICANCE**

## Section 5A Assessments of Significance

### 7 PART TESTS

*(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,*

#### Common blossom bat

Common Blossom-bats often roost in littoral rainforest and feed on flowers in adjacent heathland and paperbark swamps. They roost individually in foliage of the sub-canopy, changing roost sites daily, and return to favoured feeding sites on consecutive nights.

Threats to the Common blossom bat include:

- Clearing of coastal habitat for urban development or sandmining.
- Weeds, such as Bitou Bush, that suppress the regeneration of key food trees, such as Coastal Banksia.

Recovery actions for the Common blossom bat include:

- Control of serious coastal weed species such as Bitou Bush.
- Protect areas of littoral rainforest, coastal heath and paperbark swamp.
- Plant Common Blossom-bat feed trees such as local species of banksia, bottlebrush and paperbark.
- Initiate and support rainforest and heath regeneration projects.

Source: Office of Environment and Heritage 2017

Breeding and sheltering sites for the Common blossom bat occur within subtropical and littoral rainforest (Environment Australia 1999). The Common blossom bat forages in a diverse range of nectar producing plant communities year round and forages occasionally on rainforest fruits. The Common blossom bat requires a diverse array of nectivorous plant communities close to roost sites. Common blossom bats occur along the coastal strip in the region. This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation.

There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in foraging habitat through the compensatory planting proposed. No roosting habitat for this species would be affected by the proposed works.

#### Eastern bentwing bat

Caves are the primary roosting habitat for the Eastern (or Common) bent-wing bat, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. These bats form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes.

At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.

Threats to the Eastern bent-wing bat include:

- Damage to or disturbance of roosting caves, particularly during winter or breeding.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.

- Predation by feral cats and foxes.

Recovery actions for the Eastern bent-wing bat include:

- Control foxes and feral cats around roosting sites, particularly maternity caves.
- Retain native vegetation around roost sites, particularly within 300 m of maternity caves.
- Minimise the use of pesticides in foraging areas.
- Protect roosting sites from damage or disturbance.

Source: Office of Environment and Heritage 2017

This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in foraging habitat through the compensatory planting proposed. No roosting habitat for this species would be affected by the proposed works.

### Eastern freetail bat

The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. It occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range, roosting mainly in tree hollows but also under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.

Threats to the Eastern Freetail-bat include:

- Loss of hollow-bearing trees.
- Loss of foraging habitat.
- Application of pesticides in or adjacent to foraging areas.

Recovery actions for the Eastern Freetail-bat include:

- Retain hollow-bearing trees and provide for hollow tree recruitment.
- Retain foraging habitat.
- Minimise the use of pesticides in foraging areas.

Source: Office of Environment and Heritage 2017

This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in foraging and roosting habitat through the compensatory planting proposed.

### Eastern long-eared bat

This bat occurs in lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent areas of moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured. It roosts in hollows in trees and also in the hanging foliage of palms, in dense clumps of foliage amongst rainforest trees and under bark..

Threats to the Eastern long-eared bat include:

- Clearing, fragmentation and isolation of lowland subtropical rainforest, wet and swamp eucalypt forest and coastal scrub, particularly forest and scrub close to the coast, for agricultural, residential and other development.
- Loss of hollow-bearing trees and stands of palms and rainforest trees used for roosting and maternity sites.
- Invasion of habitat by weeds, particularly by Bitou Bush on the coast.
- Use of pesticides.

Recovery actions for the Eastern long-eared bat include:

- Protect hollow-bearing trees and patches of rainforest and other dense vegetation.
- Reduce the use of pesticides and consider alternatives where available.
- Assist with removal of weeds, particularly with Bitou Bush control in coastal areas.
- Protect known and potential habitat, particularly low elevation rainforest and coastal scrub from clearing, fragmentation and isolation.
- Reconnect and rehabilitate patches of known and potential habitat.

Source: Office of Environment and Heritage 2017

This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in foraging and roosting habitat through the compensatory planting proposed.

### **Greater broad-nosed bat**

The Greater Broad-nosed Bat utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. It forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest best suits the direct flight of this species as it searches for beetles and other large, slow-flying insects.

Threats to the Greater Broad-nosed Bat include:

- Disturbance to roosting and summer breeding sites.
- Foraging habitats are being cleared for residential and agricultural developments, including clearing by residents within rural subdivisions.
- Loss of hollow-bearing trees.
- Pesticides and herbicides may reduce the availability of insects, or result in the accumulation of toxic residues in individuals' fat stores.
- Changes to water regimes are likely to impact food resources, as is the use of pesticides and herbicides near waterways.

Recovery actions for the Greater Broad-nosed Bat include:

- Raise landowners' awareness of the presence of this species, and provide information on how their management actions will affect the species' survival.
- Actively encourage the conservation of the riparian vegetation and water quality of streams and rivers.
- DEC should be consulted when planning development/s to minimise impact/s on populations.
- Conduct searches for the species in suitable habitat in proposed development areas.
- Retain stands of native vegetation, especially those with hollow-bearing trees (including dead trees), and retain other structures containing bats.
- Retain a buffer of vegetation around roost sites in vegetated areas.
- Protect hollow-bearing trees for breeding sites, including those on farmland; younger mature trees should also be retained to provide replacements for the older trees as they die and fall over.
- Reduce the use of pesticides in the environment and enter known sites of this species and its potential habitat onto maps used for planned poison spraying activities.
- Encourage regeneration and replanting of local flora species to maintain bat foraging habitat.
- Assess the site's importance to the species' survival, including linkages provided between



This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in foraging and roosting habitat through the compensatory planting proposed.

### Grey-headed flying-fox

Grey-headed flying-foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, birth and the rearing of young. Site fidelity to camps is high with some camps being used for over a century. These bats travel up to 50 km to forage, feeding on the nectar and pollen of native trees, in particular Eucalyptus, Melaleuca and Banksia, and fruits of rainforest trees and vines. They also forage in cultivated gardens and fruit crops and can inflict severe crop damage.

Threats to the Grey-headed flying-fox include:

- Loss of foraging habitat.
- Disturbance of roosting sites.
- Unregulated shooting.
- Electrocution on powerlines.

Recovery actions for the Grey-headed flying-fox include:

- Protect roost sites, particularly avoid disturbance September through November.
- Identify and protect key foraging areas.
- Manage and enforce licensed shooting.
- Investigate and promote alternative non-lethal crop protection mechanisms.
- Identify powerline blackspots and implement measures to reduce deaths.

Source: Office of Environment and Heritage 2017

This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in foraging habitat through the compensatory planting proposed.

### Little bentwing bat

The Little bentwing bat prefers moist eucalypt forest, rainforest or dense coastal banksia scrub. It roosts in caves, tunnels and sometimes tree hollows during the day, and at night forages for small insects beneath the canopy of densely vegetated habitats. The Little bentwing bat often shares roosting sites with the Common Bentwing-bat and, in winter, the two species may form mixed clusters.

Threats to the Little bent-wing bat include:

- Disturbance of colonies, especially in nursery or hibernating caves may be catastrophic.
- Destruction of caves that provide seasonal or potential roosting sites.
- Changes to habitat, especially surrounding maternity caves.
- Use of pesticides.

Recovery actions for the Little bent-wing bat include:

- Retain stands of native vegetation.
- Reduce use of pesticides.
- Protect known roosting and nursery sites and surrounding forest.
- Check with OEH before undertaking recreational caving activities.

Source: Office of Environment and Heritage 2017

This species may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. There will be negligible loss of foraging habitat for this species. No roosting habitat for this species would be affected by the proposed works.

### Southern myotis

The Southern myotis generally roosts in groups of 10 - 15 close to water. It has been found roosting in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. This bat forages over streams and pools, catching insects and small fish by raking their feet across the water surface.

Threats to the Southern myotis include:

- Reduction in stream water quality affecting food resources
- Loss or disturbance of roosting sites.
- Clearing adjacent to foraging areas.
- Application of pesticides in or adjacent to foraging areas.

Recovery actions for the Southern myotis include:

- Retain native vegetation along streams and rivers and around other waterbodies.
- Minimise the use of pesticides adjacent to foraging areas.
- Protect roosts from damage or disturbance.

Source: Office of Environment and Heritage 2017

Foraging habitat for this species would not be affected by the proposed works. There will be negligible loss of foraging habitat for this species. Overall, the project will result in a long-term gain in roosting habitat through the compensatory planting proposed.

*(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,*

There are no listed endangered populations in the Study area.

*(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*

*(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*

*(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,*

A number of listed Endangered Ecological Communities occur in the North Coast bioregion, including:

- Byron Bay Dwarf Graminoid Clay Heath Community
- Coastal Saltmarsh in the NSW North Coast, Sydney Basin and SE Corner bioregions

- Freshwater wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and SE Corner bioregions
- Littoral rainforest in the NSW North Coast, Sydney Basin and SE Corner bioregions
- Lowland Rainforest in the NSW North Coast and Sydney Basin bioregions
- Lowland Rainforest on Floodplain in the NSW North Coast bioregion
- Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, SE Corner, SE Highlands and Australian Alps bioregions
- Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion
- Swamp oak Floodplain Forest of the NSW North Coast, Sydney Basin and SE Corner bioregions
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and SE Corner bioregions
- *Themeda* grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and SE Corner bioregions
- Coastal Cypress Pine Forest in the NSW North Coast Bioregion

One EEC is considered to occur in the Subject site, *Swamp sclerophyll forest on coastal floodplains*. No mature or juvenile paperbark trees will require removal as part of the proposed works. The proposed works will result in the long-term expansion of this EEC through the compensatory planting and expansion/restoration of riparian vegetation around Lake Ainsworth which comprises this EEC.

*(d) in relation to the habitat of a threatened species, population or ecological community:*

*(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*

*(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

*(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

Impacts to vegetation will be minor and short term and will not result in the longer term modification, fragmentation or isolation of any areas of habitat. There would be a long-term gain in vegetation cover and condition which would improve the habitat values for those species and EEC considered in this assessment.

*(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

Recommended and declared areas of critical habitat are listed on the Critical Habitat Register. The North Coast bioregion contains one area of declared Critical Habitat. Stott's Island (in the Tweed River) has been declared as critical habitat for the Mitchell's Rainforest Snail.

There are no areas of critical habitat in the Study area.

*(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

A number of priority actions have been set out for the species and EEC considered in this assessment. The proposed development is not inconsistent with these priority actions.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

A “threatening process” means a process that threatens, or may have the capability to threaten, the survival or evolutionary development of a species, population or ecological community. Key Threatening Processes have been listed in Schedule 3 of the TSC Act (1995).

A number of Key threatening processes have been listed on the schedules of the TSC Act (1995).

- Alteration of habitat following subsidence due to longwall mining
- Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands
- Anthropogenic climate change
- Bushrock removal
- Clearing of native vegetation
- Competition and grazing by the feral European rabbit (*Oryctolagus cuniculus*)
- Competition and habitat degradation by feral goats (*Capra hircus*)
- Competition from feral honey bees (*Apis mellifera*)
- Death or injury to marine species following capture in shark control programs on ocean beaches
- Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments
- Forest Eucalypt dieback associated with over-abundant psyllids and bell miners
- High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition
- Herbivory and environmental degradation caused by feral deer
- Importation of red imported fire ants (*Solenopsis invicta*)
- Infection by psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations
- Infection of frogs by amphibian chytrid causing the disease chytridiomycosis
- Infection of native plants by *Phytophthora cinnamomi*
- Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae
- Introduction of the large earth bumblebee (*Bombus terrestris*)
- Invasion and establishment of exotic vines and scramblers
- Invasion and establishment of Scotch broom (*Cytisus scoparius*)
- Invasion and establishment of the cane toad (*Bufo marinus*)
- Invasion of native plant communities by African Olive *Olea europaea* L. subsp. *cuspidata*
- Invasion, establishment and spread of *Lantana camara*
- Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)
- Invasion of native plant communities by exotic perennial grasses
- Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW
- Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants
- Loss of hollow-bearing trees
- Loss or degradation (or both) of sites used for hill-topping by butterflies
- Predation and hybridisation of feral dogs (*Canis lupus familiaris*)
- Predation by the European red fox (*Vulpes vulpes*)
- Predation by the feral cat (*Felis catus*)
- Predation by *Gambusia holbrooki* Girard, 1859 (plague minnow or mosquito fish)
- Predation by the ship rat (*Rattus rattus*) on Lord Howe Island
- Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)

- Removal of dead wood and dead trees

The proposed works will make a negligible contribution toward the clearing of native vegetation and human-caused climate change. This contribution would be negated through the proposed compensatory planting and riparian restoration works.

### **Conclusion**

With the adoption of the amelioration measures discussed in this report, the proposed development is unlikely to result in a significant impact on any Threatened (TSC Act 1995) species, population or ecological community. A Species Impact Statement is not required.

## EPBC ASSESSMENT OF SIGNIFICANCE

The following assessment follows the guidelines and definitions set out in the EPBC Act Policy Statement 1.1.

### Assessment of proposed action

*Are there any matters of national environmental significance located in the area of the proposed action?*

#### Threatened species and ecological communities.

The EPBC Protected Matters Report generated for the Subject site shows a number of Threatened species as possible occurrences within 5km of the Subject site. Of the Threatened fauna species included in the Protected Matters Report, the Vulnerable Grey-headed flying-fox is the only species considered a possible occurrence in the area subject to the proposed works.

#### Migratory species

The EPBC Protected Matters Report generated for the Subject site shows a number of Migratory species as possible occurrences within 5km of the Subject site. Several of these species, including the White-bellied sea eagle, White-throated needletail and Rainbow bee-eater, may occur in the Study area at times.

#### Ramsar Wetlands of International Significance

There are no Wetlands of International Significance within 5km of the Subject site.

#### Commonwealth marine areas

Generally, the Commonwealth marine area stretches from three miles to two hundred nautical miles from the coast. The Proposed development will not affect any Commonwealth marine areas.

#### World Heritage properties

The EPBC Protected Matters Report generated for the Subject site shows no World Heritage properties within 5km of the Subject site.

#### National heritage places

The EPBC Protected Matters Report generated for the Subject site shows no National Heritage places within 5km of the Subject site.

*Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?*

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population;
- reduce the area of occupancy of the species;
- fragment an existing population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of a population;
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat;
- introduce disease that may cause the species to decline; or
- interfere with the recovery of the species.

No critically endangered or endangered species were recorded or considered likely to occur.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species, or
- reduce the area of occupancy of an important population, or
- fragment an existing important population into two or more populations, or
- adversely affect habitat critical to the survival of a species, or
- disrupt the breeding cycle of an important population, or
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

An important population is one that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal,
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

The Grey-headed flying –fox may occur on the site at times, particularly during peak fruiting and flowering times of site vegetation. Overall, the project will result in a long-term gain in foraging habitat through the compensatory planting proposed.

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will reduce the extent of an ecological community

- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
  - assisting invasive species, that are harmful to the listed ecological community, to become established, or
  - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
- interfere with the recovery of an ecological community.

No Threatened Ecological Community (TEC) types occur in the Study area.

An action has, will have, or is likely to have a significant impact on a migratory species if it does, will, or is likely to:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of *important habitat* of the migratory species;
- result in an invasive species that is harmful to the migratory species becoming established in an area of *important habitat* of the migratory species; or
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an *ecologically significant proportion* of the population of the species.

An area of important habitat is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an *ecologically significant proportion* of the population of the species; and/or
- habitat that is of critical importance to the species at particular life-cycle stages; and/or
- habitat utilised by a migratory species which is at the limit of the species range; and/or
- habitat within an area where the species is declining.

The Study area may be used at times by a range of migratory species. The Subject site does not represent an area of important habitat for any migratory species and will not seriously disrupt the lifecycle of an ecologically significant proportion of any migratory species.

*Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?*

Amelioration measures have been recommended to reduce overall site impacts and potential impacts on areas of retained habitat.

*Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts?*

No.

### **Conclusion**

Based upon this assessment and with the implementation of the amelioration measures discussed in this report, the proposed development is unlikely to result in a significant impact on any matters of National Environmental Significance (NES) as listed under the EPBC Act 1999 and referral to the Minister is not required.





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**ANNEXURE G**      **Cultural Heritage Assessment – Remnant Archaeology (Graham Knuckey),  
2 November 2017**

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**DAC Planning Pty Ltd**

A.C.N. 093 157 165

Town Planning & Development Consultants



**- AN ABORIGINAL CULTURAL HERITAGE ASSESSMENT -**

**LAKE AINSWORTH FORESHORE IMPROVEMENTS, LENNOX HEAD, BALLINA LOCAL  
GOVERNMENT AREA, NEW SOUTH WALES**

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**A Report To:** Ballina Shire Council

**Date:** 02 November 2017

**Prepared For:** Ballina Shire Council, Cherry Street, Ballina, New South Wales. 2478

**Prepared By:** Graham KNUCKEY PhD

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Isaiah 37:4b

In preparing this report, REMNANT Archaeology has relied upon information, data, surveys and/or site inspection results taken at the time and under the conditions specified herein. REMNANT Archaeology has also relied on verbal information and documentation provided by the Proponent/Client and/or third parties representing the Proponent/Client, but has not attempted to [independently] verify the accuracy or completeness of that information. To the extent the conclusions and recommendations in this report are based in whole [or in part] on such information, they are also [therefore] based upon the validity of that information. REMNANT Archaeology assumes no responsibility for any consequences arising from information or condition(s) concealed, withheld, misrepresented, or otherwise not fully disclosed or available to REMNANT Archaeology.

The findings contained in this report are the result of methodologies used in accordance with normal practices and standards. To the best of my knowledge, they represent a reasonable interpretation of the condition of the site in question. Under no circumstances, however, can it be considered that these findings represent the actual state of the site/sites at all points in space and time. Given the changing nature of the landscape in response to processes including erosion/weathering from wind and rain, and the erosive nature of current and/or past farming and grazing activities, the circumstances reported herein may alter. As such REMNANT Archaeology places a shelf life of [no more than] four years on its reports. The formulation of any Indigenous archaeological heritage management strategy or cultural heritage management plan (CHMP) based upon information provided in this report beyond that time (four years), must be viewed with caution and is NOT recommended.

Any representation, statement, opinion or advice, expressed or implied in this report is made in good faith but on the basis that REMNANT Archaeology is not liable (whether because of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever, which has occurred or may occur in relation to that person taking (or not taking) action in respect of any recommendation, statement, or advice referred to above. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Proponent/Client.

REMNANT Archaeology accepts no responsibility for the use of this report by parties other than the Proponent/Client for which it was written. REMNANT Archaeology accepts no responsibility for use of this report beyond its shelf life.

## Document Verification

| <b>Project Name</b> | LENNOX HEAD lake ainsworth aboriginal cultural heritage assessment  |                  |          |           | <b>Project No:</b> | RA1701   |  |
|---------------------|---|------------------|----------|-----------|--------------------|----------|--|
| <b>Report Title</b> | An Aboriginal Cultural Heritage Assessment – Lake Ainsworth Foreshore Improvements, Lennox Head, Ballina Local Government Area, New South Wales |                  |          |           |                    |          |  |
| Revision No         | Date  | Nature of Review | Prepared | Finalised | Submission         |          |  |
|                     |   |                  |          |           | Method             | Date     |  |
| -                   | 29-08-17  | Draft            | gk       |           | E-mail             | 29-08-17 |  |
| 1                   | 30-10-17  | Proponent review | gk       |           | E-mail             | 30-10-17 |  |
|                     | 02-11-17  | Final            | gk       | 02-11-17  | E-mail             | 02-11-17 |  |

## EXECUTIVE SUMMARY

In July 2017 Ballina Shire Council engaged Remnant Archaeology to carry out an Aboriginal cultural heritage assessment (ACHA) for their proposed upgrades of Pacific Parade and Camp Drew Road at Lake Ainsworth, Lennox Head in northern New South Wales. Although the project had been approved under Part V of the *EP&A Act 1979*, Council were keen to take into consideration concerns by members of the community and as such although the project (as approved under Part V of the *EP&A Act*) does not require a cultural heritage assessment (CHA) to be carried out unless an EIS is required, Council were still keen to take into consideration concerns expressed by members of the community and so commissioned REMNANT Archaeology to complete a CHA regardless. Survey and inspection of Pacific Parade and Camp Drew Road was completed on 12 July 2017 and was carried out by members of the local Aboriginal Community that had registered as Aboriginal parties (RAPs) to the project (Ms Lois Cook, Mr Mik Smith and Mr Marcus Ferguson), along with Remnant Archaeology's field archaeologist (Graham Knuckey) and Mr Ian Fox, who assisted the archaeologist. No Aboriginal objects or places were located during the site inspection; a small collection of oyster shells were found however they were identified as being too young to have originated from an Aboriginal shell midden or to have any connection with Aboriginal cultural activity from the past. Despite impacts from the recent past however, including military, mining and recreational activities, potential for Aboriginal cultural heritage resources to exist within the barrier dune that separates Lake Ainsworth from Seven Mile Beach still exists.

As a result of the investigation, outcomes and assessment contained in this cultural heritage assessment report it is recommended that:

1. No further archaeological investigation is required along the sections of Pacific Parade and Camp Drew Road designated for upgrade works.
2. The barrier dune and paperbark trees along Pacific Parade can be avoided.
3. Monitoring by representatives of the RAPs should take place during initial ground disturbance activity along the eastern verge of Pacific Parade.
4. It is recommended here that Council staff and contractors who have not previously (or recently) participated in Ballina Shire Council CH Induction Programs be required to do so. The CH induction program should be developed in collaboration with the local Aboriginal Community and should include a maintained record, including timing, of all personnel and contractors involved for the duration of the project.

