REPORT

Mid-North Coast Boating Investigations Package

MN-08 Camden Haven River Recreational Boating Needs Investigation

Client: Roads & Maritime Services
on behalf of Port Macquarie-Hastings Council

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MN-08 CAMDEN HAVEN RIVER
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Executive Summary

Royal HaskoningDHV (RHDHV) has been engaged by Roads and Maritime Services (RMS) on behalf of Port Macquarie-Hastings Council (Council) to assess the future potential of existing recreational boating infrastructure to provide adequate facilities to meet future user needs.

This study was listed as a priority regional project as a key outcome of the Mid-North Coast Regional Boating Plan (Transport for NSW, 2015) and is funded by the NSW Boating Now program.

The objectives of the investigation are to:

- Identify opportunities to better meet current and future recreational boating needs of the community;
- Assessment of existing infrastructure and identification of two (2) boating improvement sites; and,
- Identify any potential redundancy or future expansion capacity in existing infrastructure.

An appraisal of existing boating facilities identified potential improvements at most sites, which related to deterioration of existing infrastructure, management of foreshore erosion, improving functionality (e.g. boat holding) and expansion of capacity. It should be noted that these potential improvements represent a long list of opportunities for future consideration subject to availability of suitable funding and priorities for allocation at specific boating infrastructure sites. Low cost improvements relating to ongoing maintenance activities on existing infrastructure (e.g. oyster removal) should be considered for implementation in the short term. Potential improvements identified for each site are summarised in the table below.

<table>
<thead>
<tr>
<th>Site Location</th>
<th>Potential Improvements</th>
</tr>
</thead>
</table>
| Dunbogan Reserve Boat Ramp    | • deepening of the navigation access channel through Gogleys Creek to the Camden Haven River, although this may be problematic for environmental reasons due to the presence of seagrass beds in the dredging footprint and the location of the channel within a SEPP14 Coastal Wetland;  
• provision of additional car and trailer parking spaces by expansion into foreshore reserve areas and shifting timber log fencing and relocating existing picnic tables/shelters as required;  
• topping up of gravel beach on southern side of boat ramp, alternatively a floating pontoon could be installed in this area to assist with boat holding; and,  
• replacement of dilapidated section of seawall on northern side of boat ramp and reinstatement of fish cleaning table. |
| Bay Street Boat Ramp           | • replacement of the ramp surface, regrading to the recommended ramp slope range, and extension of the ramp to suitable water depths;  
• formalisation of existing available parking areas with timber log fencing/bollards and signage;  
• removal of concrete platform structure and provision of a floating pontoon for loading/unloading;  
• trimming of fig tree branches (subject to Council conditions and consent); and,  
• replacement of faded no wash zone and no water skiing signage. |
### Project related

| Apex Park Boat Ramp | - replacement of the ramp surface with possible extension of the ramp as a suspended slab on piles to accommodate the expected drop off into deep water;  
| | - topping up of rock protection on adjacent shoreline areas;  
| | - replacement and relocation of existing stormwater outlet;  
| | - installation of an on-ramp pontoon to assist with boat holding;  
| | - repairs to the deteriorated manoeuvring area surfacing; and,  
| | - expansion of existing parking area into the reserve and reconfiguration to provide additional car and trailer spaces, or development of a new parking area within the Crown Reserve area opposite Apex Park.  
| Public Wharf (Mill Street) | - formalised parking spaces within Mill Street;  
| | - repair of deteriorated timber decking and rotting joists on northern side of jetty (if public access is made available by removal of handrail);  
| | - replacement of deteriorated joists supporting main jetty/wharf deck;  
| | - replacement of the displaced concrete pile supporting the northern side of the jetty foreshore landing deck;  
| | - monitoring of warped planks over main deck of jetty/wharf and consider future replacement if further deterioration creates trip hazards;  
| | - reinstate detached timber fendering along berth face and check the connections of other fenders;  
| | - reinstatement/replacement of loose timber mooring posts along the wharf face;  
| | - remove oyster growth located in areas that may cause damage to vessels;  
| | - extend rock protection to the full height of the bank along the northern foreshore;  
| | - extend shared footpath (currently terminates at Mill Street cul de sac) along foreshore reserve to link with footpath to Fishermen's Co-op;  
| | - provide pontoon berthing facility for smaller vessels; and,  
<p>| | - detailed inspection of jetty and wharf piles and timber structural elements, and replacement/repair as required. |</p>
<table>
<thead>
<tr>
<th>Location</th>
<th>Project Details</th>
</tr>
</thead>
</table>
| Laurie Street Boat Ramp and Wharf | • replacement of deteriorated precast concrete plank ramp section with new concrete planks with stainless steel connections;  
• provision of rock protection at the ramp toe to limit scour and the height/steepness of the ramp drop off;  
• remove oyster growth from ramp surface, wharf piles and wharf access ladder;  
• replacement of lower ramp section with suspended slab on piles to service larger boats (an alternative to precast concrete planks);  
• formalisation of trailer parking areas along the southern grassed reserve area;  
• provision of engineered rock protection along adjacent shoreline areas;  
• sealing (oiling or painting) of the timber wharf decking and edging and replacement of deteriorated members as required to prolong its life; and,  
• installation of an on-ramp pontoon to assist with boat holding. |
| Laurieton United Servicemen’s Club Marina Reserve | • repair/replacement of the dilapidated foreshore retaining wall along grassed reserve and creek areas;  
• repair/replacement of rotting timber decking planks on the jetty/wharf; and,  
• sealing (oiling or painting) of timber decking and edging on floating pontoon and replacement of deteriorated members as required to prolong its life. |
| Marine Rescue Boat Ramp, Laurieton | • replace rotting cross members at the head of the jetty;  
• remove oyster growth from wharf piles and wharf access ladder;  
• install rubber sheeting where missing on berth face piles;  
• replacement of boat ramp surface with possible extension of the ramp as a suspended slab on piles to service larger boats;  
• formalisation of the boat ramp approach and manoeuvring area with a sealed accessway, including line marking and signage;  
• installation of engineered rock protection along downstream shoreline area;  
• possible realignment of the foreshore pedestrian footpath and installation of line marking and signage to manage interactions between vehicles and pedestrians;  
• formalisation car and trailer parking, with utilisation of the reserve area along the southern side of Tunis Street; and,  
• installation of an on-ramp pontoon to assist with boat holding. |
| Stingray Creek Bridge Boat Ramp, North Haven | • installation of an on-ramp pontoon to assist with boat holding. However, such an improvement would attract additional usage of the facility and need to be supported with additional car and trailer parking, which may not be feasible in this space constrained site with very limited existing parking; and,  
• provision of engineered rock protection to replace ad hoc protection on the upstream side of the ramp. |
North Haven Boat Ramp | • dredging of the shoaled areas at the ramp toe and approach, although this may be problematic for environmental reasons due to the presence of seagrass beds in the dredging footprint. In addition, such an improvement would attract additional usage of the facility and exacerbate existing problems with parking availability;
• steepening of the ramp to the recommended RMS guideline slope of 1V:8H, however the ability to regrade the ramp is likely to be limited by the available water depth (without dredging) at the ramp toe and would require significant earthworks to raise the ramp crest level and adjoining parking area;
• cleaning of the ramp surface at low tides; and,
• increased Council Ranger presence to improve policing of parking.

Henry Kendall Reserve Boat Ramp | • Potential improvements to the facility include provision of a trailer parking area in close proximity to the ramp. This could be achieved by extending the length of existing car spaces further into the foreshore reserve and would be subject to assessment of applicable Tree Protection Zones.

Queens Lake Reserve Boat Ramp | • formalisation of trailer and car parking areas with line markings and signage;
• installation of an on-ramp pontoon (on the northern side of the boat ramp) to assist with boat holding and encourage motorised boat owners to use the boat ramp rather than the adjacent beach area; and,
• provision of rock protection at the toe of the ramp to fill in the scour hole and limit further propeller dredging.

Two (2) boating improvement sites at Dunbogan Reserve Boat Ramp and Marine Rescue Boat Ramp, Laurieton were identified as initial priorities for development. Preliminary design concepts were developed for each site, which involve a range of works including:
• expansion of trailer parking capacity;
• rigging/de-rigging areas;
• repair/replacement of deteriorated infrastructure;
• boat holding pontoons;
• optional wash down facilities;
• traffic and pedestrian management measures; and,
• foreshore protection.