In conjunction with induction training developed in collaboration with the local Aboriginal Community, Council is encouraged to include a program of cultural awareness. A cultural awareness program would provide an opportunity for explanation of the cultural significance to Aboriginal people of the Lake Ainsworth area and strengthen the relationships Council is seeking to build.

5. It is recommended that Ballina Shire Council maintain consultation with the RAPs. Ongoing consultation should be for the duration of the upgrade works.
6. It is recommended a Stop Work Procedure (SWP) is to be installed in recognition of the potential for discovery of unexpected or incidental finds. Note that any works that may reveal or disturb cultural heritage objects or sites will require an AHIP from OEHL in order for the find(s) to be mitigated (if avoidance is not an option). The SWP procedure is outlined in the table below and has been adapted from earlier reports completed in the region (Fox 2014a; 2014b; 2014c; Knuckey 2016).

Council must ensure every on-site contractor/worker is provided with a copy of the SWP process and that all on-site workers are made aware if/when the SWP is brought into action.

Should the work being undertaken include the use of large earth working equipment (large-scale excavators, for example), it may be possible in some instances to isolate the cultural object and continue working without further disturbance. Advice from a heritage consultant or cultural monitors (if present) should be sought, but a nominal buffer of up to 5m may be required, with high-visibility barrier fencing/mesh surrounding the find location.

**The proposed stop work procedure (SWP).**

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|                   |   |
|-------------------|---|
| <b>STOP WORK</b>  | Immediately, upon becoming aware of a potential cultural heritage object or archaeological resource   |
| <b>CONTACT</b>    | A qualified cultural heritage professional as soon as possible  |
| <b>NOTIFY</b>     | The Ballina Shire Council's Heritage (or Senior Project) Officer, Jali LALC, the RAPs (if they are not already present), and advise OEH as soon as practicable.<br><br>If bones or potential human remains are discovered, Police must be notified immediately. Police must provide written notification to proceed. If human remains are identified as Aboriginal, OEH will provide written notification of required actions.      |
| <b>ASSESS</b>     | The cultural heritage professional in conjunction with OEH and the registered Aboriginal parties should assess the significance of the resource and recommend a course of action e.g.:<br><br>Protect and avoid; or<br><br>Investigate, in accordance with the Code of Practice for Archaeological Investigations; or<br><br>Develop management strategies to inform an AHIP to regulate the unavoidable harm to Aboriginal objects |
| <b>ACTION</b>     | Identification of a previously unrecorded cultural heritage object will require registration as an Aboriginal site on the OEH AHIMS database. Registration is required as soon as practicable   |
| <b>APPLY</b>      | To OEH for an AHIP if necessary   |
| <b>RECOMMENCE</b> | Only when OEH has approved a course of action and/or provided conditions of approval for an AHIP  |

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7. In the event that skeletal remains are uncovered, work must cease immediately in the area surrounding the find and the area cordoned off. The NSW Police Department is to be contacted and no further action taken until written advice is received from the Police allowing work to recommence. If the remains are determined to be of Aboriginal origin, the Office of Environment and Heritage must be notified along with the RAPs to the project and the Jali Local Aboriginal Land Council. A plan of management for the preservation of the remains must be put in place prior to works recommencing and it must be developed in consultation with the RAPs.

## ACKNOWLEDGEMENTS

The author acknowledges with gratitude the assistance provided by Ian Fox of Ian Fox & Associates, in community consultation and in preparation for the fieldwork component of this project. Ian's advice with regard to logistical matters, report preparation, and his working relationship with the local Aboriginal Community was invaluable to the completion of this cultural heritage assessment.

The author acknowledges the Ballina Aboriginal Community and the interest and advice offered by the various registered Aboriginal parties (RAPs) to the project. In particular, acknowledgement and thanks go to the members of the field team that assisted during the field inspection on 12 July 2017. Those individuals included: Lois Cook, Mik Smith and Marcus Ferguson.

The author also acknowledges the assistance of Malcolm Milner; for his time and for access and advice regarding the Lennox Head Heritage Committee historical photograph collection.

## TERMINOLOGY

|                           |  |
|---------------------------|--|
| <b>Amorphous piece</b>    | A stone that displays attributes that identifies it as an artefact but it is not a flake or a core; also known by other names such as 'blocky' fragment and 'angular' fragment.  |
| <b>Artefact</b>           | Any item that has been created or modified by humans.  |
| <b>Artefact scatter</b>   | A concentration or 'scatter' of artefacts found on the ground surface indicating prehistoric human activity at that location. Also known as 'open' sites, surface scatter, general artefact scatter and when found in association with hearths can be called a 'campsite'.   |
| <b>Assemblage</b>         | Any collection of items from an archaeological site or deposit. The term can describe a group of similar items: the lithic assemblage or the faunal assemblage, for example. Or it can be used to describe all items, the archaeological assemblage from Test Pit 10, for example.   |
| <b>Axe blank</b>          | A lithic artefact, usually an igneous raw material (but not always) that has been 'shaped' using direct percussion, to a particular shape suitable for use as an axe. The edge has not yet been ground onto it. Also called 'bifaces'.   |
| <b>Backed artefact</b>    | Uni- or bi-directional retouch along one lateral margin of an artefact, often a flake but not always. Tends to occur on the opposite margin to the intended working edge.  |
| <b>Background scatter</b> | Defined by Hiscock (1988) as a continuous scatter of stone artefacts the density of which varies in response to the nature and amount of prehistoric activity. Also called 'off-site archaeological material'.   |
| <b>Bi-facial flaking</b>  | When, during the knapping process, flakes are removed from both the dorsal and ventral surfaces of a flake. The resulting artefact is often called a 'biface', which can be a 'blank' that is in the process of being made into something else (an axe for example), or it can be a source of raw material - a core.   |
| <b>Bi-facial point</b>    | Any point that has been struck after initial removal, where the scars occur on both surfaces, ventral and dorsal (initiated from either lateral margin).   |
| <b>Blade</b>              | A flake that measures greater in the longitudinal plane than it does in the transverse plane, usually greater than twice the width. This term does not indicate function without further clarification. For example use wear along the margins.  |
| <b>Bulb of percussion</b> | The 'lump' directly below the point of force application at the proximal end of the ventral surface of a flake. The bulb represents the point at which force applied through the PFA has removed the greatest mass. As the force passes through the flake it is reduced and so less mass is removed. The bulb is the primary diagnostic feature used when identifying flaked artefacts. Conversely, the negative bulb appears on the surface of the core from which the flake was removed. |
| <b>Chert</b>              | This is a cryptocrystalline sedimentary rock with high silica content that fractures conchoidally and is preferred as a raw material from which to make stone artefacts. Jasper and agate are forms of chert.  |
| <b>Context</b>            | This is a term used in association with ground integrity (GI) and ground surface visibility (GSV). When assessing an archaeological site the archaeologist takes into consideration the GSV, the GI, all landmarks within the site including vegetation types, lithic raw materials present and also the surrounding environment. All aspects of the on-site and off-site landscape are taken into consideration when assessing the context within which an archaeological site exists.    |
| <b>Cortex</b>             | The outer, weathered surface of a rock and is often the first thing to be removed in the initial stages of the knapping process.   |
| <b>Core</b>               | The core is one of the three basic items in the knapping process. It is the raw material resource that is struck with a hammer in order to produce a flake. The negative flake scars on their surfaces are what is used to identify cores.   |

## TERMINOLOGY

|                          |  |
|--------------------------|--|
| <b>Core: m-plat</b>      | A multiple platform core is a core that has been 'rotated' so that flakes have been removed in more than one direction from more than one platform.  |
| <b>Core: s-plat</b>      | A single platform core is a core that has not been 'rotated' so that flakes have been removed in only one direction, from only one platform.   |
| <b>Debitage</b>          | The broken and fragmentary material resulting from the knapping process. The 'waste' produced when removing flakes from a core, usually small but not always.  |
| <b>Direct percussion</b> | The primary knapping technique where one stone is used to strike a flake off another stone using direct impact. See also 'pressure flaking' as another knapping technique.   |
| <b>Distal</b>            | A term used when defining flake attributes. The distal end is the end of a flake that displays the termination. The distal end is the bottom end of a flake. See also 'proximal', 'lateral margin', 'ventral surface' and 'dorsal surface'.  |
| <b>Dorsal surface</b>    | This is the 'outside' surface of a flake: the surface that was exposed to the environment when the flake was still attached to the core. The dorsal surface often (but not always) displays the negative flake scars of flake removals taken from the core prior to the removal of the flake in question. See also 'ventral surface'.                          |
| <b>Edge-ground axe</b>   | An axe the (sharp) edge of which has been created through the grinding process.  |
| <b>Excavation spits</b>  | Soil removed in layers of arbitrary depth from an archaeological excavation.   |
| <b>Excavation units</b>  | Soil removed in layers according to the soil profile and soil type, rather than in measured (arbitrary) spits.   |
| <b>Flake</b>             | The direct result of the knapping process a flake can be either the product used directly from the core or reduced further at some later time to create an implement, or, the flake can be a by-product, removed and discarded.  |
| <b>Flaked piece</b>      | A stone that displays attributes that identifies it as a flaked artefact but that cannot be identified with any more detail than as a 'flake fragment'. For example, an artefact that does not display clearly attributes such as a bulb, proximal end or distal termination, platform, dorsal or ventral surfaces, can be called a flaked piece.              |
| <b>Ground Integrity</b>  | The degree to which the ground surface has been disturbed by whatever means. Ground integrity is important in assessing the archaeological value of a place and/or items found within a place. It is closely associated with ground surface visibility (GSV).  |
| <b>Grinding grooves</b>  | The location in close proximity to permanent water and a source of soft and/or sandy rock, where linear ruts or grooves have been ground into the base rock whilst creating edge-ground axes.  |
| <b>Grindstone</b>        | A stone that has been subjected to grinding pressure by another stone to grind up various materials; grass seeds, ochre. Grindstones were also used for putting the edge onto axes or for sharpening spear tips. Large flat grindstones are called bottom-stones or base plates, whilst the smaller stone used to do the grinding is the 'muller' or topstone. |
| <b>Ground-edge</b>       | Artefacts that have had an edge placed on them through the grinding process, rather than through knapping (percussion). This grinding process may be deliberate as with axes, or it might be a by-product of another process as with grindstones.  |
| <b>GSV</b>               | This means ground surface visibility: the degree to which the ground surface is visible.   |
| <b>Hammerstone</b>       | One of the two essential implements used in the knapping process to create flakes. See also 'core'.  |
| <b>Implement/tool</b>    | Any artefact that can be shown to have had a specific purpose. For example an axe, grindstone (base plate), muller (top stone) or tula (adze). All tools/implements are artefacts, <i>not</i> all artefacts are tools.   |
| <b>Isolated artefact</b> | Also called an 'isolate'. Single artefact found in isolation - by itself.  |
| <b>Knapping</b>          | The mechanical process of striking one stone, the core with another stone, the hammer to produce another stone, the flake. These three stones are the foundation of the knapping process.  |
| <b>Knapping floor</b>    | A specialised type of artefact scatter where artefacts of the same raw material type are found in close proximity to one another, generally within 1m <sup>2</sup> . These artefacts can often be put back together, reconstructing the original core they were struck from.   |
| <b>Lateral margin</b>    | There are two, the left and right lateral margins (sides). Which is which is determined by how the flake is viewed. Looking at the ventral surface with the platform at the top, the 'right' lateral margin is on the right; the 'left' lateral margin is on the left  |
| <b>Mudstone</b>          | A fine-grained sedimentary rock similar to chert but without the silica content of cherts.   |
| <b>Negative scars</b>    | The depression left on the core after a flake is removed; the place from which the flake has been fractured; the negative flake scar. These are most common on cores but are also identifiable on the dorsal surface of flakes. Flake scars on the ventral surface of flakes indicate retouch.   |

## TERMINOLOGY

|                         |  |
|-------------------------|--|
| <b>PFA</b>              | Point of force application is the point at which force enters the core, the impact point. Depending upon the angle and amount of force applied a flake removal is the desired result of this application of force.   |
| <b>Platform</b>         | The surface of a core that is struck by the 'hammer' to remove a flake.  |
| <b>Point</b>            | Any artefact that has the shape of a point. This term does not indicate function.  |
| <b>Pressure flaking</b> | One of the two main knapping techniques. When a pointed object (that focuses pressure at one place) is placed against a core and pressure applied to the margin of the core in order to 'squeeze' flakes off. Commonly used to reduce the thickness of a flake rather than its size. See also 'direct percussion'.                                     |
| <b>Proximal</b>         | A term used when defining flake attributes. The proximal end is the end of a flake that displays the platform and the PFA. See also 'distal', 'lateral margin', 'ventral surface' and 'dorsal surface'.  |
| <b>Retouched flake</b>  | Any artefact that has been struck after the initial impact that removed it from the core. This may be one strike; it may be more than one. The term does not indicate implement status, or function.   |
| <b>Ring crack</b>       | Another term for point of force application (PFA).   |
| <b>Silcrete</b>         | A descriptive term identifying a rock type of original, fine-, medium- or coarse-grained sedimentary material cemented together with silica in cryptocrystalline form. Grains are visible to the naked eye. Silcrete is a common source material in areas where sedimentary rocks have been subjected to low-grade contact with metamorphic processes. |
| <b>Soil horizon</b>     | A soil horizon is a layer of soil most often parallel to the land surface, with properties that differ from the layers above and/or below it. In an archaeological deposit it is most often the A Horizon that contains the cultural deposit archaeologists are interested in - but not always.  |
| <b>Test Pit</b>         | Any location chosen for subsurface exploration using 50cm <sup>2</sup> pits to test the archaeological potential at that place.  |
| <b>Test Pit Grid</b>    | A 2m <sup>2</sup> grid subdivided into 50cm <sup>2</sup> squares superimposed over the test pit location. Designed to maximise the area opened yet constrained to remain within the requirements of the OEH Code of Practice. Used where depth of deposit is, or is perceived to be a constraint.  |
| <b>Termination</b>      | The termination of a flake is the point at which the force applied exits the core. There are a number of different 'terminations' and each indicates different things including lithic raw material quality and also the skill or otherwise of the knapper.  |
| <b>Tree - carved</b>    | A tree that has been altered in recognisable patterns/designs, the actual meaning of which may be known or unknown. Carved trees are most often associated with particular or special places, or can be directional markers.   |
| <b>Tree - scarred</b>   | A tree that has been altered through the removal of bark and/or heartwood for (most commonly) utilitarian purposes. Scarring in this fashion is the result of bark removed for coolamons, shields and canoes.  |
| <b>Unifacial point</b>  | Any point that has been struck again, after initial removal, where the scars occur on one surface only, ventral or dorsal (initiated from either lateral margin).  |
| <b>Ventral surface</b>  | This is the 'inside' surface of a flake: the surface that is not exposed to the environment that is created at the time the flake detaches from the core during the knapping process. Any flake scars on this surface indicate the flake in question has been retouched. See also 'dorsal surface'.  |
| <b>Waisted axe</b>      | An edge-ground axe that has a groove around it in the transverse plane, used for attaching a haft (handle). Also known as a 'hafted axe' even if the handle is no longer present. The groove is usually applied using direct percussion and the 'pecking' - force applied to an object that is placed upon the axe at the time of impact.              |



## ABBREVIATIONS

|               |   |
|---------------|---|
| <b>ACC</b>    | Aboriginal Cultural Concepts                              |
| <b>ACHAR</b>  | Aboriginal cultural heritage assessment report            |
| <b>ACHA</b>   | Aboriginal cultural heritage assessment                   |
| <b>AHIMS</b>  | Aboriginal Heritage Information Management System         |
| <b>AHIP</b>   | Aboriginal heritage impact permit                         |
| <b>ASL</b>    | Above sea level   |
| <b>BSC</b>    | Ballina Shire Council                                     |
| <b>CH</b>     | Cultural heritage   |
| <b>CM</b>     | (lowercase) Centimetres                                   |
| <b>DECCW</b>  | Dept. of Environment Climate Change and Water (now OEH)   |
| <b>GI</b>     | Ground integrity  |
| <b>GPS</b>    | Global positioning system                                 |
| <b>GSV</b>    | Ground surface visibility                                 |
| <b>IFA</b>    | Ian Fox & Associates                                      |
| <b>JLALC</b>  | Jali Local Aboriginal Land Council                        |
| <b>KYA</b>    | Thousand years ago  |
| <b>LALC</b>   | Local Aboriginal Land Council                             |
| <b>LGA</b>    | Local government area                                     |
| <b>MM</b>     | (lowercase) Millimetres                                   |
| <b>MYA</b>    | Million years ago   |
| <b>NPWS</b>   | (New South Wales) National Parks and Wildlife Service     |
| <b>NSWALC</b> | New South Wales Aboriginal Land Council                   |
| <b>NNTT</b>   | National Native Title Tribunal                            |
| <b>NTS</b>    | Native Title Services Corporation                         |
| <b>NT</b>     | Native Title  |
| <b>OEH</b>    | NSW Office of Environment and Heritage (previously DECCW) |
| <b>RAP(s)</b> | Registered Aboriginal Party (ies)                         |
| <b>RA</b>     | Remnant Archaeology                                       |
| <b>TC(s)</b>  | Traditional Custodian(s)                                  |
| <b>TO(s)</b>  | Traditional Owner(s)                                      |

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## 1 INTRODUCTION

### 1.1 The Project Description

Ballina Shire Council (BSC or simply 'Council') is in the initial planning stages of proposed improvement works along Pacific Parade and Camp Drew Road, traversing the eastern and southern shores (respectively) of Lake Ainsworth at Lennox Head (Figs. 1-2). In recent times Council sought a Part V approval under the *EP&A Act 1979* through the BSC Development Services Branch and approval was subsequently received on 3 November 2016 (Section 2.2 – Statutory Controls, see also Appendix A). Regardless of the approval process however, the project has for some time been the subject of considerable Council deliberation and public debate, attracting significant public interest both for and against. As a result of this interest and although the project (as approved under Part V of the *EP&A Act*) does not require a cultural heritage assessment (CHA) to be carried out unless an EIS is required, Council are keen to take into consideration concerns expressed by members of the community and have requested REMNANT Archaeology complete a CHA regardless.

The works are on Crown Land for which Council is the trust manager and is on land that is subject to a plan of management formulated by BSC in 2002. The proposed works will include improvements in two areas along Pacific Parade and Camp Drew Road (Fig. 2-3), and the reconstruction of the intersection between the two thoroughfares:

- o Pacific Parade (Eastern Road) - Rehabilitating the road by profiling the existing pavement and constructing a footpath and landscaping the area of public reserve along to the over-bank area of the eastern shore of Lake Ainsworth.
- o Camp Drew Road (Southern Road) and Foreshore Area - Reconstruction of the existing road way and formalising the adjoining car parking bays between Pacific Parade and Camp Drew Road. These works are along the over-bank area of public reserve along the southern shore of Lake Ainsworth. It includes bank stabilisation, improvement of the open spaces for passive recreation and potential pedestrian linkages between existing isolated open spaces.
- o There will also be a reconstruction of the three-way intersection between Pacific Parade and Camp Drew Road adjacent to the Lennox Head/Alstonville Surf Life Saving Club. The new intersection will be a two-way intersection incorporating a turn facility and will be the termination point for Pacific Parade (open to emergency vehicle and maintenance service vehicles only).

### 1.2 The Cultural Heritage Brief

In carrying out the ACHA REMNANT Archaeology (RA) has been guided by the specifications set out in the Office of Environment and Heritage (OEH) documents, *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in New South Wales*, and the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* and addresses cultural/natural and archaeological significance for registered Aboriginal objects and/or sites, and for unregistered Aboriginal objects and/or sites found during the field component of the assessment. Consultation with the local Aboriginal Community has followed along the lines set out in the OEH document *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

### 1.3 The Objectives Of This Assessment

This assessment focuses upon the proposed upgrades to Pacific Parade that runs parallel (from north to south) with Lake Ainsworth between the lake to the west and the barrier dunes to the east, and to Camp Drew Road along the southern foreshore of the lake (Fig. 2-3). The project objectives are listed below:

- o Provide clear direction for the development of the final design and construction of the upgrades.
- o Develop management recommendations that will assist in minimising impact on any heritage significance that is or may be associated with the land in question.
- o Identify and assess the significance of known (and any potential) cultural heritage items that may be located within the project area or be impacted by works within the project area.

- o Register any known Aboriginal sites within the project areas along Pacific Parade and Camp Drew Road that have not already been registered, as per NSW Office of Environment and Heritage standards.

With respect to the registered Aboriginal parties (RAPs), the assessment objectives are:

- o To ensure that any input from the Aboriginal Community is recorded and that any issues or requirements of cultural groups are discussed and balanced to ensure appropriate results are obtained.
- o To consult with the RAPs and based upon those discussions determine if and where cultural monitoring will be required, and to develop supporting information for any AHIP application that may be required.

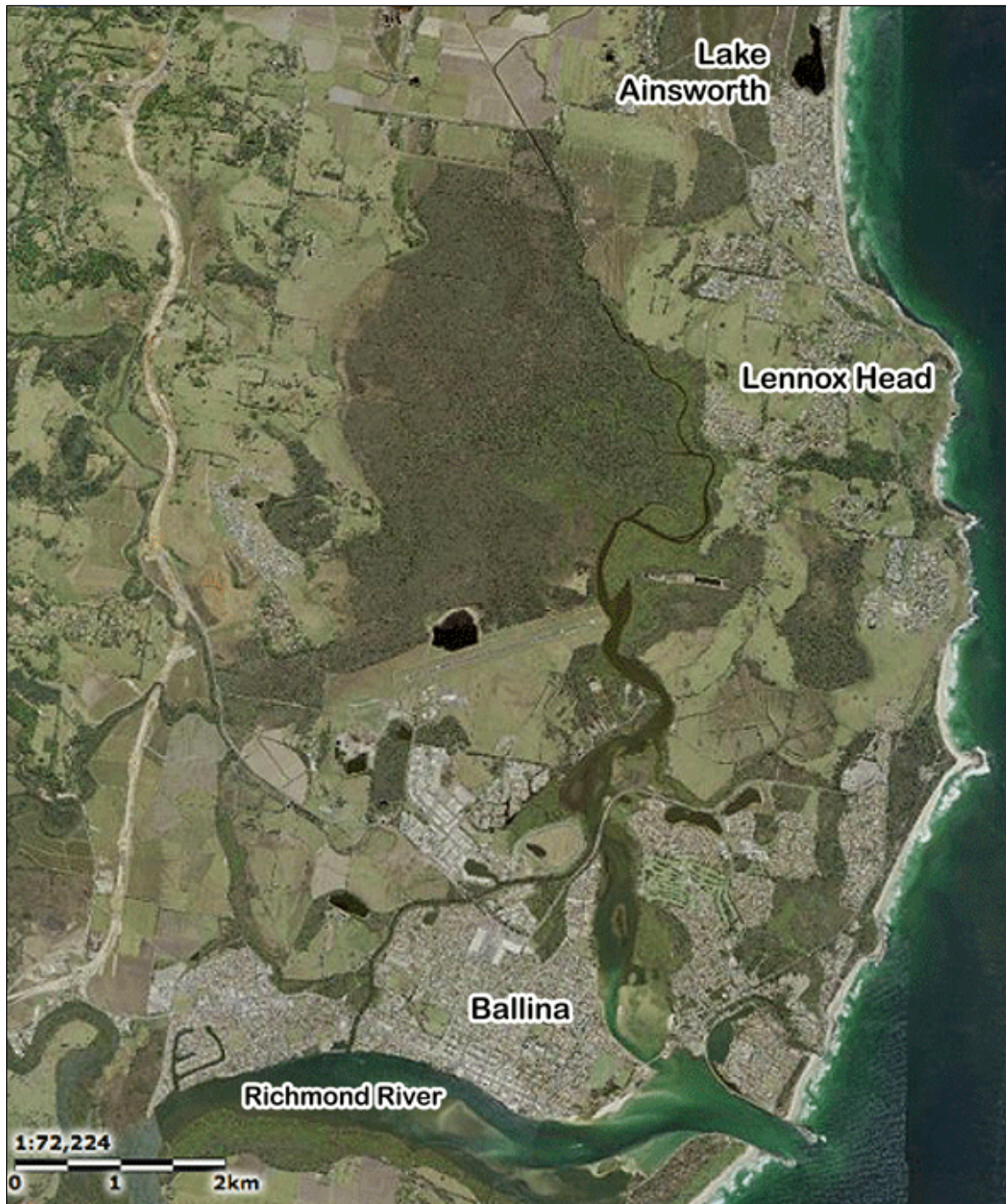


Figure 1 – The location of Lake Ainsworth in the Ballina local government area. Image source: New South Wales Spatial Information Exchange (SIX Maps) website (<https://six.nsw.gov.au>).



Figure 2 – The location of Pacific Parade and Camp Drew Road (the study area) at Lake Ainsworth in the Ballina LGA. North is up. Image source: New South Wales Spatial Information Exchange (SIX Maps) website (<https://six.nsw.gov.au>).



Figure 3 – Areas of works along Pacific Parade and Camp Drew Road at Lake Ainsworth. Image source: Ballina Shire Council.

## 2 THE LEGISLATIVE CONTEXT

### 2.1 The Legislation

#### 2.1.1 The NSW National Parks and Wildlife Act 1974

The *NSW National Parks and Wildlife Act 1974* (the '*NPW Act*') provides protection for all Aboriginal cultural heritage (ACH) sites and objects in New South Wales and promotes the conservation of Aboriginal cultural heritage objects and places that are of high cultural significance. Sections 84, 86, and 87 of the Act provide protection for Aboriginal places (S84), describe that it is an offence to harm or desecrate an Aboriginal object or declared Aboriginal place (S86) and set out defences and exemptions available for activities that have the potential to result in harm and/or desecration (S87) to Aboriginal cultural heritage objects and/or places. Section 86 also sets out the penalties and regulations as defined in the National Parks and Wildlife Regulations, Part 8A.

The *NPW Act 1974* (the '*NPW Act*') is the primary piece of legislation for the protection of Aboriginal cultural heritage in New South Wales. The Office of Environment and Heritage (OEH) administers the *NPW Act* and it provides statutory protection for Aboriginal objects by making it illegal to harm them (Aboriginal objects) and Aboriginal places, and by providing two tiers of offence against which individuals or corporations who harm Aboriginal objects or Aboriginal places can be prosecuted. The *NPW Act* defines Aboriginal objects and Aboriginal places thus:

*Aboriginal object means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*

*Aboriginal place means any place declared to be an Aboriginal place under section 84.*

If Aboriginal cultural heritage objects and/or places are present or are likely to be present and the proposed activity will harm those objects and/or places then Sections 90-90R of the *NPW Act* outline the permit process that must be followed prior to the commencement of that activity. These sections provide details of the Aboriginal Heritage Impact Permit (AHIP) system as regulated by the Director-General of the Office of Environment and Heritage (OEH) and describe the Aboriginal Heritage Information Management System (AHIMS), the database of registered Aboriginal site information across New South Wales.

In 2010 the Department of Environment, Climate Change and Water (DECCW, precursor to the OEH) introduced a range of guidelines regarding the assessment and management of Aboriginal cultural heritage in New South Wales including the;

- o *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010a).
- o *Code of Practice for the Archaeological Investigation of Archaeological Objects* (2010b).
- o *Due Diligence Code Of Practice for the Protection of Aboriginal Objects* (2010c).
- o *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage* (2011).

The highest tier offences under the *NPW Act* are reserved for knowledgeable harm of Aboriginal objects or knowledgeable desecration of Aboriginal places. Second tier offences are strict liability offences—that is, offences regardless of whether or not the offender knows they are harming an Aboriginal object or desecrating an Aboriginal place—against which defences may be established under the *NSW National Parks and Wildlife Regulation 2009*.



Section 87 of the *NPW Act* establishes defences against prosecution under s.86 (1), (2) or (4). The defences are as follows:

- o An Aboriginal Heritage Impact Permit (AHIP) authorising the harm (s.87 [1]).
- o Exercising due diligence to establish Aboriginal objects will not be harmed (s.87 [2]) due diligence may be achieved by compliance with requirements set out in the NSW National Parks and Wildlife Regulation 2009 or a code of practice adopted or prescribed by the NPW Regulation (s.87 [3]).

### **2.1.2 The NSW Environmental Planning and Assessment Act 1979**

*The NSW Environmental Planning and Assessment Act 1979* (the *EP&A Act*) provides for the consideration of the impact upon the environment of land use planning and decision-making involving land use. In New South Wales the definition of environmental impact includes an assessment of heritage, both Aboriginal and non-Aboriginal, and there are three parts in the Act that encompass Aboriginal heritage. These sections (Parts III, IV and V) include associated regulations, schedules and guidelines.

Part III of the EP&A Act governs the preparation of State Environment Planning Policies (SEPPs), Regional Environmental Plans (REPs) and Local Environmental Plans (LEPs) and it is these policies and plans that cover the uses to which a parcel of land can be put, and, the potential constraints applicable to that land. When putting one of these documents together Department of Planning guidelines must be followed and these guidelines state that Aboriginal heritage should be assessed as part of the process.

Part IV of the Act directs the decision-making process to be followed by local government during the assessment of a development application and describes the sorts of impact that must be acknowledged before development approval is given, including impacts upon the environment. As is the case in Part III, Aboriginal heritage is included within the definition of '...the environment...'. Part IV also incorporates integrated development approvals (IDAs) and these are developments where State government bodies are linked to the DA approval process. In cases where an AHIP is required the Office of Environment and Heritage also becomes an approval body.

Part V of the EP&A Act directs the decision-making process to be followed by State government bodies when assessing proposed development activity. Under Section 111 it is the duty of the State government body involved to acknowledge environmental impacts and then, under Section 112, to determine whether the level of proposed/potential impact will trigger the requirement of an Environmental Impact Statement (EIS). As previously mentioned, it is the case that Aboriginal heritage is included here in the definition of '...environmental impacts...'. It is also the case that if an EIS is required, an assessment of cultural heritage (both Aboriginal and non-Aboriginal) must be completed as part of the EIS.

### **2.1.3 The NSW Heritage Act 1977**

Administered by the Department of Planning in New South Wales the *Heritage Act 1977* protects both natural and cultural heritage. Aboriginal heritage may be subject to the provisions of this Act if the item or place is listed on the State Heritage Register or is subject to an interim heritage order (IHO). The Minister (with the advice of the NSW Heritage Council) approves the listing of items and/or places on the register and can also prevent the destruction, demolition or alteration of items of potential heritage value through an IHO until significance has been assessed.

### **2.1.4 The NSW Aboriginal Land Rights Act 1983**

The New South Wales Aboriginal Land Rights Act 1983 established the roles of the NSW Aboriginal Land Council (NSWALC) and the Local Aboriginal Land Councils (LALC) that act under the guidance of the NSWALC. The Act places certain requirements on the ALCs at state and local level and it (the Act) acknowledges the statutory roles and responsibilities of the ALCs. The Act requires the Land Councils to:

- o Take action to protect the culture and heritage of Aboriginal persons within the Council's area, subject to any other law.
- o Promote awareness in the wider community of the culture and heritage of Aboriginal persons in the Council's area.

The Act also establishes a registrar the function of which includes, but is not limited to, maintaining a Register of Aboriginal Land Claims and a Register of Aboriginal Owners. Under the Act the Registrar is to give priority to the entry into the Register of the names of Aboriginal persons who have a cultural association with:

- o Lands listed in Schedule 14 of the NPW Act 1974.
- o Lands to which Section 36a of the ALR Act applies.

### **2.1.5 Local Government Environmental Plans**

Consideration of and protection for Aboriginal heritage is provided at the local government level under Part 5, Clause 5.10 of the Ballina Local Environmental Plan (BLEP 2012), where it states that consent is required for any impacts upon heritage items (as listed in Schedule 5) including Aboriginal objects or Aboriginal places of heritage significance. Part 5 of the BLEP (5.10 [5]) states that a heritage management document (aimed at assessing potential impact) may be required before development can be approved on land within which a heritage item is located, on land that is within a heritage conservation area, or on land that is within the vicinity of either of the previous two scenarios.

### **2.1.6 The Commonwealth Environmental Protection and Biodiversity Conservation Act 1999**

Further to the state and local government heritage legislation, federal legislation may be applicable in some cases. The *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* has provisions to protect items and/or places of national environmental/heritage significance and items listed on the various lists generated by the EPBC Act are places of national significance. These lists have all been incorporated into the Australian Heritage Database and include the:

**Register of the National Estate (RNE)** - The Register Of The National Estate includes heritage places of natural, Indigenous and historical significance from around Australia. The RNE lists over 13,000 items/places but has been frozen since 2007, which means no new places have been added since that time. Places cannot, however, be removed. The list has no statutory power and has since been replaced by the National and Commonwealth heritage lists. Listing of an item on the RNE places no particular obligations on the owner prior to development and the Federal Minister is no longer obliged to give consideration to items on the list. The RNE is still accessible and is an important source of information.

**National Heritage List (NHL)** - The National Heritage List is maintained by the Commonwealth Department of the Environment and was established for much the same reasons as the RNE, that is, to acknowledge natural, Indigenous and historic places of national significance. This list is current and has replaced the RNE as the primary list for items/places that have outstanding national heritage value. Anyone can nominate a place for inclusion on the NHL using a list of criteria and guidelines specifically designed for the purpose. The Australian Heritage Council (AHC) makes recommendations about proposed listings, with the final decision made by the Federal Minister.

**Commonwealth Heritage List (CHL)** - The Commonwealth Heritage List also recognises places with Indigenous, historic or natural heritage values, however this list registers only places that are owned or controlled by the Australian Government. Most often these include places of historical importance connected to defence, communication and other federal government activities. The CHL was established via amendments to the *EPBC Act* which means Commonwealth agencies are obliged to develop management plans for heritage items on their lands, and that prior to any impact on such items, advice must be sought from the Federal Minister.

### **2.1.7 The Commonwealth Aboriginal and Torres Strait Islander Heritage Protection Act 1984**

The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 can be called upon to provide protection for Indigenous cultural property in a broad sense. It is rarely relevant in the management of cultural heritage items, but does provide the ability to protect places, objects and folklore that 'are of particular significance to Aboriginals in accordance with Aboriginal tradition'.

## **2.2 Statutory Controls**

Statutory controls concerning Aboriginal heritage items and places follow the guidelines as set out in the documents listed above, being the:

- o *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (2010a).
- o *Code of Practice for the Archaeological Investigation of Archaeological Objects* (2010b).
- o *Due Diligence Code Of Practice for the Protection of Aboriginal Objects* (2010c).
- o *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage* (2011).

Approval for the Project was issued pursuant to Section 111 of the *Environmental Planning and Assessment Act, 1979*, which includes the determination of an environmental assessment for a Part 5 "Activity". The notice of determination letter was issued on 3 November 2016 (Reference No. 22.2016/14) and is reproduced here in Appendix A. As already stated in the project introduction, regardless of the approval process however, the project has been the subject of considerable Council deliberation and public debate and as a result Council were keen to take into consideration community concerns commissioning REMNANT Archaeology to complete a cultural heritage assessment (CHA), even though under Part V of the *EP&A Act* a CHA is required only when an environmental Impact statement is necessary. This current document reports on the Aboriginal CHA commissioned by Council.

General consent conditions relating to Aboriginal cultural heritage include compliance with Part 6 of the *National Parks and Wildlife Act 1974* (see above), and a Cultural Heritage Induction Program for all personnel and contractors involved in on-site construction activities is recommended here (See Section 14). Further, during construction, guidelines are to be provided for inadvertent finds and actions required where human remains are involved – these protocols are also set out in the recommendations presented in this report.

## **2.3 Best Practice Guidelines**

Guidelines of best practice for consultation with the Aboriginal Community and for the investigation and assessment of Aboriginal cultural heritage followed by this assessment are set out in the NSW Department of Environment Climate Change and Water (DECWW, now the Office of Environment and Heritage - OEH) documents listed in Sub-section 2.1.1 and Sub-section 2.2 above.

## **3 DESCRIPTION OF THE STUDY AREA**

### **3.1 Topography And Landforms**

The Lennox Head district contains distinct landform features including prominent rock platforms at the intertidal zone, small sandy beaches, coastal dunes, cliffs and headlands in the east, backed to the west by less spectacular ridges interspersed with low-lying swamps and wetlands (Knuckey 2016). At Lake Ainsworth however, the dominant landforms are less spectacular with the freshwater lake itself dominating the landscape, bordered to the east by sand dunes that provide a barrier to the extensive sandy beaches further east along the intertidal zone (Fig. 4). No basalt platforms occur; these features are more closely associated with the basalt headlands further to the south.

To the immediate west of the lake are ancestral barrier dune systems that indicate the location of the Pleistocene coastline, and beyond the dunes lies a predominantly low landscape, susceptible to inundation and supporting extensive swamps and marshes. These low-lying areas have been extensively drained and cleared since the arrival of Europeans and are now predominantly farmland for various crops and/or pastureland for domestic stock. The prominent basalt ridges that parallel the coastline from Lennox Headland southward do not occur at Lake Ainsworth, having receded to the north west, allowing for the formation of the lowlands mentioned above.



**Figure 4 – The topography and landforms present in the Lake Ainsworth region. Note the inland dunes, remnants of a Pleistocene coastline. Image source: New South Wales Spatial Information Exchange (SIX Maps) website (<https://six.nsw.gov.au>).**

### 3.2 Geology

The Richmond-Tweed region in general is dominated by the dissected caldera of an extinct volcano and its associated geological formations, the central granite plug of which is Mount Warning (Fig. 5). South of the caldera Tertiary basalts of the Lamington Group dominate bordered to the south by the Richmond River Valley and the various drainages that flow into it from the north and northwest that contain Quaternary alluvial deposits along flood plains and river terraces. Where these alluvial sediments came into contact with volcanic rocks during Devonian-Carboniferous times, they became metamorphosed and are known as the Neranleigh-Fernvale Beds and these beds include both metamorphosed and sedimentary rocks including mudstones and siltstones, greywacke, chert and jasper rocks. It is these sedimentary and metamorphosed sedimentary rocks that were most sort after by Aboriginal people from the past for implements, however volcanic rocks, granites and basalts were also targeted and appear to have been the preferred (though not exclusive) raw material for use as ground-edge implements such as axes and grindstones.

The study area lies to the north of the classic headland formations, the northern-most being Lennox Headland at Pat Morton Lookout, rising to 60m above sea level with a geology characterised by Tertiary Lamington Group basalts that are often columnar, jointed and weathered with cobble and boulder remnants, and these weathered boulder remnants are common along portions of Boulder Beach to the south of Lennox Headland in the vicinity of Skennars Head. Beach and dune sands occur in areas of the coast where the headlands, cliffs and rock platforms do not dominate, having resulted from longshore drift, sand deposition through the Holocene to the present day. Remnant (Pleistocene) coastline barrier dunes, similar to those that exist along Pacific Parade today,

occur to the northwest of Lake Ainsworth (See Fig. 4) and alluvial deposits occur in the swampy lower-lying areas in behind (to the west) the lake. Lake Ainsworth, itself a freshwater lake created by run-off from the low-lying swamplands, was originally a marine lagoon linked to the ocean in the vicinity of the Sport and Recreation Centre entrance and anecdotal evidence suggests it may have only been since the arrival of non-Aboriginal people and the deliberate alteration of the coastline at that location, that the marine entrance was blocked (*pers. comm.* Malcolm Milner).

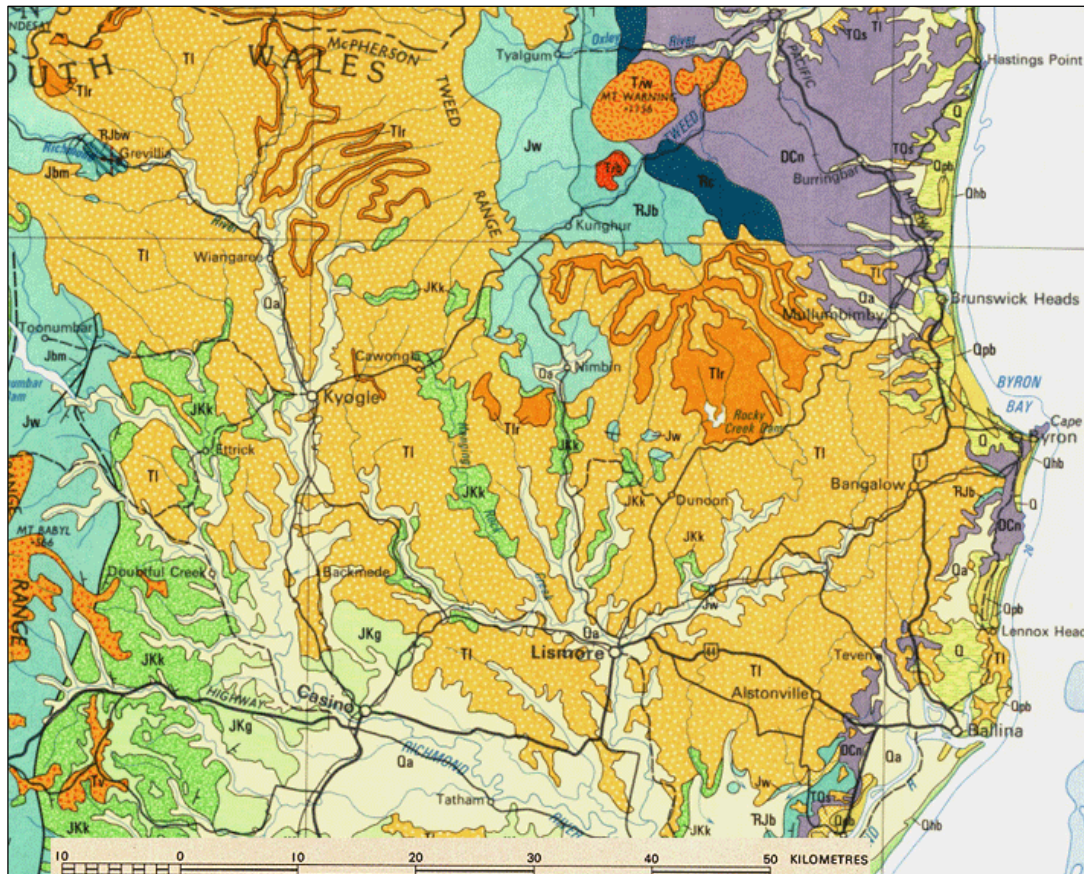


Figure 5 - The geology of northern New South Wales.