Boat ramps that are in poor condition and reported to have low levels of usage include facilities at Laurie Street and Bay Street. It is recommended that a monitoring program is established to establish the level of usage at these ramps. This information should be used to assess whether the expense of maintenance or upgrades can be justified when the facilities reach the end of their service life and/or considered to pose a risk to public safety. Users should be consulted to determine the impacts of any proposed closure of these facilities and to establish the feasibility of alternative water access options that are available at other existing ramps.

It is considered that the existing public wharves provide a range of different functions for the areas including sewage pumpout, loading/unloading points, emergency tie-up, overnight moorings and fishing.
Project related

platforms. As such, these assets should continue to be periodically inspected and maintained in a serviceable condition.

Although the development of additional/new boating facilities is outside the scope of the current investigation, it was noted in discussions with RMS operational staff that an opportunity exists to install a new boat launching site upstream of the Dunbogan Bridge (outside the study area). As water skiing is prohibited within the river from the Dunbogan Bridge to the entrance, this section of the river is reported to be heavily used in summer by water skiers and personal water craft (PWC) riders. It is understood that an informal sand ramp is located along the eastern side of the river, approximately 500m upstream of the bridge. This ramp is reported to be used for launching by skiers and the adjacent cleared reserve provides an informal parking and picnicking area. The formalisation of the launching and parking facilities in this area would provide significant benefit to this waterway user group and would also service recreational and commercial fishermen seeking upstream access to Watson Taylors Lake. The demand for such a facility should be assessed in consultation with local stakeholders, including water skiers, PWC riders, recreational/commercial fisherman and other boaters.

In addition, RMS operational staff have also identified a potential need for formalised dinghy storage (e.g. dinghy racks) to cater for access to the swing moorings located off the Dunbogan foreshore in the vicinity of the Dunbogan Boatshed.
1 Introduction

1.1 Background
Royal HaskoningDHV (RHDHV) has been engaged by Roads and Maritime Services (RMS) on behalf of Port Macquarie-Hastings Council (Council) to assess the future potential of existing recreational boating infrastructure to provide adequate facilities to meet future user needs.

This study was listed as a priority regional project as a key outcome of the Mid-North Coast Regional Boating Plan (Transport for NSW, 2015) and is funded by the NSW Boating Now program.

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

1.2 Objectives
The objectives of the investigation are to:
- Identify opportunities to better meet current and future recreational boating needs of the community;
- Assessment of existing infrastructure and identification of two (2) boating improvement sites; and,
- Identify any potential redundancy or future expansion capacity in existing infrastructure.

1.3 Scope of Work
The scope of work completed as part of the investigation included the following main tasks:
- review of background information;
- initial consultation with Council, community and government agency stakeholders;
- assessment of boating demand;
- appraisal of existing boating facilities;
- identification of two (2) boating improvement sites and development of basic concept plans;
- identification and costing of further studies, design and construction associated with concept options;
- face-to-face consultation with community stakeholders; and,
- finalisation of concept plans.

1.4 Acknowledgements
We acknowledge the assistance provided by Council staff and RMS in facilitating access to background information and reviewing the deliverables for the investigation.

1.4.1 Consultation
A number of stakeholders were consulted as part of the investigation to establish current issues and demands and future needs for boating infrastructure, and to provide feedback on the development of concept options. These stakeholders are identified within the Stakeholder Engagement Plan (refer Appendix B) and their valuable contributions to the preparation of the concept plans are outlined within Section 4.1.4 and Section 4.2.4 of this report.
2 Review of Background Information

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

Council GIS data layers:
- cadastral boundaries
- Council Land, Council-managed Crown Land, and Crown Land
- Land zoning
- SEPP14 wetland boundaries
- marine vegetation mapping
- heritage areas
- land contours
- stormwater drainage
- aerial photography

RMS GIS data layers:
- navigation aids
- navigation restrictions
- depth contours
- aquaculture lease boundaries

Mapping Data:
- Boating Map 5A for Camden Haven River, Queens and Watson Taylors Lakes, Laurieton and Lake Cathie areas (RMS, 2013)
- Marine Vegetation Mapping, Map 23 Camden Haven River (NSW Department of Primary Industries, 2005)

Design Standards and Guidelines:
- AS3962-2001 Guidelines for Design of Marinas
- Coastal Engineering Manual (USACE, 2008)
- NSW Boat Ramp Facility Guidelines (RMS, 2015)

Environmental, Recreation and Tourism Data:
- Camden Haven River and Lakes System Flood Study (WorleyParsons, 2013)
- NSW Boat Ownership and Storage: Growth Forecasts to 2026 (NSW Maritime, 2010)
- OEH NSW Tidal Planes Analysis: 1990-2010 Harmonic Analysis (MHL, 2012)
- Tourism data within LGA Profile – Port Macquarie-Hastings (Destination NSW, 2014)
- AHIMS Extensive Search – Site list report (OEH, 2016)
- RMS Mooring Licence and Vessel Registration Data (RMS, 2016)
- Bureau of Meteorology wind data from Port Macquarie Airport AWS Station No. 060139 (2016)

Council and State planning documents:
- Port Macquarie-Hastings Local Environment Plan 2011
- Port Macquarie-Hastings Development Control Plan 2013
- Draft North Coast Regional Plan (NSW Department of Planning & Environment, 2016)

Full reference listings for key documents are provided at Section 5.
3 Options Assessment

3.1 Boating Demand Assessment

The demand for boating infrastructure in the Port Macquarie-Hastings area is being driven by population growth, planned urban area expansion and residential development, dependence of the township on tourism for business and growth, and trends in regional boat ownership.

According to population forecasts by Forecast.id (2014) for Port Macquarie-Hastings Council the current (2016) population for the local government area was predicted to be 79,000 and was forecast to grow to 103,000 by 2036. This represents a projected increase of 30% over the next 20 years.

The above forecasts are supported by the Draft North Coast Regional Plan prepared by the NSW Department of Planning & Environment (2016). This states that the Port Macquarie-Hastings area is experiencing one of the fastest population and economic growth rates in the region and Port Macquarie is identified as a ‘regional city’ alongside Tweed Heads and Coffs Harbour. The population of Port Macquarie-Hastings is estimated to be around 95,000 in 2036, according to Australia Bureau of Statistics and NSW Department of Planning & Environment projections. This population growth is proposed to be supported by existing and proposed urban release areas (refer Figure 1), which are located in Port Macquarie, Wauchope, Lake Cathie-Bonny Hills, and West Haven to Kew. Priority land release areas identified within the Draft North Coast Regional Plan included Port Macquarie (Thrumster, 4,250 lots), Lake Cathie-Bonny Hills (2,000 lots) and Kew (900 lots).
Due to Camden Haven’s proximity to the coast and estuary location, it is a popular area for tourism, especially in the summer months. Available tourism data from Destination NSW (2014) indicates that the four year rolling annual average for the number of visitors to the Port Macquarie’s LGA was 1,453,000. The tourism generated from overnight and domestic day trips was estimated to represent an annual spend of $423 million. As such, it is evident that businesses within the Camden Haven area benefit significantly from tourism revenue.

Based on boat registration data provided by Roads & Maritime Services (RMS, dated 19th February 2016) for postcodes in the areas surrounding the Camden Haven Inlet (2446, 2441, 2444, 2439, 2445, 2443), there are 6,391 boats with a current, expired or pending registration. It is also important to consider the surrounding regions of Camden Haven, as during certain times of the year these regions would add further pressure on existing boating infrastructure.

The regions of the Mid North Coast have a combined 42,000 boat licence holders, which represents 8% of all boating licences in NSW. There are 20,000 registered recreational vessels, with open runabouts...
comprising 70% of registered vessels. The majority of vessels are between 2-6m in length and are therefore classed as trailable vehicles. This places further pressure on existing boat launching ramps and trailer parking spaces. (Transport for NSW, 2015)

It was highlighted in discussions with community stakeholder that boat owners travel down from Port Macquarie to North Haven to seek improved offshore access due to the notorious bar at the entrance to the Hastings River.