### 3.3 Vegetation

The Lennox Head district has been extensively cleared through the recent historical past for pastoral activity (mainly dairy cattle) across the ridges and lowlands, intensive farming (bananas and/or sugar cane for example) along the low-lying areas, and through sand mining along much of the coastal strip (Converge 2012; Fox 2014a; 2014b; 2014c; Knuckey 2016; 2017), and although residential estates and recreational activities predominate along the eastern and southern borders of Lake Ainsworth to this day, farming is still the dominant land use to the west. Extensive clearing of the original vegetation has occurred west of the lake, replaced with cleared pastures of introduced grasses such as Kikuyu (*Pennisetum clandestinum*). Across the district areas of native vegetation have re-grown and small areas of remnant vegetation still occur, represented on the headlands for example by patches of littoral rainforest and along the barrier dunes by remnants of the original Swamp Oak (*Casuarina glauca*) and Paperbark (*Melaleuca spp.*) communities - an individual Coastal Cypress Pine (*Callitris columellaris*) was located along Pacific Parade, two of these trees were recorded on the foreshore of Lake Ainsworth along the Camp Drew Road walking track. Sections of beach vegetation regeneration occur (Converge 2012), however, throughout the environment introduced grasses, weeds and trees proliferate.

Since European settlement and across the district in general the original forests and vegetation communities have been cleared and replaced with introduced pasture grasses suitable for grazing livestock and tree/shrub species used to replicate landscapes from other parts of the world. Where uncontained these introduced species have

out-competed the native species to become uncontrollable weeds most apparent along drainage lines, rivers and creeks. Camphour Laurel (*Cinnamomum camphora*) and Privet (*Ligustrum spp.*) are examples of 'weed' tree and shrub species, whilst Kikuyu (*Pennisetum clandestinum*) and Buffel Grass (*Cenchrus ciliaris*) are common introduced grasses that quickly establish themselves as weeds.



**Figure 6 - Vegetation along Pacific Parade from the Sport and Rec. Centre gate southward. Lake Ainsworth to the right (west).**

### 3.4 Current Land Use

Currently the study area, that is Pacific Parade between the surf club and the entrance to the sport and recreation facility (Fig. 7) and Camp Drew Road from the surf club west to the fenced walking track along the foreshore of the lake (Fig. 8), is used for recreational purposes; Pacific Parade as access to the sports facility and to Seven Mile Beach and the southern foreshore along Camp Drew Road as a picnic area and access to the bush walking track along the southwestern side of the lake.



**Figure 7 – The view of Pacific Parade from the Lennox-Alstonville Surf Life Saving Club. Lake Ainsworth on the left (west).**



**Figure 8 – The view west along Camp Drew Road. Lake Ainsworth is out of shot to the right (north).**

**4 COMMUNITY CONSULTATION**

**4.1 Initial Stakeholder Research and Aboriginal Community Notification**

Initial research to establish who were the appropriate Aboriginal stakeholders to contact was carried out in accordance with OEH consultation requirements, as set out in their guidelines *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (DECCW 2010a)*, the stakeholder request letter is reproduced in Appendix B and was sent out to organizations such as the Office of Environment and Heritage. Once stakeholder information was obtained Remnant Archaeology enlisted the services of Ian Fox & Associates (IFA) to carry out the community consultation process. Telephone contact was made by Remnant Archaeology and IFA to the stakeholders on the list (Appendix C) and a public notice was posted in the local news media – *The Northern Star* (Fig. 9). Project notification letters were also sent to each listed stakeholder inviting them to comment and/or indicate their interest in becoming a registered Aboriginal party (RAP) to the project. A copy of this letter and the responses to it, are provided in Appendix D. Groundwork put in by IFA resulted in seamless consultation with the Jali Local Aboriginal Land Council and the other members of the local Aboriginal Community who registered their interest and a register of stakeholder liaison is reproduced in Appendix E listing dates all notifications were carried out. Registered Aboriginal parties to the project are listed in Table 1.

**4.2 Searches of the National Native Title Tribunal Register**

Searches of the National Native Title Tribunal register of Native Title Claims revealed no claim is current within 5km of Lake Ainsworth.

| Tributes  |  | Notices   |  |
|---|--|---|--|
| <p><b>In Memoriam</b></p> <p><i>In Loving Memory</i><br/> <b>Moss, Geoffrey Keith (Geoff)</b><br/>           14/8/1939 - 16/5/2016<br/>           Remembering you is easy<br/>           We do it everyday<br/>           But missing you is the heartache<br/>           That never goes away.<br/>           Sadly missed<br/>           Claire &amp; Family</p>  |  | <p><b>KERRY LOUISE WILSON</b><br/>           11/7/1971 - 11/5/1986<br/>           31 years ago</p> <p><i>The day you left us<br/>           is a big part of us went too.<br/>           But you will never be forgotten</i></p> <p>Love from<br/>           Family &amp; Friends</p>   |  |
| <p><i>In Loving Memory</i><br/> <b>Narelle Patricia Russell</b><br/>           Nov 1933 to May 2016</p> <p><i>"A beautiful lady,<br/>           loving, warm, generous and kind"</i></p> <p><i>The most wonderful<br/>           family and friend</i><br/>           With Mom,<br/>           Mother-in-Law,<br/>           Nanna, Sister-in-Law<br/>           and Grand</p> <p><i>Forever in our hearts.</i></p>   |  | <p><b>Rodney Briggs</b><br/>           03/05/1955 - 16/05/1998</p> <p><i>We know a smile<br/>           we'd love to see,<br/>           a hand we'd love to hold,<br/>           a voice we long to hear</i></p> <p><i>You are no longer here<br/>           to share our lives which<br/>           will always raise us higher<br/>           But you're forever in<br/>           our hearts until we meet again</i></p> <p><i>We love &amp; miss you.</i><br/>           Lesley, Sarah, Ben, Carina, Beau &amp; Ivy</p>  |  |
| <p><i>In Loving Memory of</i><br/> <b>Barry (BJ) Johnston</b></p> <p><i>Late of Kyogle - 13th May 2016</i><br/>           Your heart of gold stopped beating<br/>           Two smiling eyes at rest<br/>           God broke our hearts to prove<br/>           He only takes the best</p> <p><i>Your memory is a keepsake<br/>           From which I'll never part<br/>           God has you in his keeping<br/>           I have you in my heart.</i></p>  |  | <p><b>BRIAN HAROLD KENT</b><br/>           4/11/1932 - 23/4/2017</p> <p>Brian's Family would like to thank our relatives and friends for flowers, cards and phone calls. A special thank you to St Michael's Apartments and staff, Dr Groggins and staff, Andrew and staff from Parkview Foreanda Casino, and the village caterers and staff from Gateway Lifestyle Casino.</p> <p><i>Thank you for caring<br/>           Patricia, Stefan, Samantha<br/>           and the Kent Family</i></p>   |  |
| <p><i>Reverence Thanked</i></p> <p><b>Noel Richard Gregor</b><br/>           20<sup>th</sup> April 1964 - 30<sup>th</sup> March 2017</p> <p><i>We would like to express our gratitude to all who have reached out to us in our time of bereavement with their love and support.</i></p>   |  | <p><b>PUBLIC NOTICE</b><br/> <b>Aboriginal Cultural Heritage – Lot 62 DP 755725, Pacific Parade, Lake Ainsworth, Lennox Head</b></p> <p>Members of the Aboriginal Community with cultural knowledge relevant to determining the significance of Aboriginal objects and/or places are invited to register their interest in the process of community consultation for proposed foreshore improvement works along Pacific Parade, Lot 62 DP 755725, Lake Ainsworth, Lennox Head.</p> <p>The proposal includes reconstruction and rehabilitation works along the road east of Lake Ainsworth, the road and foreshore area to the south, upgrade works on the three-way intersection adjacent the Lennox Head/Alestonville Surf Lifesaving Club, and upgrade of the car park area between Pacific Parade and Camp Drew Road. The purpose of consultation with the Aboriginal Community is to enable the preparation of an Aboriginal Cultural Heritage Assessment.</p> <p>To register an interest please respond in writing to Graham KNUCKEY at Remnant Archaeology, by email (dr_grumpy@remnant.com.au), or by letter to P.O. Box 1787, Armidale, NSW, 2350, within 14 days of the date of this notice. For further information, please contact Graham on 0488 097 916.</p> |  |
| <p><b>ballina</b> <i>the council</i></p> <p><b>Scheduled Road Works</b></p> <p>Council has scheduled bridge maintenance and road pavement works which will involve the partial closure of River Street in Ballina between Fishery Creek Road and Brunswick Street between <b>Sunday 21 May and Thursday 25 May 2017</b>.</p> <p>To minimise the disruption to motorists, this work will be completed at night between the hours of <b>7pm and 5am</b>.</p> <p>This work is likely to cause minor traffic disruptions and additional construction noise. Council will endeavour to keep noise to a minimum.</p> <p>Council wishes to thank the community in advance for your patience during the works, and apologies for any inconvenience.</p> <p><b>Enquiries:</b> Stuart Hynes, Maintenance Coordinator, Ph 6686 1459.</p> <p>Customer Service Centre / Charities<br/>           40 Cherry Street, PO Box 450<br/>           Ballina NSW 2478<br/>           Office Hours 8.30am to 4.30pm<br/>           Monday to Friday (excluding public holidays)</p> <p>Email: council@ballina.nsw.gov.au<br/>           Web: ballina.nsw.gov.au<br/>           Telephone 02 6686 4444<br/>           Facsimile 02 6686 7036<br/>           Emergency After Hours 02 6626 6864</p> |  |   |  |

Figure 9 – The public notice placed in the Lismore Northern Star (p.29) on Saturday 13 May, 2017.

4.3 The Investigator and RAPs Involved

The site inspection incorporating Pacific Parade from the surf club to the Sport and Recreation Centre front entrance and the lake foreshore along Camp Drew Road (see Figs. 2-3) was completed on 12 July 2017 by Graham Knuckey the archaeologist from Remnant Archaeology, assisted by Ian Fox. Both Remnant Archaeology and Ian Fox & Associates consulted with the local Aboriginal Community and the three registered Aboriginal parties (RAPs) expressed a desire to attend; representatives from each were present on 12 July. Table 1 lists those who attended as part of the cultural heritage site inspection team.

Table 1 – Registered Aboriginal parties and those who attended the initial site inspection.

| Registered Aboriginal Party        | Contact         | Site Inspection Attendee |
|------------------------------------|-----------------|--------------------------|
| Aboriginal Cultural Concepts       | Lois Cook       | Lois Cook                |
| Jali Local Aboriginal Land Council | Mik Smith       | Mik Smith                |
| Marcus Ferguson                    | Marcus Ferguson | Marcus Ferguson          |
| Organisation                       | Contact         | Site Inspection Attendee |
| Ian Fox & Associates               | Ian Fox         | Ian Fox <sup>1</sup>     |
| Remnant Archaeology                | Graham Knuckey  | Graham Knuckey           |

1. Assisting Remnant's archaeologist



#### 4.4 Community Consultation Register

All interested stakeholders that registered as RAPs to the project, and their representatives that attended the site inspection on 12 July 2017 are listed in Table 1. Copies of the three consultation records; telephone, project notification, and stakeholder liaison, are reproduced in Appendices C, D and E.

#### 4.5 Registered Aboriginal Party Concerns

**Lois Cook** – Lois stated she had camped in the area as a child in the 1960s and that the lake was significant as a ceremonial location; for women along the eastern shore and for men along the western shore. Lois was concerned for the trees in general but the slanting paperbarks in particular that she said were of special significance to local Aboriginal people; she said none should be pruned for any reason and that if they were bad events would occur. She cited the "...tornado that came through the last time they were pruned..." and a tornado was reported in the *Grafton Daily Examiner* on 4 June 2010 (<https://www.dailyexaminer.com.au/news/northern-rivers-lennox-head-tornado-weather/549310/>), but RA has not been unable to establish what activities Council had performed in the Pacific Parade area in June that year.

**Mik Smith** (on behalf of Jali LALC) – Mik Smith's main concern was that at the time of inspection no detailed maps had been provided to allow for a targeted inspection of exactly what portions of land along Pacific Parade and Camp Drew Road would be impacted.

Both Lois Cook and Mik Smith stated a site inspection at low tide in the lake might have been more productive. Both also voiced concern about the impact upon the barrier dune system between Pacific Parade and the beach that has not been mined (the area adjacent to the Sport and Recreation Centre entrance), a dune system that retains potential for Aboriginal cultural heritage objects and/or places, and how the dune will be managed and protected.

### 5 THE HUMAN LANDSCAPE

#### 5.1 An Ethno-Historical Account of Traditional Aboriginal Land Use

Prior to the arrival of Europeans, people of the *Bundjalung-Yugambah* language chain were the custodians of the northern New South Wales coast from the NSW-Qld border north to the Logan River, and as far south as Grafton on the Clarence River. They have maintained links to their traditional lands since non-Aboriginal settlement and the Ballina-Lennox Head district retains a strong cultural identity with the dialect subgroup known as the *Nyangbul* People, a sub-group of the broader-based *Bundjalung* people. *Nyangbul* is the preferred identity for the RAPs who were consulted for this project and their ancestors spoke their own language dialect whilst maintaining cultural practices in keeping with neighbouring groups, the *Minjungbal* to the north, *Widjabul* to the west, and *Bandjalang* to the south. *Nyangbul* people have a rich tradition of storytelling that includes explanations for the existence of landscape features along the coastline from Ballina to Lennox Head. Many of these coastal features form part of the 'Goanna Dreaming' story and are the basis for understanding the extent and significance for campsite and ceremonial locations between Ballina and Lennox Head (Lois Cook, pers. comm., cited in Fox 2014c: 15). Written accounts of Aboriginal campsites supporting these traditional stories come from early observations of shell middens lining the banks of North Creek that were observed to be more than 500m in length, 15m wide and up to 5m high (Darley 1892; Statham 1892).

Descendants recognise their heritage and continue to express their cultural identity through membership of community organisations such as Jali Local Aboriginal Land Council (Jali LALC). Family connections and oral traditions have ensured traditional beliefs and stories have been passed through successive generations and this has assisted in identifying locations within the landscape today that are of special significance and retain evidence of traditional cultural practices. Three families in particular are recognised as descendants of Jack Cook and his wife, Susan Foster, of Bangalow. Jack Cook is recognised throughout the local Aboriginal Community today as a holder of cultural knowledge for the Lower Richmond area, and who maintained his oral cultural traditions with members of his family (Lois Cook, pers. comm., cited in Fox 2014c: 14-15). Cultural knowledge

passed on by Jack Cook and other Elders of his time, has been passed down through generations of Cook, Anderson, and Ferguson family members.

Documented observations by early European settlers suggests that Aboriginal people moved frequently throughout the landscape, but tended to follow set pathways between locations and chose traditional campsites based on food and resource access, as well as ceremonial and cultural obligations (Steele 1984). Ainsworth (1987: 43) calculated that in 1847 there were between 400-500 Aboriginal people in the groups belonging to both east and west Ballina. Ainsworth also observed traditional Aboriginal daily routines, diet, and social customs including interactions with neighbouring groups (Ainsworth 1987).

## 5.2 Traditional Aboriginal Land Use

Ainsworth (1987: 43) reports from further south in the Ballina region that in 1847 Aboriginal people were (still) following traditional subsistence patterns, it is clear however, that by the mid-1850s this had begun to change with Ainsworth reporting on a massacre that occurred in the district when in 1853 or '54 a punitive expedition of mounted troopers 'dispersed' a large group of the local Aboriginal population not far from the Ballina township (Ainsworth 1987: 43-44). As much of an influence on the Aboriginal population in the Lennox Head district as any punitive action by mounted police may have had, was the spread of European disease; smallpox in particular which moved rapidly ahead of the actual arrival of non-Aboriginal people. For example, census figures from 1871-1887 indicate a 90% reduction of the Aboriginal population in the Tweed and Brunswick districts to the north of Lennox Head (Fox 2016b).

Prior to the impact of European disease however, everyday subsistence included the use of nets during hunting expeditions both for fishing in narrow and shallow waters and in the forests where nets would be strung up between trees in areas where terrestrial game was common and could be driven, by people and dogs, from some distance into the enveloping nets (Ainsworth 1987: 43). Flying foxes were also commonly hunted being easily brought down from their colonies during the day using boomerangs and digging sticks. Seasonal fishing was also popular and every spring Aboriginal people would gather on the beaches to take advantage of the salmon runs along the coast (Ainsworth 1987: 44).

Hall (1983) discusses in some depth the subsistence life styles of the Aboriginal inhabitants of the Ballina district prior to and at the time of European contact. Hall describes the division of labour between the sexes explaining that once married a woman takes on the responsibilities of making the home camp, bags and baskets, although he says men would also weave at different times. Women also hunted for small foods and although Hall does not elaborate on this, it can be assumed that this means the gathering of vegetable foods and the hunting of small mammals and reptiles. Life along the Tweed Coast further north followed a similar pattern of subsistence

## 5.3 Non-Aboriginal Land Use

The common pattern of non-Aboriginal settlement and land use along the north coast of NSW began in the 1820's with cedar cutters searching the forests for saleable timber and establishing what became known as 'cedar camps' at convenient locations, depending upon where the best communities of cedar were found and these cedar camps began to appear north of Ballina in the mid-1840s (Boileau 2004). By the 1860s cedar was becoming scarce in the coastal districts (Boileau 2004), nevertheless a timber industry grew around the harvesting of other species including a number of eucalypts (Red and Grey gum, Stringybark and Blackbutt, for example), Hoop Pine was particularly favoured (Rae 2016). With the scaling back of the timber industry and the passing of the Robertson Land Acts in the 1860's it became easier for settlers to take up land of their own, and it was from this time that farming began to take over from timber-getting as the main source of activity and income.

### 5.3.1 Farming

Farming at Lennox Head reflects closely farming activity from further south and in fact many of the landholders in the Ballina district also held property at Lennox Head. In the early 1860's, for example, John Austin Henderson took up land and began dairy farming on North Creek (BSC 2008) and by the 1890's his son Edward was a major landholder in the Lennox Head district as well, holding his father's selection on North Creek and 600 acres (240ha) at Lennox Head upon which he initially grew sugar cane and other intensive crops such as beans for the markets

in Sydney (Wilson 2003: 66). Other farmers grew pineapples (Wilson 2003: 122), but it is unsure if these were grown in marketable numbers.

**5.3.2 Recreation**

Although the army maintained a camp on the eastern shore of Lake Ainsworth during the 1940's (Wilson 2003: 123), where the Sport and Recreation Centre now stands, the lake appears to have been acknowledged more for its value as a recreational venue, than for its value as an exploitable resource, notwithstanding some farmers did take water from it (See Wilson 2003: 122, for example) and indeed, the village of Lennox Head came into being as a vacation destination in the 1920s (BSC 2008). Evidence of the lake's recreational value, at least along its eastern shore can be seen in the fact that as early as 1893 the lake was gazetted as a reserve for public recreation (See Fig. 10 for an insight into the landscape along the eastern shore during the early 20<sup>th</sup> century), and in 1924 it also became a wildlife sanctuary (Anon 1927).

One prominent feature of the lake that no longer exists although common in many early photographs was the diving tower, located to the west of where the beach access for four-wheel drives is now (Wilson 2003: 132). Originally constructed in the 1940s, the tower was rebuilt in the 1960s and later removed completely in the mid-1970s (Malcolm Milner: *pers. comm.*). This diving tower was a source of great delight for many and deep despair for the less adventurous.



**Figure 10 – Pacific Parade in the 1930s; Lake Ainsworth is to the left, the current surf club would later appear behind the right shoulder (southeast) of the photographer here. Image source: Lennox Head Heritage Committee.**



Figure 11 – The diving tower in the lake adjacent the beach access in the 1940s, as mentioned by Peter Taylor (Wilson 2003: 132). The entrance to the (future) sport and recreation centre is north (right). Image source: Lennox Head Heritage Committee.

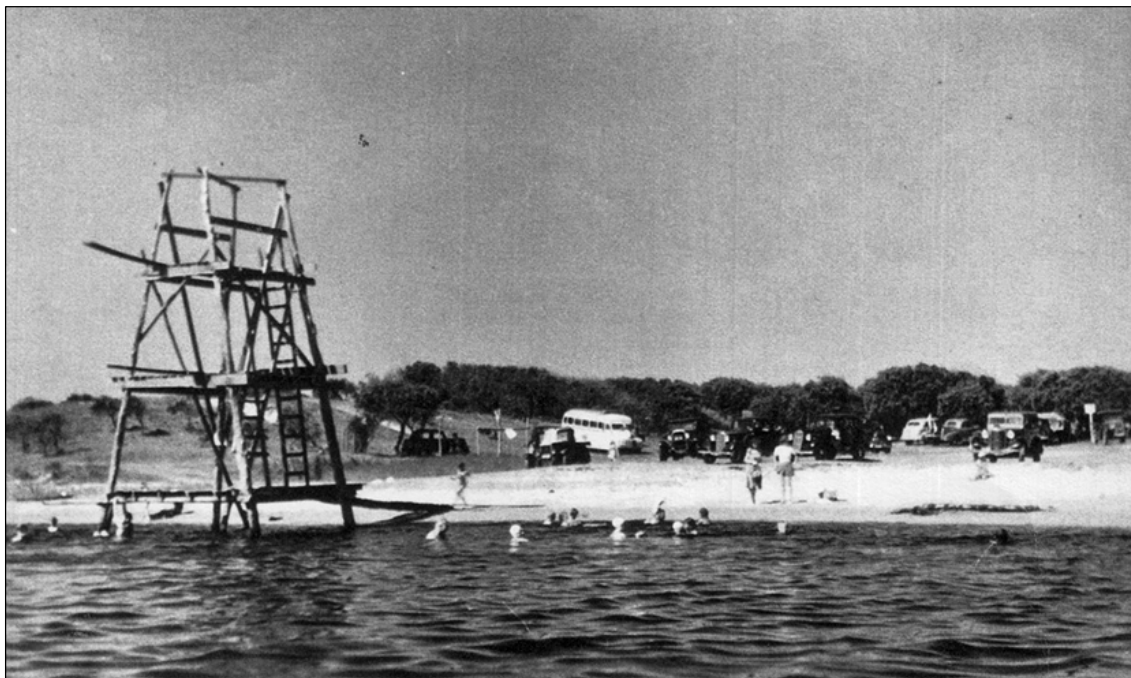


Figure 12 – View toward the southeast from Lake Ainsworth, of the surf beach access. The presence of the diving tower indicates the photograph is from the 1940s at the earliest but more likely from the 1950s. Note the bare barrier dune behind the tower, from which the photograph in Fig. 11 was taken). Image source: Lennox Head Heritage Committee.



**Figure 13 – Another view to the surf beach access also from the lake, this time looking to the northeast and the photograph taken in the late 1960s. The kiosk has been replaced with a toilet block but the electricity poles still exist. The pine tree can still be identified on the northern side of the beach access. Image source: Lennox Head Heritage Committee.**

## **6 THE ARCHAEOLOGICAL LANDSCAPE**

### **6.1 Archaeological Research**

In the 1960s Isabel McBryde (at the time from the University Of New England in Armidale) carried out archaeological excavations at sites in the Clarence River estuary (McBryde 1982). She worked on extensive shell midden systems, found commonly along all New South Wales north coast rivers. These middens were, understandably, mainly composed of discarded shell refuse yet (although small) assemblages of artefacts, lithic (stone) and bone, and small assemblages of faunal material resulting from food processing were also found in her excavations. In other areas, further south along the Macleay River, for example, middens excavated by Graham Connah (1975; 1976) not only revealed shell, bone and lithic artefacts but also human burial remains (Knuckey 1999).

Based upon the excavations of others and her own research Julia Coleman discussed in detail seasonality and the existence of semi- to permanent villages along the New South Wales north coast (Coleman 1982) mentioning in particular substantial dwellings on the Richmond River that were noted by Henry Rous in 1828 and cited by Lang (1847: in Coleman 1982: 6).

### **6.2 Archaeological Consultancy**

In 1986 Godwin (1986) completed an archaeological investigation of the proposed Ballina-Coast Linking Road, the majority of which was along Chickiba Creek up stream of the confluence with North Creek and also to the south of the confluence, south of the racecourse. The survey identified twenty-six sites consisting of stone artefacts and shell scatters, many of which were located on a Pleistocene dune. Along with a discussion of these sites, the author investigated a stone structure in the mangroves adjacent the shell mound known as 'B1' and came to the conclusion the structure was not prehistoric in origin but that it did maintain significance to the current Aboriginal Community.

As a continuation of the investigation into the dune system and the middens within it reported by Godwin (1986), Sullivan (1980) and Stockton (1974), Smith (1989) carried out an appraisal of the damage that had occurred to the dune system in archaeological terms and found in an area of the dune system approximately 1km x 600m significant impact to a depth of 50cm had occurred through earthworks relating to the North Creek residential estate development. The frequency of cultural material present was calculated at 5-10 shell fragments per 1m<sup>2</sup>

and for artefacts a frequency of from 1 artefact per 50m<sup>2</sup> minimum to 1 artefact per 3m<sup>2</sup>. The author's conclusion was that archaeological potential at the dune site was low and this was the direct result of the (non-cultural, non-natural) disturbance that had occurred. Other were also commissioned to investigation disturbance, real and potential, in the region, as the result of pending and/or potential development, see for example Hughes (1991).

At Lennox Head proper Collins (1992) carried out an archaeological investigation on Henderson Lane, west of the headland during which she located no Aboriginal objects or sites. Subsequent to Collins' work Piper undertook surveys along Skennars Head Road (Piper 1994) at Skennars Head and Survey Street in Lennox Head between Henderson Lane and Pat Morton Lookout (Piper 1997) and likewise did not locate any Aboriginal objects or sites. Three years later however, whilst carrying out a survey along North Creek Road at Lennox Head Piper (1999) located a shell midden of predominantly oyster shell covering approximately 700m<sup>2</sup>.

In the mid-2000s Davies carried out an archaeological assessment of the proposed route for the cycle way project and did not locate any Aboriginal objects or sites (Davies 2005), whereas in 2006 she undertook a cultural heritage assessment along the Coast Road at Skennars Head and identified eighteen Aboriginal cultural heritage 'places', within a Pleistocene dune system (Davies 2006). The investigator considered the fragmented shell remains identified were components of a continuous shell scatter and she concluded that sub-surface material was most likely present within the Pleistocene dune. As a result she classified the entire dune as a Potential Archaeological Deposit (PAD). In 2009 in the Angel Beach area during an assessment of pathways options, the same investigator recorded along with the ubiquitous shell, numerous stone artefacts (Davies 2009).

Everick Heritage Consultants (2009) carried out a cultural heritage assessment for the Ballina Waste Reclamation and Augmentation Program (BRWRAP) pipeline route for Ballina Shire Council. This study included the Shared Path West - Section 3 study area from Sandstone Crescent to Skennars Head Road (Fox 2014c). The report emphasised the importance of the dunes and North Creek culturally, but did not locate any Aboriginal items or record any archaeological sites.

Converge (2012) completed a cultural heritage impact assessment as part of the preliminary planning for the Ballina Shared Pathways project, and the field team located ten sites of Aboriginal heritage interest and six of non-Aboriginal (historical) heritage interest. Three of the Aboriginal sites were shell middens/scatters, one an artefact scatter with four artefacts present and the rest were intangible sites, locations in the landscape that held spiritual/ceremonial significance.

Subsequent to the Converge (2012) report Ian Fox & Associates (2014a; 2014b; 2014c) was commissioned by Ballina Shire Council to carry out a cultural heritage assessment of the finalised pathway route through Lennox Head terminating at the intersection of Skennars Head and Headlands Drive. All three reports on the pathway route found there to be no tangible evidence of Aboriginal sites within the pathway corridor, however the reports highlight the importance of the intangible aspects of the landscape through which the pathway travels as described by the Aboriginal members of the IFA field team.

Knuckey (2016) completed the Ballina pathways project begun by Ian Fox & Associates, with the survey of the Ballina Shared Path East - a non-vehicular path parallel to The Coast Road between Skennars Head and Pat Morton Lookout on Lennox Headland. Knuckey's survey located two artefacts; one a piece that appears to have been struck once only and identified by the consultant as an assayed piece, the other a multiple platform core. Both artefacts were located together in a disturbed context and both were of an unidentified igneous raw material.

oOo

Regardless of the broad nature of the information above it is clear the information provided supports the hypothesis that Aboriginal people following traditional lifestyles made extensive use of the dune systems present in the Ballina-Lennox Head district. Despite wide-ranging impacts from farming, urban and infrastructure development Aboriginal resource gathering and feasting areas are still evident around Chickiba and North Creeks and there is potential for similar areas to exist in the dune systems to the east and northwest of Lake Ainsworth. Ridgelines appear to have been used to traverse the area between camp and feasting grounds and ceremonial sites such as the earthen ring at Lennox Head. The traditional knowledge currently held by the RAPs to this project also recognises cultural connections to shoreline landscape features through ceremonial sites and stories

involving those features. Stories associated with women's sites on the eastern shore of Lake Ainsworth and men's sites on the western shore are examples of this traditional knowledge.

### **6.3 Database and Register Searches**

#### **6.3.1 The Aboriginal Heritage Information Management System (AHIMS)**

A search of the OEH Aboriginal Heritage Management System (AHIMS) database carried out during an earlier investigation (Knuckey 2016) indicates that 68 sites have been registered within a 3km radius of Lennox Head. Earlier reports indicate that with a 4km radius of Lennox Head this number increases substantially to >100 sites (Fox 2014a; 2014b; 2014c). A register search for this project revealed there is 16 registered Aboriginal sites within 2km of Lake Ainsworth (See Table 2), specifically the beach access point on Pacific Parade south of the Sport and Recreation Centre entrance.

The AHIMS register is not an accurate record of what exists in the landscape; rather it is a record of the sites that have been found in areas where development has been proposed and/or has gone ahead. As such areas that have not been earmarked for any form of development attention and that may contain Aboriginal objects and/or sites, will not be recognised in the AHIMS database and are therefore 'invisible' until ground surveys are carried out. Nevertheless, and keeping this caveat in mind, the register still provides an overview of site types that might be expected throughout the area in question. The sites listed in the AHIMS search carried out for this assessment are found in Table 2 and mapped in Figure 14. The AHIMS search results appear in Appendix F.

#### **6.3.2 National Native Title Tribunal Register**

Two Native Title claims are currently active in the Ballina Shire however neither of them encompasses the study area at Lake Ainsworth. The Byron Bay *Bundjalung* People #3 Native Title claim (NC2001/008) contains the area of the north coast between Brunswick Heads and Snapper Rocks to the south, whilst the *Widjabul-Wia-bal* People have a Native Title claim (NC2013/005) over the area to the west of the Byron Bay *Bundjalung* People, the Blackwall Range being (roughly) the eastern boundary of the claim. Regardless, the local Aboriginal Land Council (Jali LALC) and representative families for the area were contacted, consulted and involved in the assessment, as reported here.

#### **6.3.3 Local Government Environmental Plans**

No sites of Aboriginal heritage significance are listed in Schedule 5 of the *Ballina Shire Council Local Environment Plan 2012 (BSC LEP 2012)* or shown on the BSC Heritage Map series. Interestingly the Lennox Head Bora Ring, located off Gibbons Street south of Barrett Drive in Lennox Head, is not listed in Schedule 5 nor is it indicated on the Heritage Map (Sheet HER 005D).

#### **6.3.4 Other Database Searches**

A search of the NSW Heritage Register revealed one Aboriginal Place and again, the bora ring is not listed. A search was also carried out of the Australian Heritage Database that incorporates listings from the *Register of the National Estate* (RNE), the *National Heritage List* (NHL), and the *Commonwealth Heritage List* (CHL). All sites of Aboriginal and environmental importance/significance found on these lists are shown in Table 3.

**Table 2 - Sites registered on the Aboriginal Heritage Information Management System (AHIMS) database within a 2km radius.**

|    | AHIMS Site Number | Site Name   | Co-ordinates (GDA94) |          | Feature Description                     |
|----|-------------------|---|----------------------|----------|---|
|    |                   |   | Easting              | Northing |   |
| 1  | 04-4-0092         | Barrett 6   | 557564               | 6815439  | Open site, artefact                     |
| 2  | 04-5-0009         | Lennox Head Public School                                 | 557403               | 6813909  | Open site, artefact                     |
| 3  | 04-5-0018         | Lennox Head   | 558203               | 6814689  | Burials                                 |
| 4  | 04-5-0029         | Lennox Head near Gibbon St (NPWS Lennox Head Bora Ring)   | 557653               | 6815039  | Artefact, shell midden, ceremonial ring |
| 5  | 04-5-0030         | Lake Ainsworth  | 557953               | 6815359  | Open site, artefact                     |
| 6  | 04-5-0031         | Lennox Head   | 557963               | 6815139  | Open site, artefact                     |
| 7  | 04-5-0048         | Lennox Head   | 557423               | 6814089  | Artefact, shell midden                  |
| 8  | 04-5-0049         | Lennox Head   | 556573               | 6816309  | Artefact, shell midden                  |
| 9  | 04-5-0094         | Lennox Head Dune (Croftag Pty Ltd Aboriginal Site-Site 3) | 556903               | 6815309  | Open camp site; burials                 |
| 10 | 04-5-0105         | Barrett 4   | 557513               | 6818519  | Artefact, open camp site                |
| 11 | 04-5-0106         | Barrett 3   | 557473               | 6815389  | Shelter, shell midden, artefacts        |
| 12 | 04-5-0107         | Barrett 5   | 557503               | 6815109  | Shelter, shell midden, artefacts        |
| 13 | 04-5-0108         | Barrett 2   | 557453               | 6815419  | Open site, artefact                     |
| 14 | 04-5-0143         | Site 1; Fern St   | 557403               | 6814764  | Open camp site, artefact                |
| 15 | 04-5-0167         | AF-1  | 556203               | 6815609  | Artefact                                |
| 16 | 04-5-0305         | Seven Mile Beach Fishing Traps                            | 558100               | 6814119  | Aboriginal resource location            |

**Table 3 – Places of Aboriginal and natural significance listed in the online heritage databases.**

| Database                     | Environmental                   | Aboriginal                                 | Location   |
|------------------------------|---------------------------------|--|--|
| NSW Heritage Register        |                                 | East Ballina-Angels Beach Aboriginal Place | East Ballina-Angels Beach  |
|                              | Ballina Nature Reserve          |  | Two and a half km southwest of Lennox Head township                      |
| Australian Heritage Database |                                 | Indigenous Place                           | No information available other than it was registered on the RNE in 1978 |
|                              | Lennox Head Littoral Rainforest |  | Two km south of Lennox Head township comprising SEPP 26 areas 37-38, 38a |





Figure 14 - Aerial map indicating the location of each AHIMS registered site in relation to Lake Ainsworth in the centre of the shot. The dotted line indicates the 2km radius around the lake; north is up. Image source: Google Earth Pro 2017.

## 7 REGIONAL CHARACTER

A clear landform profile is possible for the landscape Pacific Parade/Camp Drew Road, Lake Ainsworth, as set out in Section 3 where the landforms present, and the topography, geology and vegetation of the area were discussed. Further, review of the cultural heritage site registers available provides a general archaeological base that can be applied to that landscape profile, allowing a picture of traditional Aboriginal presence prior to and at the time of European contact, to be constructed. From the landscape profile, the background ethnographic information available in the literature (briefly discussed in Section 5 - The Human Landscape), and the review of both the archaeological literature (Section 6 – The Archaeological Landscape) and the cultural heritage database listings of archaeological sites currently recorded, predictions about the types of sites most likely to be found along both roadways can be made. With this information in hand a predictive model of Aboriginal occupation and land use in the past can be constructed. Site types found in the surrounding environment and the landscapes they were found in, adhere to the following character traits:

- o Shell middens are common in the dune systems of both Holocene (close to the current coastline) and Pleistocene (further inland) age (See Fig. 4). These middens can be substantial landscape features of considerable height and have been recorded in some cases to be kilometres long (Connah 1975; 1976).
- o Low-density artefact scatters were found most readily in association with shell middens but also along ridgelines and/or headlands, particularly where strategic views of the surrounding landscape were/are apparent. Areas of exposure such as along stock pads, vehicular tracks and along drainages where water scouring is apparent in these landscapes were of interest.
- o Campsites; locations that reveal more than one activity in one place (indicators of occupation rather than transitory, one-stop locations) were found in association with middens.
- o Hearth sites - campfires - are most often found in association with campsites.
- o Burials have been found in association with middens (Connah 1975; 1976; Knuckey 1999) and potential for them exists across the dune systems.
- o Culturally modified trees, carved or scarred are not common.
- o Ceremonial features such as rings occur in flat, low-lying areas most commonly constructed of packed earth - stone rings/arrangements are not common.

## 8 PREDICTIONS

Based upon the regional character model built in Section 7, it becomes possible to assess the landforms and other landscape features of the study area at Lake Ainsworth (Section 3) with a view to formulating a predictive model for the potential occurrence of archaeological sites along Pacific Parade and the southern section of Camp Drew Road. Table 4 indicates the potential for each landform type in the study area to possess archaeological items and/or places.

The predictive model suggests that:

- o Shell middens of Holocene age will occur in the dune systems along the coastal strip and of Pleistocene age further inland. Higher density middens will likely occur further away from the intertidal zone.
- o Artefact scatters and/or campsites are most likely to occur in the dune systems (regardless of the age of those systems) in association with shell middens.
- o Artefact scatters may also occur on the ridgelines that are in close proximity to semi- and/or permanent fresh water, but not along minor tributaries that drain into these creeks. Areas of erosion, vehicular tracks and cattle pads are of particular interest.
- o Low-density artefact scatters may occur within any landscape but particularly in areas of erosion and weathering such as vehicular tracks, cattle pads, fence lines and gateways. Potential is greatest across the ridges and within the dune systems.
- o Isolated artefacts are likely to occur within any landscape but particularly in areas of erosion and weathering such as vehicular tracks, cattle pads, fence lines and gateways. Potential is low-to-moderate along Pacific Parade and the southern section of Camp Drew Road.

- o Burials are likely to be associated with middens located in either Holocene or Pleistocene dune systems.
- o Hearths will be associated with campsites and middens and as such potential for these sites exists across the dune systems present.
- o Stone arrangements are unlikely to occur, however, there is potential for arrangements constructed of earth, in particular bora rings, may be found in the low-lying flatter areas associated with the lake.

**Table 4 - The archaeological potential along Pacific Parade and Camp Drew Road (south).**

| Landform <sup>1</sup>   | Archaeological Potential |          |      |
|-------------------------|--------------------------|----------|------|
|                         | Low                      | Moderate | High |
| Beach (yellow)          | ✓                        | -        | -    |
| Dune System (orange)    | -                        | -        | ✓    |
| Lakes and Creeks (blue) | ✓                        | ✓        |      |
| Lowland (brown)         | ✓                        | ✓        |      |
| Slopes-Ridges (green)   |                          | ✓        | ✓    |
| Swamp (Teal)            | ✓                        |          |      |

1. Colour from Fig. 4 in parentheses

## 9 FIELDWORK

### 9.1 Survey Method

A linear pedestrian survey of Pacific Parade from the Sport and Recreation Centre gate south to the intersection with Camp Drew Road at the surf club was completed on Wednesday 12 July, 2017, with a field team that included three representatives from the local Aboriginal Community (Mrs Lois Cook, Mr Mik Smith and Mr Marcus Ferguson - see Section 4 for further details), the Remnant Archaeology archaeologist (Graham Knuckey) and Ian Fox (Ian Fox & Associates) assisting the archaeologist with logistical support. Any object considered by the team to require closer inspection and/or needed to be recorded alerted the archaeologist and all such objects were mapped using hand-held GPS, photographed and where possible basic attributes measured on each. All information gathered was recorded in a field book, and at the end of the day all GPS co-ordinates and photographs were downloaded to a laptop computer for storage and later reference.

### 9.2 Potential Constraints

Areas and landscapes of interest during archaeological survey/inspection are subject to natural (weather or animal/insect activity) and non-natural (for example, human agency) modification. The latter (human agency) can be sub-divided into Aboriginal (which includes both traditional and contemporary activity) and non-Aboriginal activity. Both these subdivisions are of interest, the former for its cultural heritage value and the later for its impact upon the former. Non-Aboriginal human agency includes farming, mining, infrastructure construction, and urban development. These activities contribute directly to, or have a direct influence upon the two main natural constraints affecting archaeological field survey/inspection; ground surface visibility (GSV) and ground integrity (GI). The subject land along the eastern foreshore of Lake Ainsworth (Pacific Parade) and along the southern foreshore of the lake along Camp Drew Road are examples of rural, semi-rural, and urban recreational development that has resulted in a modified and disturbed landscape.

**9.2.1 Ground Surface Visibility**

Estimations of ground surface visibility (GSV) are essential in allowing some determination of how much of the ground surface can be seen (and thus inspected for archaeological and/or cultural remains). The most common constraints to GSV include vegetation cover, both growing (grasses after rain) and dead (humus cover in a forest environment), however concrete, road-fill gravel and bitumen are also inhibitors to GSV. The definition of GSV used here has been adapted from (Hnatiuk *et al.* 2009: 87) and is scaled as a percentage of total coverage, (Table 5). Ground surface visibility was categorised on average as fair (26-50%) along both Pacific Parade and Camp Drew Road.

**Table 5 - Ground surface visibility. Based on Table 19 of Hnatiuk, Thackway and Walker (2009: 87).**

| Description (coverage)  | %      | Designation |
|---|--------|-------------|
| Any number of plants covering $\frac{3}{4}$ of the area (75-100%)                 | 0-25   | Poor        |
| Any number of plants covering $\frac{1}{2}$ to $\frac{3}{4}$ of the area (50-75%) | 26-50  | Fair        |
| Any number of plants covering $\frac{1}{4}$ to $\frac{1}{2}$ of the area (25-50%) | 51-75  | Moderate    |
| Any number of plants covering $\frac{1}{4}$ of the area (25%)                     | 76-95  | Good        |
| Few individual plants with little cover, to completely bare ground (0-5%)         | 96-100 | Excellent   |

**9.2.2 Ground Integrity**

Assessing ground integrity (GI) provides an opportunity to determine whether or not the subject land has been modified by natural, non-natural and/or human (non-Aboriginal) means, and to what degree. Natural vectors can be subtle, wind and rain across many years, or they can be abrupt, flood and fire. Human vectors can also be subtle, in particular through the activity of domestic livestock. Livestock can; however, be a more serious impact upon GI when high stocking rates and low rainfall combine to degrade the landscape more rapidly. More blatant human vectors include urban development, mining, exploration and infrastructure construction.