According to the *NSW Boat Ownership and Storage: Growth Forecasts to 2026* (NSW Maritime, 2010) a growth trend of 2.9% annually for registration of recreational vessels is expected in NSW. The report also identified that the North Coast region (inclusive of Port Macquarie) would have a 4% growth rate. This is above the state wide growth rate of vessel ownership. It was also forecast that the North Coast would have greater growth in trailable vessels. This again would further increase the demand for boat launching facilities.

The Australian Bureau of Statistics (ABS) publishes estimates of participation in sport and physical activities based on a national household survey of people aged 15 years and over. Table 1 provides estimated national participation numbers and rates for selected water based activities (only the more popular activities, such as swimming, are reported for individual States). As shown in Table 1, the estimated number of people participating in canoeing/kayaking has more than doubled since 2005-2006.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Estimated Number of Participants</th>
<th>Estimated Participation Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>05/06</td>
<td>09/10</td>
</tr>
<tr>
<td>canoeing/kayaking</td>
<td>66,200</td>
<td>112,900</td>
</tr>
<tr>
<td>fishing</td>
<td>250,900</td>
<td>239,000</td>
</tr>
<tr>
<td>rowing</td>
<td>42,600</td>
<td>27,000</td>
</tr>
<tr>
<td>Waterskiing/powerboating</td>
<td>100,600</td>
<td>107,400</td>
</tr>
</tbody>
</table>

*participation rate in particular activities for those who participate in some form of physical activity

**difference in participation between previous survey is statistically significant

The Camden Haven Inlet provides an easy access point for people to enjoy activities such as kayaking, canoeing and paddle boarding on the river. It is suggested within the Regional Boating Plan (Transport for NSW, 2015) that there may be several thousand of such vessels in the mid north coast region.
3.2 Appraisal of Existing Boating Facilities

Map 1 (refer Appendix A) shows the locations of existing boating facilities within the study area, which are discussed in detail below.

3.2.1 Dunbogan Reserve Boat Ramp

Location

Dunbogan Reserve boat ramp (refer Figure 2) is located at the junction of The Boulevarde and Camden Head Road. The ramp provides access to Gogleys Creek, which feeds into Gogleys Lagoon and also links with the main channel of the Camden Haven River. The ramp is positioned in close proximity to the river entrance and is a convenient location for vessels seeking offshore access.

Gogleys Creek is a shallow waterway providing a passage from the Camden Haven River to the Lagoon. Rock mound structures extend from both sides of the creek entrance and are submerged at times of high water levels. The Lagoon is a large expanse of shallow water that is occupied by seagrass beds, mangrove communities and oyster leases.

Figure 2: Aerial view of Dunbogan Reserve boat ramp

The RMS Boating Map for the Camden Haven area indicates that starboard and port pipe beacons mark the entrance to Gogleys Creek through the rock mound structures. Gogleys Creek and Gogleys Lagoon are within a no wash zone and no towing zone. There is also a caution marked on the Boating Map for
the Gogleys Lagoon advising of extensive oyster leases and to observe speed and wash limits to avoid unnecessary damage to oyster farms.

**Description**

The boat ramp is a grooved, concrete two lane ramp and is 7.73m wide (refer Figure 3). Its lower portion is formed by precast concrete planks. According to the RMS Boat Ramp Locator the ramp provides water access at all times. A 1.35m wide dish drain is located along the northern side of the ramp to receive stormwater runoff. The slope of the ramp was measured to be 9 degrees (1V:6.3H) at the waterline, 8.3 degrees (1V:6.9H) at the top of the precast planks, 5.7 degrees (1V:10H) at the bottom of the grooved concrete slab section, and 5.5 degrees (1V:10.4H) at the top of the ramp. Local stakeholders have reported that the boat ramp receives a high level of usage. However, it is understood that the depth restrictions within Gogleys Creek through to the entrance rock mounds limits the size of vessels that can use the ramp at different states of the tide.

**Figure 3: Dunbogan Reserve boat ramp surface**

The foreshore immediately north of the boat ramp is retained by a near-vertical concrete seawall, which is backed by a 30m long pedestrian pathway. On the southern side of the boat ramp a 6.5m wide gravel beach area exists adjacent to a localised stand of mature mangroves. Further to the south, the creek bank is protected with a rock revetment.

Dunbogan Reserve is a flat expanse of grassland interspersed with large mature trees and extends along the foreshore on the northern side of the ramp and behind the ramp manoeuvring area. The area supports a range of other user groups with other facilities including a community hall (Jubilee Hall), picnic tables and BBQ equipment, playground equipment and an accessible fishing platform.

**Associated Facilities**

Vehicular access to Dunbogan ramp is achieved via a one way sealed bitumen road (The Boulevarde), which links with Camden Head Road at the exit to the facility. There are 5 car and trailer spaces provided near the community hall (Jubilee Hall) and a further 3 car and trailer spaces located opposite the ramp manoeuvring area (refer Figure 4). Approximately 18 car only parking spaces are available alongside the
foreshore reserve on the northern side of the boat ramp (refer Figure 5) and approximately 4 spaces are located within a small parking area adjacent to the community hall (Jubilee Hall).

Additional car only parking bays are provided along the accessway into Dunbogan Reserve (refer Figure 6). These include sealed and unsealed areas along the foreshore reserve and are estimated to provide capacity for around 35 to 40 vehicles. The landward side of the accessway is lined with timber log fencing to prevent parking on the cleared grass area adjacent to the road edge.
A double fish cleaning table (refer Figure 7) comprising a concrete slab supported on concrete block foundations is provided on the northern side of the ramp. Rubbish bins are located at the crest of the boat ramp and throughout Dunbogan Reserve. Telegraph pole lighting is provided at the crest of the boat ramp and throughout the parking area.

A gravel beach is provided on the southern side of the boat ramp (refer Figure 8) for boat holding and launching of passive craft.
A range of signage is provided at the ramp and comprises:

- warning signs for offshore access;
- motorised vessel and personal watercraft prohibitions at Pilot Beach;
- powerline crossing vessel height warning;
- location of an offshore Commonwealth Marine Reserve; and,
- NSW fisheries legal size and bag limits sign.

A netted swimming area is located to the north of the boat ramp next to the creek entrance. It is understood that this facility is underutilised and that Council have previously investigated dredging to increase water depths in the area but were constrained by environmental issues. Available mapping indicates that seagrass beds exist in the area and that Gogleys Creek and Gogleys Lagoon is classed as a SEPP14 Coastal Wetland.

Other infrastructure that is located at Dunbogan Reserve includes:

- timber bollards along the road shoulder of The Boulevarde to delineate the extent of parking areas;
- ‘t-shaped’ accessible fishing platform with timber handrails (recently built);
- community hall (Jubilee Hall);
- toilet block (including mens and ladies disabled toilets and a disabled car space positioned immediately adjacent to the toilet block);
- playground;
- seats along the creek foreshore;
- sheltered picnic tables;
- sheltered BBQ facilities;
- rubbish bins; and,
- flood markers.
Condition

The boat ramp surface was considered to be in good working condition. However, minor undercutting of the boat ramp slab was noted along its southern edge (Figure 9). Topping up of the gravel beach area on this side of the ramp may resolve the issue.

Figure 9: Minor undercutting of boat ramp slab at Dunbogan Reserve

The concrete slab and seawall structure supporting the fish cleaning table on the northern side of the boat ramp is in a dilapidated condition (refer Figure 10 and Figure 11). The concrete structure has cracked and settled, and evidence of reinforcement corrosion was observed. Loss of soil from behind the seawall is also evident with mass concrete infill of cavities observed in the foreshore reserve (refer Figure 10).

Figure 10: Concrete infill along foreshore adjacent to Dunbogan Reserve boat ramp
Identified Issues

Although the boat ramp is favourably positioned close to the entrance to Camden Haven River, it is understood that it is predominantly used by locals with small tinnies. It is considered that the use of the ramp is limited by the restrictive water depths along the navigation access between the ramp and the Camden Haven River.