Archaeologically, determinations of GI are necessary to establish the degree of archaeological integrity - is the archaeological material observed in the same location as where it was originally left? Or have events through time changed that location? If evidence supporting the latter is strong then integrity is reduced and any lessening of archaeological integrity lessens the power of all subsequent investigation, observation and interpretation.

Removal of archaeological significance (or integrity) does not, however, equate with removal and/or destruction of the archaeological record itself. Further, removal of integrity does not remove Aboriginal cultural significance, and for Aboriginal people if archaeological material is present (regardless of its level of integrity) it can be as important.

Ground integrity is determined here using a percentage scale, 0% meaning context (integrity) is gone - 100% is equal to excellent preservation of the landscape (Table 6). Ground surface integrity was categorised on average as fair (26-50%) along both Pacific Parade and Camp Drew Road.

**Table 6 – Ground integrity, based on non-natural, non-Aboriginal vectors of impact. Hnatiuk, Thackway and Walker (2009: 87)**

| Description  | Percent | Designation |
|--|---------|-------------|
| Landscape totally disturbed showing 100% modification, with no remnant vegetation present  | 0-25    | Poor        |
| Landscape heavily disturbed 75-100% modification, may contain (minimal) remnant vegetation | 26-50   | Low         |
| Landscape disturbed, 50-75% modification present, may contain 25-50% remnant vegetation    | 51-75   | Moderate    |
| Landscape displaying low disturbance; includes to 25% modification. Remnant common         | 76-95   | Good        |
| Landscape dominated by remnant canopy and ground cover ( $\leq$ 5% modification)           | 96-100  | Excellent   |

### 9.3 Outcomes

Areas of erosion and weathering present the best opportunity for ground surface visibility (GSV) but reduce the integrity (GI) of the landscape. Therefore it is in areas where ground disturbance is highest, along vehicular tracks, animal pads and along creeks and other (including man-made) drainages that GSV is highest. However, when an artefact/artefacts is/are found in these areas the integrity of where the artefact(s) has/have been found will be compromised. It is up to the archaeologist to determine to what degree GI at that location has been affected.

#### 9.3.1 Ground Surface Visibility and Integrity

Ground surface visibility along both Pacific Parade and Camp Drew Road peaked at 25%, meaning that GSV was poor (0-25%). The poor visibility was most often attributed to vegetation and humus cover on the ground surface but non-natural cover (bitumen and concrete) were also a contributing factor.

#### 9.3.2 Archaeological Finds

No Aboriginal objects or places were located during the inspection of Pacific Parade and the southern section of Camp Drew Road. A small shell scatter (Fig. 15) was located along the eastern verge of Pacific Parade (557881E 6816005N - GDA94), 50m south of the entrance to the Sport an Recreation Centre and 50m north of the beach access with the toilet block (Fig. 17). The shells were identified as not having originated from an Aboriginal midden given there was still colour present; that is, they were too young to have been the result of traditional Aboriginal activity.

**Figure 15 – Oyster shell found along Pacific Parade.**

**NOTE –** At an earlier date an axe had been located and stored in the vicinity of the toilet block (*pers. comm.* Ian Fox), but after considerable searching by members of the field team the item was not re-located.

#### 9.3.3 Intangible Evidence

Cultural significance has been associated with the paperbark trees and their growth pattern (the acute angle of growth to the west) found along the eastern verge of Pacific



Parade (Fig. 16). The trees have been linked to women's sites along the eastern shore of the lake and it is believed any modification/alteration of those trees will lead to significant environmental/climatic events.

**Figure 16 – The paperbarks (Melaleuca sp.) growing along the eastern verge of Pacific Parade. Camera direction is north, the lake is to the left (west).**



**10 DISCUSSION**

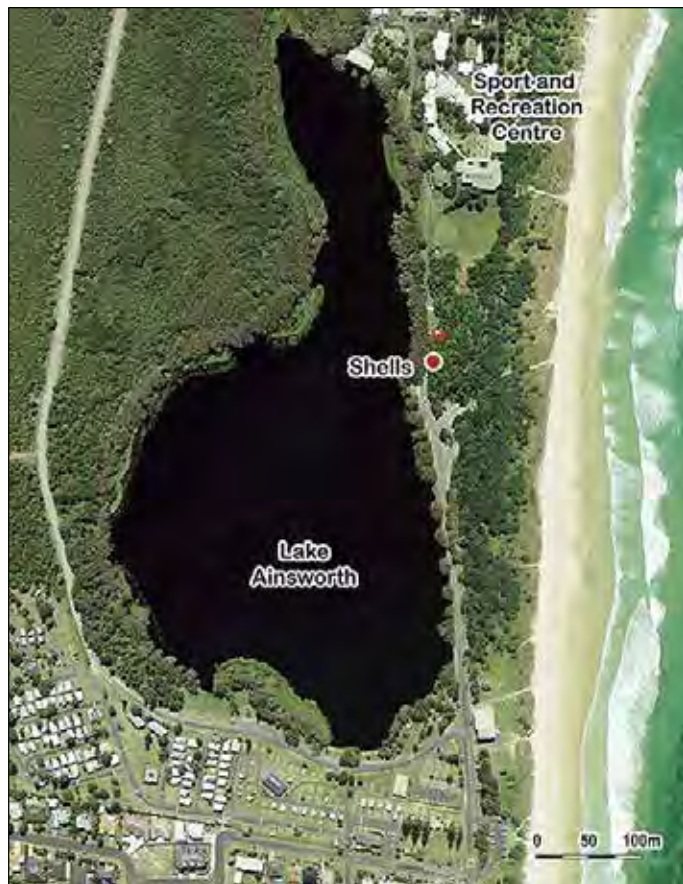
**10.1 Areas of High Potential**

Although no artefacts were located during the inspections reported here, and although levels of historic disturbance have been random and varied as a result of mining, military and recreational activity, the archaeological record of other areas along the north coast where the same landforms and environments are found (See the discussion in Sections 6-7 and the resulting predictive model in Section 8) suggests the potential for objects and/or places to exist within the barrier dune complex at Lake Ainsworth is still high. Further, as discussed in Sub-section 4.5 (RAP Concerns) the cultural significance of the lake is still high regardless of the presence/absence of tangible (archaeological) evidence.

Of the six landform types identified in the vicinity of the eastern and southern foreshores of Lake Ainsworth, the dune systems and slopes/ridges retain the highest potential for the presence of Aboriginal objects and or sites. However, although it is possible to identify the landforms themselves as holding potential for the presence of cultural heritage (CH) resources, actually locating CH within these landforms on the ground (at the 'local level') depends entirely upon constraints to GSV (visibility) and GI (integrity) and these constraints make finding CH difficult.

Given the constraints to GSV and GI present during the current survey and the fact that no objects or site of interest were found, it became difficult to identify areas of high probability at the local level which means that CH potential (areas of high probability) can only be identified at the landform level and with no finer detail or precision than that.

**Figure 17 – The location of the shells along Pacific Parade.**



## 10.2 Areas of High Disturbance

Areas of highest disturbance occur at walking tracks and picnic areas along the southern foreshore (Camp Drew Road) and along the beach access tracks, vehicular tracks and the bitumen road that provides access to the Sport and Recreation Centre. Direct impact upon shell material was identifiable at the location of the shell material found (Fig. 16) but the significance of the impact is low given the shells are not of any great age and probably were deposited within the last few years. Natural disturbance along the eastern foreshore is apparent in a dramatic fashion when current lake levels are compared to those seen in photographs from the last 50 years (Compare for example Figs. 11-13 with Fig. 18).



**Figure 18 – The eastern foreshore of Lake Ainsworth has disappeared with water at some places lapping at the roadway. Camera direction is north from the surf club.**

## 11 ASSESSING SIGNIFICANCE

Assessing cultural significance means defining why a place is culturally important (OEH 2011) and to whom. Aboriginal items and places possess value in the wider community in different ways and for different reasons. What is paramount in assessing Aboriginal items and places is that the Aboriginal Community is involved and central to the process. The New South Wales Office of Environment and Heritage (OEH) acknowledge this role stating that Aboriginal people are the primary source of information about their culture, they must have an active role in its assessment and they must have control over how their cultural knowledge is used (OEH 2011). The non-Aboriginal community and in particular the scientific (archaeological) community, may look at the value of Aboriginal objects and places in a different way, and archaeologists may use differing value criteria to assess that value. In both cases the primary document of reference is the *Burra Charter* (Marquis-Kyle and Walker 2004: 103) which defines cultural significance as the:

*...aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the **place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.** Places may have a range of meanings for individuals or groups.*

The *Burra Charter* and the NSW Heritage Branch (NSWHO 2001) use four principal values to assess cultural significance (social, historic, scientific and aesthetic) and in consultation with the registered Aboriginal parties (RAPs) to the current project these values have been applied in assessing the cultural significance of Pacific Parade and the southern section of Camp Drew Road study areas to the local Aboriginal Community. The OEH elaborates upon these four principle values suggesting that any significance assessment should also take into account criteria such as research potential, representativeness, rarity and educational potential (OEH 2011: 10).

The four principal values are as follows:

1. **Historic Value (Heritage Branch Criterion A)** - This refers to associations with a person, event or activity that is of importance to the Aboriginal community. In common with places of cultural value, locations of historical value will not necessarily possess physical evidence of that person/event/activity. "They may have 'shared' historic values with other (non-Aboriginal) communities" (OEH 2011: 9).
2. **Aesthetic Value (Heritage Branch Criterion C)** - How a place looks and 'feels' can also be significant, especially (and most often) when associated with social/cultural value. The aesthetics of a place considers "...form, scale, colour, texture and material of the fabric or landscape, and the smell and sounds associated with the place and its use..." (OEH 2011: 9).
3. **Social-Cultural Value (Heritage Branch Criterion D)** - The associations and attachments a place has for Aboriginal people including both traditional links to country and links arising from contemporary community identity. "Social or cultural value can only be identified through consultation with Aboriginal people" (OEH 2011: 8).
4. **Scientific Value (Heritage Branch Criterion E)** - Scientific value comes from the fact a place or item or landscape can provide further information to current understanding and knowledge. The degree of significance depends upon the degree of rarity or representativeness the item or place or landscape, possesses.

The OEH criteria are explained thus:

- o **Research potential** - Refers to the potential of a place to contribute to an understanding of the area, or region, or state natural and/or cultural history.
- o **Representativeness** - Builds on the Charter concept by assessing how much variability exists both inside and outside the subject area, what is already conserved and how much connectivity exists.
- o **Rarity** - Also builds on the Charter concept of rarity by assessing whether or not a place demonstrates a distinctive way of life, custom, process, land-use, function or design no longer in use.
- o **Educational Potential** - Assessing whether or not a place contains teaching sites or sites that might have teaching potential.

### 11.1 Cultural and Scientific Value Assessment

As required by OEH the core values listed above (both from the Charter and OEH's add-ons) will be used to grade the cultural significance to Aboriginal people of the current study area using a low, moderate or high ranking. The above-mentioned values will also be used to grade the scientific significance of Pacific Parade and Camp Drew Road (south) using the same ranking system - research potential, representativeness, rarity and educational potential will be targeted here. What follows in Tables 7 and 8 is an assessment of the study area overall, for its value to Aboriginal people culturally and also for its scientific value to the wider non-Aboriginal community. It must be noted that Aboriginal people also recognise the scientific value of their heritage, but that scientific investigation must always be tempered by cultural obligations.

### 11.2 Site Assessment and Statement of Significance

At this point, having assessed the Pacific Parade/Camp Drew Road study area overall and with all the regional character and predictive modelling data at hand, an assessment of sites found becomes possible. However, no sites were located during the site inspection. It is still possible to assess the cultural (non-tangible) importance of the location to Aboriginal people (See Sub-sections 4.5, 5.1-5.2) and it is appropriate (given the discussion in Sections 7-8) to assess the potential for tangible objects and/or sites to be present within the barrier dune systems.

A review of Sub-sections 4.5, 5.1, 5.2, and Sections 7-8 indicates it is the landscape that is of most significance. The tangible evidence (physical remains) of Aboriginal occupation before and after European contact is scant, nevertheless, a lack of such evidence does not diminish the cultural importance of the landscape to the Aboriginal Community; the *Nyangbul* People.



**Table 7 - An assessment of value to Aboriginal people of the Pacific Parade/Camp Drew Road study area.**

| Value Criterion       | Description   | Significance  |
|-----------------------|---|---------------|
| Historic              | Oral history and documented European record of post-contact campsites.  | Moderate      |
| Aesthetic             | Contains topographical features linked to stories and cultural beliefs  | High          |
| Social/Cultural       | Oral history and recognition of intangible cultural heritage. Significant women's story attached to eastern foreshore and the paperbark trees, while men's story associated with western foreshore. Both linked to ceremonial are at Lennox Head Bora Ring. | High          |
| Scientific            | Potential for physical evidence of campsites and cultural practices   | Moderate      |
| Research Potential    | Possibility of cultural objects despite disturbance through military/mining/recreation activity and infrastructure development  | Moderate-High |
| Representativeness    | Barrier dunes in association with a freshwater lake is not common. Freshwater representativeness more a non-Aboriginal phenomenon given anecdotal evidence the lake was originally salt   | Moderate      |
| Rarity                | Landforms not uncommon, uniqueness attached to the stories relating to the lake   | Moderate-High |
| Educational Potential | Extensive observational opportunity of the surrounding landscape  | Moderate      |

**Table 8 - An assessment of scientific value across the Pacific Parade/Camp Drew Road study area.**

| Value Criterion       | Description   | Significance  |
|-----------------------|---|---------------|
| Historic              | Of historical significance to both the Aboriginal and non-Aboriginal Community as a place of recreation from earliest settlement to the former and a camp ground, ceremonial area and food resource up until the recent past to the latter. | Moderate-High |
| Aesthetic             | An aesthetically pleasing environment possessing views of the lake and countryside to the west, with spectacular coastal beaches to the east over the barrier dunes.  | Moderate      |
| Social/Cultural       | Since European arrival the Lennox Head-Lake Ainsworth district has contributed considerably to the social/recreational and cultural fabric of the Ballina region through oral histories, past newspaper articles and photographs            | Moderate-High |
| Scientific            | Potential for undiscovered post contact <i>in-situ</i> cultural sites and pre-contact midden sites in the adjacent dune systems   | Moderate-High |
| Research Potential    | Physical evidence of pre- and post-contact Aboriginal occupation, further investigation of non-Aboriginal stone structures (e.g. dry stone walls)   | Moderate      |
| Representativeness    | Barrier dunes in association with a freshwater lake is not common. Freshwater representativeness more a non-Aboriginal phenomenon given anecdotal evidence the lake was originally salt   | Moderate      |
| Rarity                | Landforms not uncommon, uniqueness attached to the stories relating to the lake   | Moderate      |
| Educational Potential | Possibility of undiscovered cultural sites further informing the archaeological record  | Moderate      |

Intangible evidence is strong across and around the lake and is recognised through natural features and landmarks despite the European activity and infrastructure development that have reduced the frequency of tangible evidence. Although the proposed upgrades show only moderate scientific value, the lake environment overall retains high cultural, historic, and aesthetic value to the *Nyangbul* People.

## **12 ASSESSING IMPACT**

### **12.1 The Proposed Development**

Ballina Shire Council is proposing improvement works along Pacific Parade and Camp Drew Road along the eastern and southern shores (respectively) of Lake Ainsworth at Lennox Head (Figs. 1-2). The project has for some time been the subject of considerable Council deliberation and public debate, attracting significant public interest both for and against and as a result of this interest Council is keen to take into consideration concerns expressed by members of the community, resulting in the Aboriginal cultural heritage assessment (CHA) reported here in this document

The proposed works will include improvements in two areas along Pacific Parade and Camp Drew Road (Fig. 2-3), and the reconstruction of the intersection between the two thoroughfares:

- o Pacific Parade (Eastern Road) - Rehabilitating the road by profiling the existing pavement and constructing a footpath and landscaping the area of public reserve along to the over-bank area of the eastern shore of Lake Ainsworth.
- o Camp Drew Road (Southern Road) and Foreshore Area - Reconstruction of the existing road way and formalising the adjoining car parking bays between Pacific Parade and Camp Drew Road. These works are along the over-bank area of public reserve along the southern shore of Lake Ainsworth. It includes bank stabilisation, improvement of the open spaces for passive recreation and potential pedestrian linkages between existing isolated open spaces.
- o Reconstruction of the three-way intersection between Pacific Parade and Camp Drew Road adjacent to the Lennox Head/Alstonville Surf Life Saving Club. The new intersection will be a two-way intersection incorporating a turn facility and will be the termination point for Pacific Parade (open to emergency vehicle and maintenance service vehicles only).

### **12.2 The Assessment of Potential Impacts**

#### **12.2.1 Harm to Aboriginal Objects or Sites**

As a result of the current site survey and inspection carried out on 12 July 2017 and reported here, no harm will occur to Aboriginal objects and/or site, simply because no sites were located. There is, however, potential for objects and/or places to still exist within the barrier dune system located between Pacific Parade and Seven Mile Beach. This means, therefore, that while there is potential for Aboriginal cultural heritage (CH) resources to exist there remains potential for impacts on that CH material as a result of the proposed upgrade works.

#### **12.2.2 RAP Responses To Potential Harm**

As stated in Sub-section 4.5, RAP concerns centred around the cultural significance of the paperbark trees along Pacific Parade and that they should not be altered in any way (Lois Cook), and that the Land Council were concerned about a lack of detailed mapping being available at the time of the inspection and that as a result only the bitumen road and its verges were inspected (Mik Smith). Both RAPs commented that an inspection during low tide on the lake might have been more productive and that the barrier dune system along the eastern verge of Pacific Parade (between the road and Seven Mile Beach) should in no way be impacted by upgrade works.

#### **12.2.3 Potential Impacts**

Therefore, based on a surface assessment of both Pacific Parade and the southern section of Camp Drew Road (completed on 12 July 2017 during which no Aboriginal objects or sites were found), and based upon personal consultation with all three RAP representatives participating in the field investigation (Lois Cook, Mik Smith and Marcus Ferguson), the proposed road upgrades will not impact any known physical evidence of cultural heritage. There remains however, potential for cultural heritage material to exist within the Pacific Parade barrier dune system and a low-medium possibility for unexposed subsurface material to occur during upgrade works across all three work zones (as defined in Sub-section 12.1).

## **13 AVOIDING AND MINIMISING HARM**

### **13.1 Guiding Principles for Heritage Site Management**

The NSW OEH aims at ensuring impacts to Aboriginal objects and places are avoided or reduced and that where possible Aboriginal sites should be conserved. Three OEH policies promote this aim:

1. Impacts to significant Aboriginal objects and places should always be avoided wherever possible.
2. Where impacts to Aboriginal objects and places cannot be avoided the proponent or AHIP applicant is required to develop (or amend) proposals so as to reduce the extent and severity of impacts to significant Aboriginal objects and places through the use of reasonable and feasible measures. Any measures proposed should be negotiated between the proponent or AHIP applicant and the Aboriginal community.
3. Once all avoidance, minimalisation and mitigation options have been adequately explored OEH may also consider the appropriateness of any proposed actions having potential Aboriginal cultural heritage benefit. Any actions proposed should be negotiated between the proponent or AHIP applicant and the Aboriginal community.

The guiding principle is therefore that wherever possible avoidance should be the primary management option but that if avoidance is not feasible measures must be taken to mitigate against impacts to Aboriginal items and/or places. If mitigation is adopted the nature of that mitigation is based on the significance assessment, both cultural (as defined by the Aboriginal community) and scientific, applied to the Aboriginal items and/or sites in question.

### **13.2 Proposed Preservation Strategies**

#### **13.2.1 Avoidance**

The proposed location of upgrade works as it currently stands is in close proximity to the barrier dune system parallel to the Pacific Parade work zone. This dune system has potential to contain Aboriginal cultural heritage material even though none was located on the dune surface closest to Pacific Parade during the site inspection. Avoidance of the dune system is attainable and barrier fencing should be employed to establish the work zone perimeter. The paperbark trees are located within close proximity to the eastern verge of Pacific Parade and will need to be marked with high visibility barrier mesh/fencing during upgrade works.

## **14 RECOMMENDATIONS**

Subsequent to the consideration of:

- o The relevant legislative requirements (set out in Section 2),
- o The results of the current cultural heritage assessment process,
- o The concerns and interests of the Aboriginal Community, represented by the RAPs, and,
- o The proposed impacts of the upgrade works.

It has been found that:

- o The proposed upgrade works will occur in a landscape that is of high cultural importance to the Aboriginal Community.
- o The occurrence of tangible Aboriginal objects and/or sites within the study areas along Pacific Parade and Camp Drew Road (south) is zero; the shells found (See Figs. 15, 17) are not cultural.
- o The proposed upgrade works will have a direct impact upon the cultural landscape, however, potential physical impact upon particular landforms (the barrier dune along Pacific Parade) and individual sites (the paperbark trees along Pacific Parade) can be avoided.

As a result of these findings it is recommended that:

1. No further archaeological investigation is required along the sections of Pacific Parade and Camp Drew Road designated for upgrade works.
2. The barrier dune and paperbark trees along Pacific Parade can be avoided.