The small number of car and trailer parking bays also limits boat ramp capacity. However, this has not been reported in complaints to Council. Notwithstanding, it may be prudent to increase parking capacity to accommodate future population increase and increase in demand generated by any upgrades/improvements to the facility. This could be achieved by extending the length of the car only spaces on the northern side of the boat ramp to allow car and trailer parking. If required, the associated reduction car only parking capacity could be compensated by creating additional spaces along the landward side of the reserve accessway, which would require removal of the existing timber log fencing.

The gravel beach on the southern side of the ramp is depleted and the edge of the ramp slab is exposed to tidal currents and wave action leading to local scour of muddy sediments and minor undercutting.

Deterioration of the seawall and concrete slab on the northern side of the ramp has resulted in an unstable structure that is a safety hazard and adversely affects visual amenity within the reserve.

According to available mapping, Zostera seagrass beds exist within Gogleys Creek in the vicinity of the boat ramp and along the navigation route to the Camden Haven River. The presence of seagrass beds and the designation of Gogleys Creek and Gogleys Lagoon as a SEPP14 Coastal Wetland are likely to represent a significant constraint to dredging in the area.

Potential Improvements

Potential improvements to the boat ramp include (not in any order of priority):

- deepening of the navigation access channel through Gogleys Creek to the Camden Haven River, although this may be problematic for environmental reasons due to the presence of seagrass
beds in the dredging footprint (refer Map 2.3) and the location of the channel within a SEPP14 Coastal Wetland (refer Map 2.1);
- provision of additional car and trailer parking spaces by expansion into foreshore reserve areas and shifting timber log fencing and relocating existing picnic tables/shelters as required;
- topping up of gravel beach on southern side of boat ramp, alternatively a floating pontoon could be installed in this area to assist with boat holding; and,
- replacement of dilapidated section of seawall on northern side of boat ramp and reinstatement of fish cleaning table.

3.2.2 Bay Street Boat Ramp

Location
Bay Street boat ramp (refer Figure 12) is located on eastern side of the Camden Haven River, south-west of Dunbogan. The boat ramp provides access to the main channel of the Camden Haven River.

![Figure 12: Aerial view of Bay Street boat ramp](image)

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited within the river from the road bridge to the entrance. A 4.5m clearance height is specified for the upstream road bridge. A no wash zone upstream from the boat ramp is indicated with prominent signage. Oyster leases are located immediately upstream of the boat ramp (refer Figure 12) and continue further upstream.

Description
The ramp is a single lane concrete ramp and is in poor condition (refer Figure 13). The ramp was previously an old car ferry access point and is comprised of a mixture of concrete blocks, metal rails and old concrete. The surface of the ramp is deteriorated and uneven due to the patchy nature of its construction. The lower portion of the ramp was muddy and slippery. The ramp was measured to be
4.75m wide and had a slope of 9.3 degrees (1V:6.1H) at the waterline, 9.7 degrees (1V:5.9H) in the middle of the ramp and 10 degrees (1V:5.7H) at the top of the ramp surface.

Figure 13: Bay Street boat ramp surfacing

A suspended concrete slab exists adjacent to the downstream side of the ramp with dimensions 3m long by 1m wide by 0.1m thick (refer Figure 14). This structure may be used as a vessel loading/unloading point. However, access to the slab is uneven and has not been formalised.

The water depth off the end of the concrete slab was measured to be 0.7m and was approximately at the toe of the concrete ramp slab. Based on local tides at the time of inspection, this depth corresponds to a bed level of -0.8m AHD or around 0.3m below level of Indian Spring Low Water (ISLW at the Laurieton tide gauge is -0.519m AHD). As such, the sealed portion of the ramp is considered to be short relative to the toe depths recommended for all tide boat launching.
The foreshore downstream of the boat ramp comprises a sandy beach area which extends for a distance of around 70m downstream (refer Figure 15). The beach backs on to an area of grassed foreshore reserve, which is retained by remnants of a deteriorated low-level timber log retaining wall. A grouted sandstone rock facing has been applied along the face of the old timber retaining wall at a slope of around 1V:2H. The retained height is around 0.6m and reduces further downstream along the beach area. The foreshore reserve area is Crown Land and has width of around 15m and runs along the water frontage of several residential properties.

Local stakeholders have advised that the ramp is primarily used by commercial netters and oyster farmers due to its upstream position for access to Watson Taylor Lake. The low usage of the facility by
recreational boaters may be due to the poor ramp condition, limited parking area and lack of ancillary facilities.

**Associated Facilities**

The ramp is located at the end of Bay Street, which is a single lane sealed road accessed off The Boulevarde along the main route into Dunbogan. A large fig tree is positioned alongside the approach to the ramp and overhanging branches provide a clearance height of around 2.6m for vessels. No formalised parking area exists at the ramp. However, the small grassed reserve and gravel areas on the road shoulder provide limited informal parking (refer Figure 16). The sandy beach area downstream of the ramp provides a favourable river access point for passive recreation activities (e.g. paddleboards and kayaks).

*Figure 16: Approach road and informal parking at Bay Street boat ramp*

Other facilities at the Bay Street boat ramp include:
- timber mooring post immediately downstream of the ramp;
- rubbish bin located at the crest of the ramp;
- telegraph pole lighting is provided for the grassed reserve in the vicinity of the Dunbogan Flowmeter Station building;
- sign indicating the location of an offshore Commonwealth Marine Reserve;
- no wash zone sign;
- no water skiing sign;
- sign indicating that a submarine cable crosses the river in the area;
- picnic table located on foreshore reserve downstream of the boat ramp; and,
- timber bollards located adjacent to the large fig tree along the road shoulder preventing vehicular access to the grassed reserve.

**Condition**

As noted above, the boat ramp surface is in poor condition with its lower portion being noted to be muddy and slippery.
Access to the concrete slab loading/unloading platform is rocky and uneven, and the structure is not considered to be suitable for safe public access.

The no wash and no water skiing signage was noted to be in a weathered and faded condition.

The sealed bitumen access road to the ramp is considered to be in a serviceable condition.

**Identified Issues**

The poor condition of the boat ramp surface is problematic for boat launching. In addition, local stakeholders have reported incidents where trailers have fallen off the end of the ramp. This indicates that the ramp may not extend far enough into the river to achieve a suitable toe depth for launching, which is also supported by site measurements. The ramp is also relatively steep in comparison to the recommended slope range of 1V:7H to 1V:9H within the *NSW Boat Ramp Facility Guidelines* (RMS, 2015), which may be problematic for launching/retrieving on the slippery ramp surface.

The concrete platform adjacent to the boat ramp is not considered to be suitable for safe public access.

There are mature mangroves and oyster leases located immediately upstream of the ramp and *Zostera seagrass* has been mapped in the vicinity of the ramp and is evident on aerial photographs (refer Figure 12).

The 2.6m clearance provided below overhanging fig tree branches on the approach to the ramp would restrict usage by larger vessels.

Parking is limited at the boat ramp and is difficult to expand due to the presence of surrounding residential properties and existence of a SEPP14 Coastal Wetland on the southern side of Bay Street.

Foreshore instability is evident along the foreshore reserve downstream of the ramp. The land immediately behind the retaining wall is soft and sinking, indicating previous loss of soil through the wall. Blue metal has been used in localised areas to fill washouts behind the wall (refer Figure 17). Grouting within the sandstone rock protection placed in front of the deteriorated timber log retaining wall may also have been applied to limit loss of soil from the foreshore reserve.
Potential Improvements

Potential improvements to the boat ramp include (not in any order of priority):

- replacement of the ramp surface, regrading to the recommended ramp slope range, and extension of the ramp to suitable water depths;
- formalisation of existing available parking areas with timber log fencing/bollards and signage;
- removal of concrete platform structure and provision of a floating pontoon for loading/unloading;
- trimming of fig tree branches (subject to Council conditions and consent); and,
- replacement of faded no wash zone and no water skiing signage.
3.2.3 Apex Park Boat Ramp

Location
The Apex Park boat ramp (refer Figure 18) is located in Laurieton and is positioned off Reid Street immediately downstream of the road bridge. The boat ramp provides access to the main channel of the Camden Haven River. The ramp is the most upstream launching point in the study area and provides the best access to Watson Taylor Lake.

![Aerial view of Apex Park boat ramp](image)

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited within the river from the road bridge to the entrance. A 4.5m clearance height is specified for the upstream road bridge.