3. Monitoring by representatives of the RAPs should take place during initial ground disturbance activity along the eastern verge of Pacific Parade.
4. It is recommended here that Council staff and contractors who have not previously (or recently) participated in Ballina Shire Council CH Induction Programs be required to do so. The CH induction program should be developed in collaboration with the local Aboriginal Community and should include a maintained record, including timing, of all personnel and contractors involved for the duration of the project.

In conjunction with induction training developed in collaboration with the local Aboriginal Community, Council is encouraged to include a program of cultural awareness. A cultural awareness program would provide an opportunity for explanation of the cultural significance to Aboriginal people of the Lake Ainsworth area and strengthen the relationships Council is seeking to build.

5. It is recommended that Ballina Shire Council maintain consultation with the RAPs. Ongoing consultation should be for the duration of the upgrade works.
6. It is recommended a Stop Work Procedure (SWP) is to be installed in recognition of the potential for discovery of unexpected or incidental finds. Note that any works that may reveal or disturb cultural heritage objects or sites will require an AHIP from OEHL in order for the find(s) to be mitigated (if avoidance is not an option). The SWP procedure is outlined in Table 9 and has been adapted from earlier reports completed in the region (Fox 2014a; 2014b; 2014c; Knuckey 2016).

Council must ensure every on-site contractor/worker is provided with a copy of the SWP process and that all on-site workers are made aware if/when the SWP is brought into action.

Should the work being undertaken include the use of large earth working equipment (large-scale excavators, for example), it may be possible in some instances to isolate the cultural object and continue working without further disturbance. Advice from a heritage consultant or cultural monitors (if present) should be sought, but a nominal buffer of up to 5m may be required, with high-visibility barrier fencing/mesh surrounding the find location.

**Table 9 - The proposed stop work procedure (SWP).**

|                   |  |
|-------------------|--|
| <b>STOP WORK</b>  | Immediately, upon becoming aware of a potential cultural heritage object or archaeological resource  |
| <b>CONTACT</b>    | A qualified cultural heritage professional as soon as possible   |
| <b>NOTIFY</b>     | The Ballina Shire Council's Heritage (or Senior Project) Officer, Jali LALC, the RAPs (if they are not already present), and advise OEHL as soon as practicable.<br><br>If bones or potential human remains are discovered, Police must be notified immediately. Police must provide written notification to proceed. If human remains are identified as Aboriginal, OEHL will provide written notification of required actions.     |
| <b>ASSESS</b>     | The cultural heritage professional in conjunction with OEHL and the registered Aboriginal parties should assess the significance of the resource and recommend a course of action e.g.:<br><br>Protect and avoid; or<br><br>Investigate, in accordance with the Code of Practice for Archaeological Investigations; or<br><br>Develop management strategies to inform an AHIP to regulate the unavoidable harm to Aboriginal objects |
| <b>ACTION</b>     | Identification of a previously unrecorded cultural heritage object will require registration as an Aboriginal site on the OEHL AHIMS database. Registration is required as soon as practicable   |
| <b>APPLY</b>      | To OEHL for an AHIP if necessary   |
| <b>RECOMMENCE</b> | Only when OEHL has approved a course of action and/or provided conditions of approval for an AHIP  |

7. In the event that skeletal remains are uncovered, work must cease immediately in the area surrounding the find and the area cordoned off. The NSW Police Department is to be contacted and no further action taken until written advice is received from the Police allowing work to recommence. If the remains are determined to be of Aboriginal origin, the Office of Environment and Heritage must be notified along with the RAPs to the project and the Jali Local Aboriginal Land Council. A plan of management for the preservation of the remains must be put in place prior to works recommencing and it must be developed in consultation with the RAPs.

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APPENDIX A NOTICE OF DETERMINATION (FIRST PAGE)

enquiries refer  
**Peter Drew**  
in reply please quote  
Pt V Register No: 22.2016/14



Ballina Shire Council  
PO Box 450  
BALLINA NSW 2478

**NOTICE TO APPLICANT OF DETERMINATION OF AN  
ENVIRONMENTAL ASSESSMENT FOR A PART V "ACTIVITY"**  
(Issued pursuant to Section 111 of the Environmental Planning and Assessment Act 1979)

**Part V Register No:** 22.2016/14

**Project File Reference:** PF 022.2016.00000014.001

**Applicant:** Ballina Shire Council

**Subject Land:** Lot 7002 DP 1052251, Lot 62 DP 755725, Lot 2 DP 1115145, Lot 3 DP 1115145, Ross Street LENNOX HEAD, No. 6 Ross Street LENNOX HEAD, Pacific Parade LENNOX HEAD

**Activity Proposal:** Rehabilitation Works along the Eastern Section of Lake Ainsworth Comprising Tree Removal, Closure and Removal of Existing Vehicle Access and Parking Areas, Construction of Footpath (3m Wide), Weed Management, Revegetation and Foreshore Restoration Works.

**Determination:** The proposed activity has been determined by Ballina Shire Council on 27 October 2016 by way of the grant of approval subject to the following ameliorative/mitigation measures being implemented to reduce any likely environmental impact:

 (initial)  
Assessment Officer

40 cherry street, po box 450, ballina nsw 2478  
t 02 6686 4444 • f 02 6686 7035 • e council@ballina.nsw.gov.au • w ballina.nsw.gov.au

APPENDIX B STAKEHOLDER REQUEST LETTER



PO Box 1787

Armidale, New South Wales. 2350

M – 0488 097 916

E – dr\_grumpy@remnantas.com.au

ABN – 99 092 565 110

Thursday 11 May 2017

Name  
Number and Street  
Suburb/Town,  
STATE. Postcode

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT – LOT 62 DP 755725,  
PACIFIC PARADE, LAKE AINSWORTH, LENNOX HEAD, 2478, BALLINA SHIRE LGA, NEW SOUTH WALES**

Dear Sir/Madam,

Remnant Archaeology is writing on behalf of Ballina Shire Council in regards to carrying out an Aboriginal Cultural Heritage Assessment within Lot 62 DP 755725 on Pacific Parade at Lake Ainsworth (Fig. 1) as part of preliminary works in preparation for the proposed upgrade, rehabilitation and improvement of sections of Pacific Parade and the car park immediately south of Lake Ainsworth. The proposed works will include improvements in three areas along Pacific Parade (Fig. 1) including:

- *Eastern Road* - Rehabilitating the road by profiling the existing pavement and constructing a footpath and landscaping the area of public reserve along to the over-bank area of the eastern shore of Lake Ainsworth.
- *Intersection* - Reconstruction of the three-way Intersection between Pacific Parade, the eastern road and the southern road adjacent to the Lennox Head/Alstonville Surf Life Saving Club. The new intersection will be a two-way intersection incorporating a turn facility and will be the termination point of the existing eastern road (open to emergency vehicle and maintenance service vehicles only).
- *Southern Road and Foreshore Area* - Reconstruction of the existing road way and formalising the adjoining car parking bays between Pacific Parade and Camp Drew Road. These works are along the over-bank area of public reserve along the southern shore of Lake Ainsworth. It includes bank stabilisation, improvement of the open spaces for passive recreation and potential pedestrian linkages between existing isolated open spaces.

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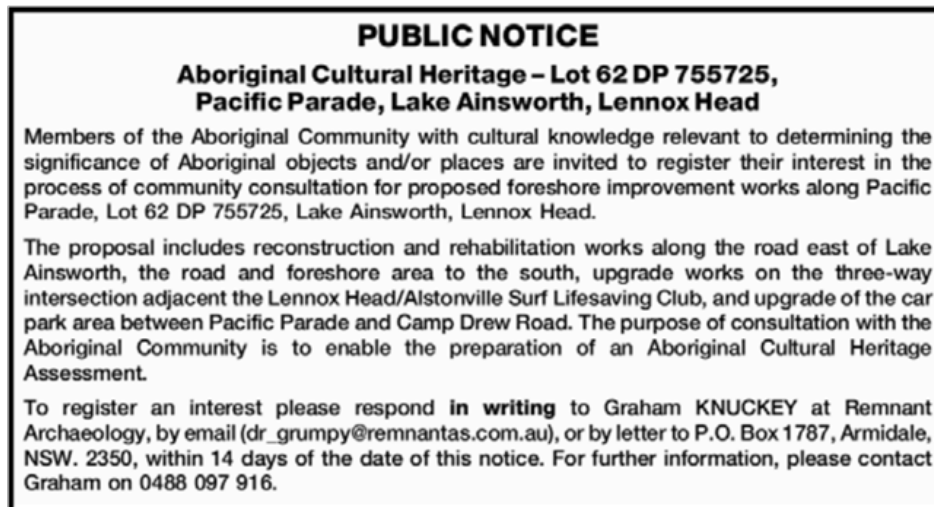


Figure 2 – A copy of the public notice to appear in the Northern Star on 13 May 2017.

Please address any return correspondence to Remnant Archaeology as per letterhead address.

Yours Sincerely



Graham KNUCKEY PhD

Archaeologist – REMNANT Archaeology



## APPENDIX D COMMUNITY CONSULTATION – PROJECT NOTIFICATION LETTER



PO Box 1787  
Armidale, New South Wales. 2350  
M – 0488 097 916  
E – dr\_grumpy@remnantas.com.au  
ABN – 99 092 565 110

Tuesday 20 June 2017

Name  
Number and Street  
Suburb/Town, STATE. Postcode

**ABORIGINAL CULTURAL HERITAGE ASSESSMENT OF FORESHORE IMPROVEMENT WORKS,  
LOT 62 DP 755725, PACIFIC PARADE AT LAKE AINSWORTH, LENNOX HEAD, 2478, BALLINA SHIRE, NSW**

### Registration Of Interested Aboriginal Parties

Ballina Shire Council (BSC) is proposing to undertake improvements at Pacific Parade along the eastern and southern shores of Lake Ainsworth (Fig. 1). The proposed works will include improvements in three areas along Pacific Parade (Fig. 2) including rehabilitation works on the eastern section of Pacific Parade, the reconstruction of a three-way intersection between Pacific Parade and the southern road adjacent to the Lennox Head/Aistonville SLSC, rehabilitation of the southern road and foreshore area, and formalisation of the car park. These works were described in the stakeholder notification letter circulated in late May 2017 that invited Aboriginal stakeholders with a cultural connection to the work zones described to indicate an interest in becoming registered Aboriginal parties (RAPs) to the project. Your organization is one of three stakeholders that responded to the notification letter and all three are listed in Table 1.

This current letter outlines the proposed cultural heritage assessment methodology including field survey methodology, research methodology if objects and/or places of Aboriginal cultural heritage significance are located, and health and safety considerations in the field.

### Field Work Times and Availability

One day has been set aside for the field component of this cultural heritage assessment, a date for that field survey has not yet been finalised. Please respond to this letter by supplying the availability of one field officer to accompany the archaeologist.

Team members will need to provide their own transport to and from site and their own personal protective equipment (PPE). See the discussion of what this includes below. A first aid kit will be provided and each team member will need to bring his or her own water, lunch and morning tea.

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Figure 1 – Lake Ainsworth north of Lennox Head. Image source: NSW Spatial Information Exchange web site (Six Maps - <https://six.nsw.gov.au>).



Figure 2 – Areas of proposed works along Pacific Parade. Image source: Ballina Shire Council.

Table 1 – The respondents to the stakeholder notification letter.

| Stakeholder                        | Contact Person  |
|------------------------------------|-----------------|
| Aboriginal Cultural Concepts       | Lois Cook       |
| Jali Local Aboriginal Land Council | Michael Smith   |
| Marcus Ferguson                    | Marcus Ferguson |

### Field Work Methodology

Remnant Archaeology (RA) proposes using archaeological field survey for the cultural heritage assessment program of the foreshore improvement works along the eastern and southern shores of Lake Ainsworth (See Figs. 1-2). With the assistance of representatives from the local Aboriginal Community (the RAP representatives) Remnant will assess the potential for Aboriginal cultural and archaeological objects and/or places to be found on the surface of the ground within the boundaries of the areas of interest shown in Figure 2. After the field survey and depending upon what is found, a sub-surface test-pitting exploration program may become necessary. Field survey method and test-pitting method are described below.

#### Survey

On-foot (pedestrian) surveys will be carried out with three main objectives:

1. To carry out a ground surface archaeological survey to determine the presence/absence of archaeological material across the study areas.
2. To confirm what is already known from background Aboriginal Heritage Information management System (AHIMS) site register searches.
3. To allow the RAPs the opportunity to identify areas of concern known to them.

Field survey will be randomised and will be governed by the boundaries of the work zone involved and given the relatively small area involved it is assumed work zone coverage will be maximised. The survey will be done as follows; the archaeologist walks an imaginary line (transect) as guided by his hand-held GPS unit whilst members of the field team line up on either side and walk along inspecting the ground surface in front and to the sides as they go. When the archaeologist reaches the end of the transect he selects another line adjacent to the one just walked and the process is repeated. This continues with each transect until the study areas have been inspected to the satisfaction of the field team. The archaeologist stops at various points to record information in his field book, information about land surface modification, ground surface visibility, stone raw materials present, soil types, vegetation, for example. Items and/or places of interest found by members of the field team are flagged (using stake flags) for the archaeologist to record, map and measure. The archaeologist collects the flags as he goes - no flags or flagging tape is left in the study areas. All information is recorded in a field book.

#### Test Pitting (if required)

Depending upon what is found during the ground surface surveys, it may become necessary to carry out sub-surface test pitting. **IF** required, a test-pitting program can be completed without an Aboriginal heritage impact permit (AHIP) in place, as per the *Code of Practice for Archaeological Investigation of Aboriginal Objects In New South Wales*.

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At each location chosen a 50x50cm square is set up using a string line and then dug (using trowel and brush) to a depth where the team members are satisfied no archaeological items will be discovered. This depth coincides with the base of the first soil layer (the A horizon) and is usually between 100-500mm deep. The A horizon is dug out in layers called 'spits' or excavation units and each bucketful of soil is weighed before it is run through a 5mm sieve. Artefacts found during excavation are photographed where they were found, mapped in the pit, removed, measured, photographed again, bagged, labelled and returned to the pit. Artefacts found on the sieve are measured and photographed, bagged, labelled and returned to the pit. If possible the depth they came from is recorded. During the test-pitting process the archaeologist fills out paperwork for each excavation unit and completes the relevant documentation when artefacts are found.

### Research Methodology

#### Aims

The aim of any archaeological study (research) is to try to find information that will answer questions about how Aboriginal people in the past moved through the landscape and how they used the landscape – in other words, how did Aboriginal people in the past interact with their environment? Answering questions about the past may also lead to increased knowledge of current Aboriginal use of the landscape and the connection of current-day Aboriginal people to sites in the district.

Questions of relevance here may include;

1. Have artefacts found remained *in situ* (that is, where they were originally placed or dropped), or have they been moved away from their original location by farming, urban development, erosion?
2. Would a detailed analysis (subject to the agreement of the RAPs):
  - Assist in identifying the uses Aboriginal people from the past gave these objects?
  - Highlight the tool-making technologies used by the local people?
  - Provide information about the range of raw materials used to make tools?
  - Provide information about the range of food resources used by the local people?

#### Analysis

A spatial analysis of artefact location, (where across the land surface artefacts are found and how that position might relate to the position of other artefacts found), across the study area will be carried out. If agreed to by the RAPs and if at all possible, more detailed analysis of the artefacts themselves may be requested in order to attempt to answer the questions presented above.

### Artefact Management

During field survey no artefacts will be recovered until the appropriate Office of Environment and Heritage (OEH) protocols have been satisfied. Artefacts found will be recorded then left at their find spot, recovery and/or removal of artefacts can only be addressed within the conditions of an Aboriginal Heritage Impact Permit (AHIP). **IF** a test-pitting program is required all artefacts recovered will be dealt with in the following manner.

- Artefacts will be recorded using standard OEH site recording forms.
- Artefacts from each excavation spit within each square will be placed in a sealed plastic bag.
- Each bag is labelled with relevant information, and a similar label will be in the bag.
- All artefacts will be stored in a hard plastic container.

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- o Excavation ends when enough information to satisfy OEH requirements has been recovered.
- o When all required information has been gathered, all artefacts will be reburied on-site.

If reburial on-site is not possible, for whatever reason, (a large number of items to be processed is one possible example), materials will be temporarily stored at Remnant Archaeology's office in Armidale in a secured and locked cabinet. Within 7 days of recording being completed the artefacts will be reburied in their test pits and the locations noted for future reference. If reburial is not possible all materials will be subject to a care agreement for their future protection and this care agreement will be a condition of the AHIP. Site cards will be submitted to OEH and all findings are included in the report.

### Field Work Health and Safety

#### 1. How to maintain a safe working environment in the field

- Work with due care and consideration for your surroundings, yourself and other people.
- Bring to the attention of your team members any potential hazards identified.
- Comply with all safety requirements of your team, the landowner, the mining company.
- Remain in constant eye contact with other team members.
- In thick vegetation ensure you remain in constant hearing of other team members.
- Drink plenty of water - see heat stress section below.
- Let your team know if you are feeling unwell.
- Do not attempt physical activity you feel is beyond you or makes you feel uncomfortable.
- You always have access to a first aid kit if required.
- Only work within the area described at the beginning of the day.
- Do not commence fieldwork if you are hung over or under the influence of drugs.
- Do not commence work if you have a medical condition that may be affected by physical exercise or heat and would put your health in danger.

#### 2. Suitable clothing (Personal Protective Equipment or PPE) must be worn:

- A long-sleeved shirt - cotton preferred but not essential. High-vis colours to ensure visibility in the field and when working in the vicinity of heavy machinery. If no hi-vis shirt available, a hi-vis vest can be worn over an ordinary work shirt.
- Long trousers - may also be hi-vis but not essential.
- Sturdy, fully enclosed walking boots - can be steel-capped but not essential for the work.
- Broad-rimmed hat.
- Other items of PPE you may wish to consider include: gloves, earplugs, sunglasses, protective glasses, gators (extra leg protection), and sunscreen.

#### 3. Heat Stress

It is essential to be able to recognise the early signs of heat stress and to be able to promptly address them. Heat stress has a mortality rate up to 80% if prompt treatment is not immediately administered. Factors that may increase the risk of heat stress include:

- Some prescribed medicines including antihistamines, heart tablets and tranquilisers.
- Lack of acclimatisation - especially high risk within the first two days in the field.

5

- Age - younger than 10 years of age and older than 45 years of age increases the risk.
- Poor physical fitness and obesity.
- Drug and/or alcohol abuse.
- Bacterial or viral infections and the drugs used to control them, diabetes, malnutrition, and lack of sleep.

There are three stages of heat stress to keep a lookout for:

- 1) Heat Cramps – Painful and at times severe cramps of the larger muscles used during the workday. Symptoms may include: muscle cramps, tiredness, weakness, prone to fainting, nausea/vomiting, dizziness, moist, cool skin.
- 2) Heat Exhaustion – The body's heat control system goes into overdrive. Symptoms may include: headache, unquenchable thirst, muscle and stomach cramps, profuse perspiration, pale, cool and clammy skin, weakness/fatigue, nausea, shortness of breath, rapid pulse, confusion, irritability.
- 3) Heat Stroke – A serious condition that can cause brain and/or kidney damage, or death. Symptoms include: headaches, nausea/vomiting, visual disturbance and/or mental confusion, aggression, seizures and/or loss of consciousness, body temperature above 40°C, rapid pulse, hot/dry, flushed skin, cardiac arrest

Factors that help prevent heat stress:

- Drink at least 3-6 glasses of water (500-1000ml) per working hour.
- Wear loose-fitting, full-length porous clothing, a broad-brimmed hat and sunglasses.
- Work in the cool of the day. Alternatively, avoid working in the hottest part of the day.
- Drink even when not thirsty.
- Salt tablets should not be used as a mineral replacement or to treat muscle cramps.
- Be aware of the symptoms of heat stress before commencing fieldwork.
- Ensure a source of clean, cool water is always on hand.
- Have frequent rest periods in cooler, shaded areas.
- Do not drink alcohol or soft drinks as fluid replacements.
- Act promptly if symptoms appear.
- Place sufferer in a vehicle with cool drinking water and with air-conditioning on.

### Personnel

The field survey work will be a collaborative effort between Graham Knuckey (Remnant Archaeology) and the stakeholders from the Aboriginal Community who are registered for the project - the registered Aboriginal parties (RAPs) as listed in Table 1. It will be the responsibility of the RAPs to select their representative to participate in any fieldwork. IF test-pitting becomes necessary it will be carried out as described above and will also be subject to further discussions between the RAPs, Remnant Archaeology and the Proponent before any excavations can begin.

### Logistics

The fieldwork set out in this notification letter is subject to a number of possible restrictions and the most obvious will be weather conditions. Fieldwork will not be carried out during inclement weather.

With regard to field survey, constraints may include:

- The level of expertise of the RAP representatives - Remnant recommends experienced field officers be selected as RAP representatives but also understands this decision is up to each RAP body and Remnant will support those decisions wherever possible.
- Issues relating to difficult topography and/or vehicle-landowner access.

With regard to test pit excavation (IF required), constraints may include:

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- Site preparation – the amount of time required to prepare the land surface for excavation.
- Soil profile and density at each location - the degree of excavation difficulty.
- Excavation depth - this will vary between trenches and test pits.
- The frequency of objects/places located – the more found, the more time will be required.

Taking into consideration the potential constraints and the size of the study area involved, it is predicted one day will be required for the field survey, with a minimum of eight hours work time in the day. These eight hours do not include travel time to and from the work site. No predictions concerning time required for test-pitting can be calculated until it has been decided that test-pitting is required and secondly to what degree test-pitting will be carried out.

RAP representatives will be responsible for their own transport, personal protective equipment, drinking water, morning tea and lunches.

o0o

Remnant Archaeology has been engaged by Ballina Council to undertake the assessment and provide findings to OEH, which will include the views of Registered Aboriginal Parties (RAPs), for review and approval before work on the proposed project can proceed. A public notice regarding the proposal was placed in the Northern Star on Saturday 13 May 2017 and a stakeholder notification letter was circulated on 29 May 2017. In addition to Jali LALC, there have been 2 respondents, as listed in Table 1.

Yours Sincerely,



Graham KNUCKEY PhD

Archaeologist – Remnant Archaeology

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APPENDIX E COMMUNITY CONSULTATION – STAKEHOLDER LIAISON

| Stakeholder                                     | Acronym | Contact Person    | Stakeholder Category | Contact Method        | Engagement Method | Stakeholder Ref/Initials | Consent Method | Response Received | 4447 Linc Letter Sent | Stakeholder Location | Report Date Sent | Response Received From         | Response Received When | Comments   |
|---|---------|-------------------|----------------------|-----------------------|-------------------|--------------------------|----------------|-------------------|-----------------------|----------------------|------------------|--------------------------------|------------------------|--|
| Bellina Shire Council                           | BSC     | Simon Smith       | 11-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Loddon Shire Council                            | LSC     |                   | 11-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Nelson Mandela TAFE                             | NMT     |                   | 11-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| North East Victoria Regional Council            | NEVRC   |                   | 11-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Office of Environment and Heritage              | OEH     | Renee Nera        | 11-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Aboriginal stakeholders                         | -       | General community | 19-May-2017          | Print media           |                   |                          |                | Y                 |                       |                      |                  | Michael Smith, Marcus Ferguson | 24-May-17              | Placed public notice in the Northern Star. Response received from Lalland by word of mouth from Marcus Ferguson. |
| Aaron Tibbot and Natelene Mercy                 | ATM     | Aaron Tibbot      | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Aboriginal Community Concepts                   | ACC     | Lisa Cook         | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Benjaming Aboriginal Corporation                | BAC     | Shirley Barber    | 28-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Belconnen Aboriginal Corporation                | BAC     | Steve McLaughlin  | 28-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Benjaming Elders Council Aboriginal Corporation | BECAC   | Bertha Koppen     | 28-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Berrigan Aboriginal Corporation                 | BAC     | Michelle Cook     | 28-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Burrumbidgee Aboriginal Corporation             | BAC     | Dave Walker       | 28-May-2017          | Aust. Post            |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Castlemaine Aboriginal Corporation              | CAC     | Michelle Ferguson | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Cook Family                                     | CF      | Lewis Cook        | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Coonambidgee Aboriginal Corporation             | CAC     | Aimee Negishi     | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Jill Local Aboriginal Land Council              | JLALC   | Michael Smith     | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Marcus Ferguson                                 | MF      | Marcus Ferguson   | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Mitlenak Cultural Museum                        | CM      |                   | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| North East Victoria Regional Council            | NEVRC   |                   | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Aboriginal Cultural Concepts                    | ACC     | Lisa Cook         | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Jill Local Aboriginal Land Council              | JLALC   | Michael Smith     | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |
| Marcus Ferguson                                 | MF      | Marcus Ferguson   | 28-May-2017          | Aust. Post and e-mail |                   |                          |                |                   |                       |                      |                  |                                |                        |  |

APPENDIX F AHIMS SEARCH RESULTS

Your Ref/PO Number : 1701 LENNOX HEAD  
Client Service ID : 297566

**AHIMS Web Services (AWS)**  
Extensive search - Site list report



| SiteID  | SiteName  | Datum | Zone | Eastng | Northing | Context     | Site Status | Site Features  | Site Types               | Reports  |
|---|---|-------|------|--------|----------|-------------|-------------|--|--------------------------|--|
| 04-5-0305   | Seven Mile Beach Fishing Traps  | GDA   | 56   | 558100 | 6814119  | Open site   | Valid       | Aboriginal Resource and Gathering ; 1                              |                          |  |
| <b>Recorders</b> Jali Local Aboriginal Land Council                 |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0095   | Contact<br>Gallina N.R. Middlen   | AGD   | 56   | 555000 | 6813080  | Open site   | Valid       | Shell ; -> Artefact ; -  | Middlen                  |  |
| <b>Recorders</b> J. Turvey  |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0167   | Contact<br>AP-1   | AGD   | 56   | 556100 | 6815420  | Open site   | Valid       | Artefact ; 68  |                          |  |
| <b>Recorders</b> Mr. Adrian Piper                                   |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0049   | Contact<br>Lennox Head  | AGD   | 56   | 556470 | 6816120  | Open site   | Valid       | Shell ; -> Artefact ; -  | Middlen                  | 1957   |
| <b>Recorders</b> Graeme Bailey                                      |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0094   | Contact<br>Lennox Head Dune (Grafag Pty Ltd Aboriginal Site - Site 3)     | AGD   | 56   | 556890 | 6815120  | Open site   | Valid       | Artefact ; -> Burial ; -   | Bora/A, Open Camp Site   |  |
| <b>Recorders</b> Mary Dallas Consulting Archaeologists, Kerry Navin |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0069   | Contact<br>Lennox Head Public School Lennox Head                          | AGD   | 56   | 557000 | 6813720  | Open site   | Valid       | Artefact ; -   | Open Camp Site           | 40,51,540,699,<br>700,1,209,1,237,<br>1,254,1,926,203<br>7,2,182 |
| <b>Recorders</b> Unknown Author                                     |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0143   | Contact<br>Site 1, Fern St.   | AGD   | 56   | 557300 | 6814575  | Open site   | Valid       | Artefact ; -   | Open Camp Site           |  |
| <b>Recorders</b> Mr. Adrian Piper                                   |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0048   | Contact<br>Lennox Head  | AGD   | 56   | 557220 | 6813060  | Open site   | Valid       | Shell ; -> Artefact ; -  | Middlen                  | 1957   |
| <b>Recorders</b> Graeme Bailey                                      |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0108   | Contact<br>Barrett 2  | AGD   | 56   | 557350 | 6815230  | Open site   | Valid       | Artefact ; -   | Open Camp Site           |  |
| <b>Recorders</b> Ms. Jacqueline Collins                             |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0106   | Contact<br>Barrett 3  | AGD   | 56   | 557370 | 6815200  | Closed site | Valid       | Shell ; -> Artefact ; -  | 1133                     |  |
| <b>Recorders</b> Ms. Jacqueline Collins                             |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0107   | Contact<br>Barrett 5  | AGD   | 56   | 557400 | 6814920  | Closed site | Valid       | Shell ; -> Artefact ; -  | 1133                     |  |
| <b>Recorders</b> Ms. Jacqueline Collins                             |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0105   | Contact<br>Barrett 4  | AGD   | 56   | 557410 | 6815330  | Open site   | Valid       | Artefact ; -   | Open Camp Site           |  |
| <b>Recorders</b> Ms. Jacqueline Collins                             |   |       |      |        |          |             |             |  |                          |  |
| 04-4-0092   | Contact<br>BARRETT 6  | AGD   | 56   | 557460 | 6815250  | Open site   | Valid       | Artefact ; -   | Open Camp Site           |  |
| <b>Recorders</b> Ms. Jacqueline Collins                             |   |       |      |        |          |             |             |  |                          |  |
| 04-5-0029   | Contact<br>Lennox Head near Gillmans Street (NPWS Lennox Head Flora Ring) | AGD   | 56   | 557550 | 6814850  | Open site   | Valid       | Shell ; -> Artefact ; -<br>Ceremonial Ring<br>(Stone or Earth) ; - | Bora/Ceremonial, Middlen | 206,473  |
| <b>Recorders</b> J.A. Stirling, K.A. Baeban-Alexandra Kelly         |   |       |      |        |          |             |             |  |                          |  |

Report generated by AHIMS Web Service on 23/08/2017 for Graham Knuckey for the following area at Datum: GDA, Zone: 56, Eastings: 555888 - 559894, Northings: 6813964 - 6817944 with a Buffer of 1000 meters. Additional Info : Aboriginal heritage assessment. Number of Aboriginal sites and Aboriginal objects found is 20

This information is not guaranteed to be free from error or omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

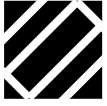
## AHIMS Web Services (AWS) Extensive search - Site list report

Your Ref/PO Number : 1701 LENNOX HEAD  
Client Service ID : 297566

| SiteID    | SiteName                   | Datum            | Zone                   | Easting | Northing | Context   | Site Status | SiteFeatures          | SiteTypes      | Reports     |
|-----------|----------------------------|------------------|------------------------|---------|----------|-----------|-------------|-----------------------|----------------|-------------|
| 04-5-0030 | Lake Ainsworth;<br>Contact | AGD<br>Recorders | 56<br>JA Starling      | 557850  | 6815170  | Open site | Valid       | Artifact :-           | Open Camp Site |             |
| 04-5-0031 | Lennox Head<br>Contact     | AGD<br>Recorders | 56<br>Inghoven Outdoor | 557860  | 6814950  | Open site | Valid       | Artifact :-           | Open Camp Site |             |
| 04-5-0052 | Lennox Head;<br>Contact    | AGD<br>Recorders | 56<br>Graeme Bailey    | 558090  | 6813200  | Open site | Valid       | Shell :-, Artifact :- | Midden         | 1957        |
| 04-5-0038 | Lennox Head;<br>Contact    | AGD<br>Recorders | 56<br>Lobel McIlroy    | 558100  | 6814500  | Open site | Valid       | Burial :-             | Burial/s       |             |
| 04-5-0054 | Lennox Head;<br>Contact    | AGD<br>Recorders | 56<br>Graeme Bailey    | 558590  | 6813000  | Open site | Valid       | Shell :-, Artifact :- | Midden         | 1957,100530 |
| 04-5-0017 | North Creel<br>Contact     | AGD<br>Recorders | 56<br>JA Starling      | 558900  | 6812900  | Open site | Not a Site  | Artifact :-           | Open Camp Site | 100530      |

Report generated by AHIMS Web Service on 23/08/2017 for Graham Knuckey for the following area at Datum :GDA, Zone : 56, Eastings : 555888 - 559894, Northings : 6813964 - 6817941 with a Buffer of 1000 meters. Additional info : Aboriginal heritage assessment. Number of Aboriginal sites and Aboriginal objects found is 20

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**ANNEXURE H     Part 5 Activity Approval Issued on 27 October 2016**

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**DAC Planning Pty Ltd**

A.C.N. 093 157 165

Town Planning & Development Consultants



enquiries refer

**Peter Drew**  
in reply please quote

**Pt V Register No: 22.2016/14**



Ballina Shire Council  
PO Box 450  
BALLINA NSW 2478

**NOTICE TO APPLICANT OF DETERMINATION OF AN  
ENVIRONMENTAL ASSESSMENT FOR A PART V "ACTIVITY"  
(Issued pursuant to Section 111 of the Environmental Planning and Assessment Act 1979)**

**Part V Register No:** 22.2016/14

**Project File Reference:** PF 022.2016.00000014.001

**Applicant:** Ballina Shire Council

**Subject Land:** Lot 7002 DP 1052251, Lot 62 DP 755725, Lot 2 DP 1115145, Lot 3 DP 1115145,  
Ross Street LENNOX HEAD, No. 6 Ross Street  
LENNOX HEAD, Pacific Parade LENNOX HEAD

**Activity Proposal:** Rehabilitation Works along the Eastern Section of Lake Ainsworth Comprising Tree Removal, Closure and Removal of Existing Vehicle Access and Parking Areas, Construction of Footpath (3m Wide), Weed Management, Revegetation and Foreshore Restoration Works.

**Determination:** The proposed activity has been determined by Ballina Shire Council on 27 October 2016 by way of **the grant of approval subject to the following ameliorative/mitigation measures being implemented to reduce any likely environmental impact:**

 (initial)  
Assessment Officer

40 cherry street, po box 450, ballina nsw 2478

t 02 6686 4444 • f 02 6686 7035 • e council@ballina.nsw.gov.au • w ballina.nsw.gov.au

**GENERAL****1. Approved Plans & Supporting Documentation**

Works being carried out generally in accordance with the plans and associated documentation lodged by the proponent, including the following documents, except as modified by any ameliorative measures required to be implemented by this approval. Where there is any inconsistency with the REF and the specific requirements listed within this approval, the specific requirements listed within this approval shall prevail.

| <b>Document</b>  | <b>Reference</b>        | <b>Dated</b> |
|--|-------------------------|--------------|
| Review of Environmental Factors (Revised) – Prepared/submitted by Peter Brown                  | TRIM Record No 16/79824 | 22.09.2016   |
| DRAWING No: LHR30.058 – Prepared/submitted by Ballina Shire Council - TRIM Reference: 16/89055 | Sheet 1 of 4 (Issue A)  | 21/9/2016    |
|  | Sheet 1 of 4 (Issue A)  | 21/9/2016    |
|  | Sheet 1 of 4 (Issue A)  | 21/9/2016    |
|  | Sheet 1 of 4 (Issue A)  | 21/9/2016    |

2. An assessment for the necessity to pull sand from the Lake to maintain the stabilisation of the eroded banks must be carried out by a suitably qualified and experienced person prior to this works being carried out. If sand has retreated back into the Lake to a degree that requires the pulling of it back up to the toe of the log revetment, a plan of management to minimise the environmental impacts on the Lake (including erosion and sediment control) must be prepared by a suitably qualified and experienced person prior to these works being carried out.
3. Prior to the closure of the eastern road the proponent is to install the access ramp and rehabilitate the lake foreshore area as depicted in the plan titled "Lake Ainsworth Foreshore Works Stage 1-Eastern Foreshore Plan and Long section (CH0 to CH120). Protective fencing and signage explaining the purpose of the fencing is to be established around the rehabilitated foreshore. The fencing is to remain in place until the area is fully stabilised and revegetated.
4. The proponent is to establish a monitoring program of the bank stabilisation works depicted Drawings LHR 30.058 (Issue A), dated Sept 2016. Details of the monitoring program and proposed remediation are to be incorporated into a Foreshore Erosion and Rehabilitation Monitoring Program (FERMP). Details of the FERMP are to be submitted to Council's Open Spaces and Resource Recovery section for approval prior to works commencing at the site. If the monitoring program confirms an unacceptable rate of erosion is occurring the proponent will be required to undertake remediation actions. Proposed erosion benchmarks and remediation measures are to be included into the FERMP. The FERMP is also to include;
  - Measures to protect and enhance all areas of riparian and terrestrial revegetation species habitat, in perpetuity.
  - A list of all weed species and methods to be used to control them.
  - Details of measures to be implemented to monitor the success of the planting works including the provision of monitoring reports to be provided to Council's Environmental Scientist.
  - Commitment that all planting stock will be sourced from plants growing in the immediate locality.
  - Confirmation that the revegetation program will be undertaken for a minimum period of five years and the proponent will fund all aspects of the program.

 (initial)  
 Assessment Officer

- A range of performance goals that are measurable and include commitment that, unless the goals are achieved, the rehabilitation program will be extended until they are achieved. In this regard, all forested areas are to achieve 80% closed native vegetation coverage within a five year time period. All vegetation stratas are to be free of all environmental and noxious weeds.
- A timetable for the implementation of all revegetation, rehabilitation and weed control works.
- Identify contingency plans if proposed revegetation works do not respond to proposed treatment works e.g. feral animal browsing.
- The FERMP will be prepared by suitably qualified Council staff or a qualified bush regenerator.
- Identify appropriate measures for protection against foot and vehicular traffic to ensure long-term protection of all significant vegetation communities and/or rehabilitation areas (eg exclusion fencing, provision of walking tracks etc).
- Management actions to eradicate other invasive species from the rehabilitation areas.
- Measures to be implemented to ensure that all areas of native vegetation are managed and protected in perpetuity.

All restoration work shall be undertaken by, or overseen by, a suitably qualified person.

5. To ensure the closure of the eastern road does not result in the increased erosion of the southern portion (Stage 2) of the lake, the proponent is to implement an erosion monitoring program for this section of the lake. Details of the monitoring program including, monitoring frequency, proposed erosion benchmarks and remediation measures are to be included into the FERMP.
6. The proponent is to activate the actions of the approved FERMP prior to any works commencing at the site.
7. To prevent the pollution of waterways, the proponent is to ensure adequate sediment and erosion control measures are in place prior to the commencement of works.

#### **DURING CONSTRUCTION & MAINTENANCE**

*The following conditions in this section of the approval must be complied with or addressed during the course of carrying out the construction works and during maintenance relating to the approved activity.*

8. All construction works must be managed in accordance with the *Construction Management Plan* included as *Appendix E* of the submitted *Review of Environmental Factors*, dated 22 September 2016. This includes the management of dust, noise, waste, and erosion and sediment control.
9. Acid Sulphate Soils (ASS) may be encountered while excavating therefore monitoring of this excavated material shall occur. Should ASS materials be disturbed, they should be tested, stored separately to non-ASS material and adequately banded. The material must be treated with lime at the required rate. After treatment has occurred the material shall again be tested to ensure the potential acid generation has been adequately neutralised.
10. To prevent the pollution of waterways, the proponent is to ensure adequate sediment and erosion control measures maintained, regularly inspected, and repaired during the construction of the project until the site has been stabilised by permanent vegetation cover or a hard surface. This is to include:

  
\_\_\_\_\_(initial)  
Assessment Officer

- The prevention of soil erosion and the transportation of sediment material into any roadway, natural or constructed drainage systems, watercourse and or adjoining land;
  - Trenches being backfilled as soon as practical;
  - Buffer vegetation zones being retained on sites that adjoin roadways, drainage systems and or watercourses;
  - Sediment and erosion control measures are to be maintained throughout the construction process and beyond by the owner, where necessary.
11. A single all weather access way is to be provided on site. All construction vehicles are to enter and exit the site via this access way so as to minimise erosion on site and prevent the movement of soil onto surrounding roadways. When necessary roadways shall be swept and all drains and gutters cleaned of soil material.
12. Soil erosion and sediment control measures shall be designed, installed and maintained in accordance with Managing Urban Stormwater – Soils and Construction, LANDCOM, March 2004.
13. When necessary dust control measures such as wetting down, covering stockpiles and physical barriers shall be used to control and prevent a dust nuisance to surrounding properties.
14. Waste arising from construction activities must be removed and/or transported in accordance with the requirements of the NSW EPA and SafeWork NSW pursuant to the provisions of the following:
- (a) Protection of the Environment Operations Act 1997
  - (b) Protection of the Environment Operations (Waste) Regulation 2014
  - (c) Waste Avoidance and Resource Recovery Act 2001
  - (d) Work Health & Safety Act 2011
  - (e) Work Health & Safety Regulation 2011
15. Clean up equipment including suitable absorbent material shall be available on site to effectively deal with liquid contaminates such as oils and fuel spills.
16. To ensure fill/soil or other material is suitable and will not contaminate the site, only fill/soil material that may be received at the subject property is:
- a) Virgin excavated natural material (within the meaning of the Protection of the Environment Operations (POEO) Act);
  - b) Any other waste-derived material the subject of a resource recovery exemption under Clause 91 of the Protection of the Environment Operations (Waste) Regulation 2014 that is permitted to be used as fill material, excluding waste tyre.
17. Any waste-derived material the subject of a resource recovery exemption received at the development site must be accompanied by documentation as to the material's compliance with the exemption conditions and must be provided to Council's Environmental Health Section, on request.
18. The exportation of waste, including fill or soil from the site must be in accordance with the provisions of the *Protection of the Environment Operations Act (POEO) 1997* and the Environment Protection Authority "*Waste Classification Guidelines*" and shall comply with the terms of any approval issued by Council.

 (initial)  
Assessment Officer

19. Any vegetation to be removed is to be clearly marked with flagging tape, prior to the commencement of work at the site.
20. All vegetation and/or trees to be retained immediately adjoining construction works areas are to be protected with temporary fencing in accordance with the approved RRWCP. Fencing is to be established a minimum of 1 metre outside of the identified root protection zone areas and/or drip line zone whichever is greater. No vegetation clearing, earthworks and/or storage of any vegetative matter, goods and/or equipment shall be undertaken within the barrier fenced areas.
21. Any vegetation removal is to be undertaken in a manner that ensures the ongoing integrity of retained vegetation and/or adjacent native plants. Any vegetation matter is to be removed from the site and disposed of in an appropriate manner.

#### **ADVISORY MATTERS**

1. The eastern area of the lake has being designed and promoted as a recreational area which includes the provision of picnic areas. The proposal has minimal provision for waste receptacles which may increase the likelihood of littering occurring in the area. This issue should be monitored by Council's Open Spaces and Resource Recovery Section and, if required, additional receptacles should be installed in suitable locations.
2. A permit for the approved works may be required from the NSW Department of Primary Industries (Fisheries) under the Fisheries Management Act 1994. If required, this permit should be obtained prior to commencement of works.

**Signed:**



Peter Drew  
**Senior Planner**

Date: 3/11/2016

**Signed:**



Rod Willis  
**Group Manager  
Development and Environmental Health**

Date:

 (initial)  
Assessment Officer