Description
The ramp is a 7.7m wide, two lane ramp formed by flexible concrete block mattress (e.g. Flexmat). Each block is 250mm by 250mm and 50mm high and is formed so that there is a 20mm gap at the bottom and a 40mm gap at the top of the block (Figure 19). The grade of the ramp was measured to be 6.2 degrees (1V:9.2H) at the water line and 6.7 degrees (1V:8.5H) at the middle of the ramp. According to the RMS Boat Ramp Locator the ramp provides water access at all times. The toe of the ramp is expected to drop off steeply into the deep channel running along the Laurieton side of the river.

The foreshore is protected with rock on both sides of the ramp. On the upstream side of the ramp, rock protection is sparse and the underlying beach can be seen between rocks. On the downstream side of the ramp a more robust rock revetment wall (refer Figure 20) extends downstream towards the Fishermen's Co-op moorings.
Figure 19: Apex Park boat ramp surfacing

Figure 20: Rock protection along foreshore downstream of Apex Park boat ramp

** Associated Facilities **

Vehicular access to Apex Park boat ramp is provided off Reid Street, which is the main road linking with Dunbogan (via the road bridge) and leading into the Laurieton township. Parking is provided in a large sealed area behind the ramp (refer Figure 21 and Figure 22). A total of 11 car and trailer spaces and 19 car parking spaces including a single disabled parking space. This parking area caters for both users of the boat ramp and the Apex Park foreshore reserve area.

Numerous facilities exist in Apex Park, including:

- concrete fish cleaning table located adjacent to the boat ramp, with two fish cleaning boards and taps;
- light poles are located within the park area and a light pole positioned adjacent to the crest of the boat ramp;
- toilet block;
- sheltered electric BBQ facilities;
- picnic tables and shelters;
- community garden;
- Apex Park activities and use sign;
- NSW fisheries legal size and bag limits sign;
- timber bollards, log fencing and line markings to delineate parking areas;
- rubbish bins provided near the ramp and adjacent to parking areas; and,
- 375mm diameter stormwater outlet and headwall located immediately adjacent to the downstream side of the boat ramp.

Figure 21: Car and trailer parking areas behind Apex Park boat ramp
Condition
At the time of inspection the condition of the ramp was considered to be serviceable. However, several obvious defects were observed.

The downstream edge of the ramp has settled, due to a washout of foundation material from beneath the ramp. This movement has caused a larger gap of up to 100mm to form between blocks in the mattress (refer Figure 23). Furthermore, the blocks on the downstream edge of the ramp were loose. On the upstream edge of the ramp a geotextile fabric has been exposed (refer Figure 24).
Evidence of past potholing repairs exists at the crest of the boat ramp and the manoeuvring area surface is in a deteriorated condition (refer Figure 25).
Figure 25: Potholing repairs and deteriorated surfacing at the crest of Apex Park boat ramp

The headwall of the stormwater outlet immediately adjacent to the downstream side of the ramp has cracked and has signs of spalling and reinforcement corrosion (Figure 26).

Figure 26: Damage to 375mm diameter outlet headwall at Apex Park boat ramp

**Identified Issues**

The surfacing of the boat ramp is in poor condition due to edge scour and settlement of the concrete block mattress.
At the time of inspection an ebb current of approximately 0.8m/s (1.6 knots) was observed at a distance of around 10m out from the boat ramp. This is consistent with anecdotal reports from local stakeholders who have advised that strong tidal currents exist in the area. The ramp is also exposed to significant wind fetches to the north-east and south to south-east. The foreshore adjacent to the ramp comprises a surface of loose oyster encrusted rocks and is unfavourable for beaching of vessels. As such, it is expected that boat holding during launching and retrieval operations would be difficult under adverse combinations of wind and tidal current conditions.

The stormwater outlet is damaged and its position immediately adjacent to the boat ramp is likely to have contributed to local scouring and undermining of the concrete block mattress.

Available mapping indicates that a bed of Zostera seagrass exists immediately adjacent to the ramp. However, this would need to be verified as the relatively deep channel and strong tidal velocities existing at the location would generally be unfavourable conditions for seagrass growth.

The two lane boat ramp facility has only 11 car and trailer spaces and has the capacity to service a larger parking area. However, expansion of the parking area further into the reserve may be limited by the presence of a number of mature trees located within the reserve (refer Figure 22). This would need to be assessed by Council's Arborist in relation to the current tree population health and applicable Tree Protection Zones, and may also include consideration of tree removal and environmental offset requirements. Alternatively, additional car and trailer parking could be formalised within the area of Council-managed Crown Reserve on the other side of Reid Street directly opposite the entry to Apex Park.

Potential Improvements
Potential improvements to the boat ramp include (not in any order of priority):
- replacement of the ramp surface with possible extension of the ramp as a suspended slab on piles to accommodate the expected drop off into deep water;
- topping up of rock protection on adjacent shoreline areas;
- replacement and relocation of existing stormwater outlet;
- installation of an on-ramp pontoon to assist with boat holding;
- repairs to the deteriorated manoeuvring area surfacing; and,
- expansion of existing parking area into the reserve and reconfiguration to provide additional car and trailer spaces, or development of a new parking area within the Crown Reserve area opposite Apex Park.
3.2.4 Public Wharf (Mill Street) / Laurieton Fish Co-Op Wharf

Location
The public wharf on Mill Street (refer Figure 27) is located in Laurieton and is positioned along the main channel of the Camden Haven River, around 250m downstream of the Diamond Head Road Bridge.

![Figure 27: Aerial view of Mill Street Public Wharf](image)

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited within the river from the road bridge to the entrance. In addition, signage on the wharf indicates that a no wash zone exists upstream and downstream of the wharf. The waterway in the vicinity of the wharf is a priority oyster harvest area.

Description
The existing structure comprises a timber jetty that includes multi-tiered platforms and ‘T-head’ wharf for vessel berthing. The structure is supported by timber piles that are encased in concrete (expected to be the result of previous remedial works). The piles support the timber girders and cross beams which in turn provide support to timber decking planks (refer to Figure 28 and Figure 32). The width of the main jetty and wharf platform is generally 2.5m with an extended section to the south providing a further 2.5m width at the foreshore landing area. The jetty extends approximately 15m out from the foreshore and the wharf face runs parallel to the river channel over a length of approximately 30m.

Along the northern face of the jetty a timber ramp extends to below water level and is supported on piles (refer Figure 28). On either side of this ramp a small square timber platform exists. A steel handrail extends across the face of the timber ramp preventing access from the main jetty platform. This structure appears to have been a skid for small craft launching (e.g. dinghies, kayaks, canoes) but is no longer used.
Figure 28: Northern face of Mill Street Public Wharf

The eastern face of the wharf provides a location for temporary boat mooring. Signage indicates that the wharf face is to be used for the purpose of loading/unloading only for a maximum of 1 hour with vessels to be attended at all times. At the southern end of the wharf is a sewage pump-out facility, with vessels given priority to use this facility on the wharf face (refer Figure 29).

Figure 29: Sewage pump-out facility at Mill Street Public Wharf

Tubular steel hand rails exist along each side of the main jetty deck and along the landward side of the wharf with the wharf face left clear for vessel loading/unloading. A timber edge plank also extends along both edges of the wharf deck. A series of low level timber mooring posts are provided along the wharf face to allow vessels to tie up (refer Figure 30). Vertical timber fenders are attached at intervals along the wharf face (refer Figure 30).
The level of the main wharf deck is designed for larger vessels such as sailing boats and large cruisers with sufficient freeboard. During site inspections a large yacht was tied up at the wharf, which may be indicative of the size of vessels using the facility (refer Figure 31).

On the southern face of the jetty, a small timber ramp provides access to a lower deck closer to water level (refer Figure 32). This lower platform facilitates berthing of smaller vessels (e.g. tinnies and runabouts) with ramped access from the main deck improving ease of use for less able-bodied persons.
Vehicular access to the wharf is provided by Mill Street, which is a turn off Bold Street (the main street through Laurieton). Mill Street runs perpendicular to the shoreline and ends in a cul-de-sac. The cul-de-sac is wide enough to allow roadside parking in unmarked areas (refer Figure 33).

Pedestrian access is provided from the shared cycling/pedestrian footpath along the Laurieton foreshore. The shared footpath enters the cul-de-sac area from the northern side (refer Figure 34). A separate footpath continues to the south from the wharf foreshore landing point to the Laurieton Fishermen’s Co-op (refer Figure 35).
Figure 34: Shared footpath along Laurieton foreshore

Figure 35: Foreshore reserve area at Mill Street Public Wharf

Lighting at the wharf is provided above the sewage pump-out facility for vessels on the wharf (refer Figure 36). Street lighting is provided by telegraph poles running along the southern side of Mill Street.
The Laurieton Fishermen’s Co-op is located to the south of the wharf which operates a slipway and provides vessel refuelling facilities. Piled mooring pens are provided along the foreshore adjacent to the Fishermen’s Co-op and accommodate approximately 20 vessels.

Other infrastructure along the foreshore includes:

- no wash zone sign;
- sewage pump-out facility signage;
- sign indicating the area is a priority oyster harvest area;
- rubbish bin located at the entry to the wharf;
- picnic table located on the foreshore reserve to the north of the wharf;
- sheltered picnic table located on the foreshore reserve behind the wharf; and,
- three (3) stormwater pipes discharge through the rock lined embankment immediately north of the wharf (a 600mm diameter pipe and two 375mm diameter pipes) (refer Figure 37 and Figure 38).
**Condition**

At the time of inspection the overall condition of the wharf was noted to be poor. In particular, the timber decking over the lower platforms on the northern side of the jetty has bowed and is in very poor condition. Several timber planks are missing at the lower end of the ramp structure and the supporting joists have rotted below the water line. However, public access to this area is prevented with handrails extending across main jetty deck above (refer Figure 39).
The timber decking on the main wharf area is weathered in parts with general deterioration observed, including warping of decking planks. A number of timber joists were observed to be severely weathered and in need of replacement. A concrete pile supporting the northern side of the jetty foreshore landing deck was observed to be displaced (refer Figure 37), possibly due to adjacent foreshore instability.

**Identified Issues**

Due to the wharf being a fixed structure, access to the main wharf deck would be subject to tides, particularly for smaller vessels with low freeboard. However, a lower access platform had been provided along the southern side of the jetty for smaller vessels.

The wharf location is exposed to significant fetches along dominant wind directions, including a 1.2km fetch from the south to south-east and a 1km fetch from the north-east. Furthermore, the Camden Haven River narrows at Laurieton producing high tidal velocities, which has been observed during site inspections and reported anecdotally. As such, both wind waves and tidal velocities experienced at the wharf may adversely affect access and mooring during unfavourable conditions. It is expected that these environmental conditions also contribute to the foreshore instability observed in the area (discussed below).

Limited parking exists at the wharf with the majority of parking being along the unmarked roadside of Mill Street. Public and commercial usage for river cruises may be limited at times by the lack of formalised parking in the immediate vicinity of the wharf.

There is substantial oyster growth on all piles and the adjacent rock lined foreshore. This growth could be problematic for vessels mooring against the structure and may cause hull damage, particularly for smaller vessels.

Warped and bowed decking planks on the wharf have the potential to become trip hazards in accessible areas.
The vertical timber fendering along the berthing face (refer Figure 40) was observed to be detaching from the wharf at one location. It is recommended that the detached fendering is reinstated and other fenders are checked to ensure they are secured.

Figure 40: Detached timber fendering along berth face at Mill Street Public Wharf

Some of the timber mooring posts along the wharf face are loose. All mooring posts should be checked and reinstated or replaced with new posts as required.

Erosion and foreshore instability is a concern in the area immediately to the north of the wharf. The upper bank is exposed to 1m below the crest (refer Figure 37 and Figure 38) above a layer of ad hoc rock protection. The rock size in this area varies between 200mm and 600mm with the median diameter being around 350mm. Mass concrete infill also appears to have been applied to address bank instability adjacent to the 600mm diameter stormwater outlet (refer Figure 37). The rock protection applied along the foreshore reserve frontage further to the north is of a larger size and extends to the crest of the bank (refer Figure 41).
Figure 41: Rock protection to the north of Mill Street Public Wharf

Potential Improvements

Potential improvements to the wharf include (not in any order of priority):

- formalised parking spaces within Mill Street;
- repair of deteriorated timber decking and rotted joists on northern side of jetty (if public access is made available by removal of handrail);
- replacement of deteriorated joists supporting main jetty/wharf deck;
- replacement of the displaced concrete pile supporting the northern side of the jetty foreshore landing deck;
- monitoring of warped planks over main deck of jetty/wharf and consider future replacement if further deterioration creates trip hazards;
- reinstate detached timber fendering along berth face and check the connections of other fenders;
- reinstatement/replacement of loose timber mooring posts along the wharf face;
- remove oyster growth located in areas that may cause damage to vessels;
- extend rock protection to the full height of the bank along the northern foreshore;
- extend shared footpath (currently terminates at Mill Street cul de sac) along foreshore reserve to link with footpath to Fishermen’s Co-op;
- provide pontoon berthing facility for smaller vessels; and,
- detailed inspection of jetty and wharf piles and timber structural elements, and replacement/repair as required.
3.2.5 Laurie Street Boat Ramp and Wharf

Location
Laurie Street boat ramp and wharf (refer Figure 42) is located at the end of Laurie Street in Laurieton and is accessed by turning off Bold Street (the main road through Laurieton). The ramp provides access to the main channel of the Camden Haven River.

Figure 42: Aerial view of Laurie Street boat ramp and wharf

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited in the area. Due to the submarine cable crossing in the area, no anchoring is permitted.

Description
The Laurie Street ramp is located at the site of an old vehicle ferry crossing, which ran to the Bay Street boat ramp on the opposite side of the river. The existing structure comprises a single lane concrete ramp that measures 3.84m wide. The upper portion of the ramp is formed by a grooved concrete slab whilst the lower section of the ramp comprises precast concrete planks (refer Figure 43). The precast concrete planks span across the width of the ramp and are 340mm wide by 120mm high with 80mm gaps. Each plank is linked with bolted steel connections and founded on 20-30mm sized gravel. The slope of the ramp was measured at 7.3 degrees (1V:7.8H) at the waterline, 7.6 degrees (1V:7.5H) in the middle of the precast plank section, 9 degrees (1V:6.3H) at the top of the precast plank section, and 6.8 degrees (1V:8.4H) at the base of the concrete slab section.

A 5m wide gravel beach has been established on the upstream side of the boat ramp (refer Figure 44). Immediately downstream of the boat ramp rock protection has been placed along the shoreline to address bank erosion problems.
A timber wharf is located on the downstream side of the boat ramp and is connected to the foreshore with a concrete abutment. The wharf is in reasonable condition and comprises a timber deck with a wharf face formed by three (3) timber berthing piles (wrapped with rubber sheeting) and a metal safety ladder (refer Figure 45). Mass concrete repairs were evident around the concrete abutment. The water depth off the end of the wharf was measured to be 1.2m. Based on local tides at the time of inspection, this depth corresponds to a bed level of -1.4m AHD or around 0.9m below level of Indian Spring Low Water (ISLW at the Laurieton tide gauge is -0.519m AHD).

Figure 43: Laurie Street boat ramp surface

Figure 44: Gravel beach on upstream side of Laurie Street boat ramp
Associated Facilities

Vehicular access to the ramp is provided via Laurie Street, which is a two way sealed bitumen road. A wide turning circle (approximately 25m diameter) with a grassed centre is provided at the end of Laurie Street (refer Figure 47). No formalised parking is provided at the boat ramp. However, car only parking is available outside the swimming centre located 50m to the west of the ramp. Boat ramp users are able to park their trailers along the road shoulders and along the edge of the large grass reserve to the south of the ramp (Council managed Crown Land).
A shared cycling/pedestrian footpath runs along the foreshore reserve (Council managed Crown Land) downstream of the boat ramp and terminates at the Laurie Street turning circle. The shared footpath recommences on the other side of the turning circle and runs through the southern reserve area.

**Figure 47: Turning circle at the end of Laurie Street**

Other facilities in the area include:

- fish cleaning table with a single tap located beneath the mangroves on the upstream side of the boat ramp (refer Figure 44), which is old and weathered but still in serviceable condition;
- rubbish bin is located at the crest of the ramp;
- lighting is provided by telegraph poles along the street and directly over the boat ramp;
- water conservation signage at the crest of the ramp providing guidance for use of water supply at the fish cleaning table;
- sign indicating the location of an offshore Commonwealth Marine Reserve;
- NSW fisheries legal size and bag limit sign;
- sign indicating that a submarine cable crosses the river in the area;
- powerline crossing vessel height warning signage; and,
- timber posts installed across the foreshore to prevent vehicular access to the wharf deck.

**Condition**

The upper cast in situ portion of the ramp is in reasonable condition. However, the steel connections between the precast concrete panels in the lower portion of the ramp have corroded. Furthermore, the precast panels have spalled along the alignment of the steel connections, as is shown on **Figure 48**.

The condition of the structural timber members, decking planks and berthing piles at the adjacent wharf is fair. The fendering along the berth face, provided by timber piles wrapped with rubber sheeting, was in serviceable condition. However, previous deterioration at the shore landing point is evident from recent
mass concrete repairs to the abutment. This is likely to have been related to the bank instability observed along the adjacent shoreline (discussed further below).

Figure 48: Spalling of precast concrete panels at Laurie Street boat ramp

Identified Issues

Discussions with community stakeholders indicated that the end of the ramp has a relatively steep drop off into deep water. This was said to be an issue for larger boats as there is a risk that trailers may be reversed off the end of the ramp. It was also noted that the ramp is sited within the fastest flowing section of the river, which runs against the bank and maintains deep water depths on the Laurieton side. In addition to strong currents, the ramp is exposed to significant wind fetches from the south and north-east. As such, wind waves generated from these directions would create difficult conditions for single person launch and retrieval. Stakeholder discussions have indicated that this boat ramp has low usage relative to other ramps in the area. This is possibly due to the above issues.

Oyster growth on the sides of the ramp and in between the precast concrete planks in the lower portion of the ramp (refer Figure 49) is a safety concern, particularly for ramp users that are handling their boats without footwear.
There is also substantial oyster growth on all of the wharf piles and the wharf access ladder (refer Figure 50). This growth could be problematic for vessels mooring against the structure and may cause hull damage, particularly for smaller vessels. The oysters on the access ladder would be a safety hazard for people using it.

The ramp is not supported by a formalised trailer parking area and has limited roadside parking.

Shoreline instability is an issue along the adjacent area where bank erosion is evident (refer Figure 51). On the downstream side of the ramp a 0.5m high erosion scarp exists behind ad hoc rock protection provided by sandstone rocks and concrete rubble of variable size.
Figure 51: Foreshore erosion adjacent to Laurie Street boat ramp

Potential Improvements
Potential improvements to the boat ramp include (not in any order of priority):

- replacement of deteriorated precast concrete plank ramp section with new concrete planks with stainless steel connections;
- provision of rock protection at the ramp toe to limit scour and the height/steepness of the ramp drop off;
- remove oyster growth from ramp surface, wharf piles and wharf access ladder;
- replacement of lower ramp section with suspended slab on piles to service larger boats (an alternative to precast concrete planks);
- formalisation of trailer parking areas along the southern grassed reserve area;
- provision of engineered rock protection along adjacent shoreline areas;
- sealing (oiling or painting) of the timber wharf decking and edging and replacement of deteriorated members as required to prolong its life; and,
- installation of an on-ramp pontoon to assist with boat holding.
3.2.6 Laurieton United Servicemen’s Club Marina Reserve / Seymour Street Wharf

Location
The Laurieton United Servicemen’s Club (LUSC) Marina Reserve (refer Figure 52) is located off the car park of the Club and is accessed via Seymour Street. The facility comprises a boat ramp, fixed jetty and wharf, and gangway and floating pontoon. The boat ramp provides access to the main channel of the Camden Haven River.

![Figure 52: Aerial view of Laurieton United Servicemen’s Club Marina Reserve](image)

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited in the area.

Description
The boat ramp is a two lane grooved concrete ramp that is 8m wide (refer Figure 53). The ramp slope was measured at 6.5 degrees (1V:8.8H) at the waterline, 6.8 degrees (1V:8.4H) mid ramp and 6.5 degrees (1V:8.8H) at the top of the ramp. On the downstream side of the boat ramp, a timber log and pile retaining wall separates a narrow flat muddy beach from the grassed reserve above. Mangrove communities exist upstream and downstream of the ramp in shallow intertidal areas.
The LUSC fixed jetty and wharf (refer Figure 54) is located on the downstream side of the boat ramp. The wharf is accessed from a timber jetty structure that extends approximately 20m out from the shoreline and has timber handrails along both sides of the timber decked walkway. The wharf comprises a fixed timber structure that provides a 30m long berthing area on the downstream side of the jetty. Signage indicates that the maximum duration for mooring at the wharf is 5 days and it is generally used by larger vessels, including sailing boats.

An aluminium gangway leads to a floating pontoon restrained by two piles on the upstream side of the jetty (refer Figure 55). The provision of a floating pontoon allows for smaller vessels to utilise the wharf and associated facilities. Water depths measured alongside the upstream side of the pontoon comprised 1m at its landward end, 1.6m in the middle of the pontoon, and 2.2m at its offshore end. Based on local tides at the time of inspection, these depths correspond to bed levels of -1.2m AHD, -1.7m AHD and -2.4m AHD respectively or around 0.7m, 1.2 and 1.9m below Indian Spring Low Water (ISLW at the Laurieton tide gauge is -0.519m AHD).

The facilities are licensed to LUSC by Crown Lands and LUSC undertakes maintenance on the facilities, which are available for public use.
Figure 54: LUSC fixed jetty and wharf

Figure 55: LUSC gangway and pontoon

**Associated Facilities**

A sealed, single lane access road located off Seymour Street provides vehicular access to a large formalised parking area. There are approximately 17 car and trailer parking spots with grassed areas.
provided for trailer parking (Figure 56). Additional car parking is available in the LUSIC parking facility off Seymour Street.

The shared footpath continues from the south (from Laurie Street boat ramp) and provides formalised pedestrian access via a footbridge over the creek upstream of the boat ramp. This leads to a concrete footpath through grassed reserve at the rear of the trailer parking facility.

![Image of parking area at LUSIC Marine Reserve]

*Figure 56: Car and trailer parking area at LUSIC Marine Reserve*

Other facilities provided in the area include:
- light pole located between the jetty and the boat ramp;
- sheltered concrete fish cleaning table with 3 taps;
- sheltered picnic tables;
- 2 rubbish bins behind the fish cleaning table;
- timber posts linked with rope are used to delineate vehicle parking and access areas;
- toilet and shower facilities are provided at the LUSIC building;
- car and trailer parking only signage provided throughout the parking area;
- NSW fisheries legal size and bag limits sign;
- sign indicating the conditions of use for the wharf; and,
- sign indicating navigation restrictions associated with the Stingray Creek Bridge Replacement Project.

**Condition**

The boat ramp was considered to be in good condition. The jetty/wharf structure was in fair condition apart from several rotting timber decking planks. The timber decking and edging on the floating pontoon was showing signs of age (refer Figure 57) but was considered to be in serviceable condition.
Figure 57: Timber deck and edging on LUSC pontoon

Identified Issues
The landward position of the boat ramp relative to the shoreline provides sheltering from strong currents within the river. The adjacent pontoon and wharf structures would also help to reduce the effects of wind and waves acting on the ramp area. The adjacent beach area and floating pontoon may be used for boat holding. Discussions with community stakeholders indicated that the LUSC boat is popular due to its wide range of facilities, accessibility and usability.

The main issue at the facility is the poor condition of the retaining wall along the foreshore reserve (refer Figure 58). The timber log retaining wall is dilapidated, and deterioration of timber logs has resulted in exposure of the bank material and washout leaving voids behind the wall (refer Figure 59). The pressure of Casuarina tree roots has also contributed to instability of the retaining wall adjacent to the boat ramp (refer Figure 60). Similar deterioration of the retaining wall was also observed along the creek immediately upstream of the boat ramp (refer Figure 61).
Figure 58: Timber log retaining wall on downstream side of LUSC boat ramp

Figure 59: Washout of foreshore material from behind retaining wall at LUSC Marine Reserve
Figure 60: Casuarina tree roots behind retaining wall at LUSC Marine Reserve

Figure 61: Retaining wall along small creek upstream of LUSC boat ramp
Potential Improvements
Potential improvements to LUSC facility include (not in any order of priority):
- repair/replacement of the dilapidated foreshore retaining wall along grassed reserve and creek areas;
- repair/replacement of rotting timber decking planks on the jetty/wharf; and,
- sealing (oiling or painting) of timber decking and edging on floating pontoon and replacement of deteriorated members as required to prolong its life.

3.2.7 Marine Rescue Boat Ramp and Wharf, Laurieton / Tunis Street Boat Ramp and Wharf

Location
The Marine Rescue boat ramp is located in Laurieton on the corner of Tunis Street and Short Street and is positioned adjacent to the Camden Haven Marine Rescue base (refer Figure 62). The boat ramp provides access to the main channel of the Camden Haven River and also provides ready access to the Stingray Creek entrance, which is located 200m downstream.

Figure 62: Aerial view of Marine Rescue boat ramp and wharf

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited in the area. A no wash zone is marked at Camden Point (200m downstream of the boat ramp) to protect the oyster leases existing on the North Haven side of the river. Lit port and starboard buoys mark the deep river channel, which narrows downstream of the boat ramp and meanders through shallow shoaled areas to the river training walls. A caution is provided for the submerged rock wall that exists in the nearshore area downstream of the ramp near Camden Point. The rock wall hazard is indicated by a cardinal mark.

Description
The existing ramp comprises a single lane 3.65m wide concrete ramp with measured slopes of 5.6 degrees (1V:10.2H) at the waterline and 7.2 degrees (1V:7.9H) at the top of the ramp. A veneer of sand was observed to have covered the ramp (refer Figure 63), and was possibly derived from the narrow sandy beach in front of the Marine Rescue building.
The water depth at the toe of the sealed concrete ramp slab was measured to be 0.3m. Based on local tides at the time of inspection, this depth corresponds to a bed level of -0.5m AHD or around the level of Indian Spring Low Water (ISLW at the Laurieton tide gauge is -0.519m AHD).

The Marine Rescue building exists immediately upstream of the boat ramp and is supported by a private jetty/wharf structure and slipway. The foundations of the Marine Rescue are protected with a sandstone and mass concrete revetment wall.

A public wharf exists downstream of the boat ramp and comprises a timber jetty with a wharf face provided by berthing piles extending over a 20m length (refer Figure 64). Two mooring cleats and a metal access ladder are provided at the end of the jetty. The jetty structure is supported by timber piles that have rubber sheeting attached to their outside face. Signage indicates that there is a maximum stay of one hour allowed on the wharf for the purpose of loading/unloading.

Figure 63: Marine Rescue boat ramp at Laurieton
Figure 64: Public wharf at Marine Rescue boat ramp

**Associated Facilities**

The boat ramp can be accessed via either Short Street or Tunis Street. The approach to the ramp manoeuvring area (refer Figure 65) comprises a wide unsealed accessway that leads to the shore landing point of the public jetty and continues to the head of the boat ramp. The unsealed accessway runs past the boat ramp to form a turning circle that returns to the corner of Short Street and Tunis Street.

A pedestrian footpath extends through the reserve on either side of the ramp manoeuvring area providing pedestrians with access along the Laurieton foreshore. No formalised trailer parking is provided at the ramp. As a result the grassed reserve along the foreshore adjacent to the ramp is used as an informal parking area along with the grassed centre of the turning circle. A low-level timber log barrier fence has been installed to prevent parking within Bruce Porter Reserve (refer Figure 65), which is used every month as the site for the Laurieton Riverwalk Markets.
Other facilities provided in the area include:
- picnic and bench seating is provided in Bruce Porter Reserve and a sheltered picnic table on the foreshore adjacent to the boat ramp;
- accessible public amenities are provided 100m from the jetty in Short Street;
- 2 rubbish bins are located at the entrance to the jetty;
- signage indicating allowable length of stay at the jetty;
- powerline crossing vessel height warning signage; and,
- lighting is provided on the power pole at the corner of Short Street and Tunis Street.

Condition
Inspection of the ramp surface was not possible due to sand deposition. The ramp was reported to be cracking up by Marine Rescue personnel, who also noted that the sand deposit was transient. This assessment was supported by Council staff who advised that the ramp was in poor condition. Other community stakeholders noted that the ramp is avoided by large boats as it drops off into deep water. Marine Rescue advised that the ramp is able to take boats of up to 5m to 6m.

The public wharf was generally considered to be in poor condition (refer Figure 66). The timber piles supporting the structure and the wharf access ladder were covered in substantial oyster growth. A number of piles had rubber sheeting attached to their outside face to provide fendering, however some piles along the berth face did not have rubber sheeting. Cross members at the head of the jetty were rotted through and no longer providing lateral support. The timber hand rails and jetty deck were considered to be in serviceable condition.
Identified Issues

As noted above, there are several issues that have been identified with the existing boat ramp. These include cracking of the ramp surface and the short length of the ramp and drop off into deep water being unsuitable for launching of larger vessels.

The alignment of the foreshore footpath through the boat ramp manoeuvring area is considered to be a public safety issue. The current situation could be improved by formalising the manoeuvring area with sealed surfacing, line marking and appropriate signage. The formalisation of car and trailer parking areas would also assist in managing interactions between vehicles and pedestrians.

Shoreline instability was observed along the area immediately downstream of the ramp to the public jetty (refer Figure 67). The shoreline had receded markedly behind existing rock protection resulting in loss of foreshore reserve area. Due to the low crest height of the existing rock protection, shoreline erosion may have occurred at high tide in conjunction with boat wake or wind wave action.
Figure 67: Bank erosion downstream of Marine Rescue boat ramp

Potential Improvements

Potential improvements to the facility include (not in any order of priority):

- replace rotting cross members at the head of the jetty;
- remove oyster growth from wharf piles and wharf access ladder;
- install rubber sheeting where missing on berth face piles;
- replacement of boat ramp surface with possible extension of the ramp as a suspended slab on piles to service larger boats;
- formalisation of the boat ramp approach and manoeuvring area with a sealed accessway, including line marking and signage;
- installation of engineered rock protection along downstream shoreline area;
- possible realignment of the foreshore pedestrian footpath and installation of line marking and signage to manage interactions between vehicles and pedestrians;
- formalisation car and trailer parking, with utilisation of the reserve area along the southern side of Tunis Street; and,
- installation of an on-ramp pontoon to assist with boat holding.
3.2.8 Stingray Creek Bridge Boat Ramp, North Haven

Location
The Stingray Creek Bridge boat ramp (refer Figure 68) is located immediately downstream of the Ocean Drive road bridge and is on the corner of Ocean Drive and River Street in North Haven. The ramp provides access into the lower reaches of Stingray Creek, which provides navigable access to the Camden Haven River. The facility is located on Crown Reserve and is an asset managed by Crown Lands.

![Figure 68: Aerial view of Stingray Creek Bridge boat ramp](image)

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited within Stingray Creek. A no wash zone has also been applied in the creek to limit bank erosion and damage to oyster leases. The deep water channel through Stingray Creek is marked by port and starboard pipe beacons and lit buoys. The channel extends around the southern mangrove island to the west before joining the Camden Haven River. Oyster leases exist on the opposite side of the creek to the west and north west of the boat ramp.

At the time of the inspections, the Stingray Creek Bridge was undergoing replacement work with the new bridge reported to have a similar clearance height to the existing bridge (3.6m). A number of temporary navigation restrictions are in place around the bridge construction site. These include a 4 knot zone and no anchoring zone in the vicinity of the works area. It is understood that RMS intend to maintain the 4 knot zone as a permanent navigation restriction following completion of the works (scheduled March/April 2017).
Description
The Stingray Creek boat ramp is a single lane, approximately 4m wide, grooved concrete ramp with a 2m wide unsealed edge and a 0.5m wide concrete dish drain on the downstream side of the ramp (refer Figure 69). The ramp extends below the waterline with precast concrete planks.

The adjacent foreshore reserve on both sides of the ramp is retained by a timber log walls to approximately 0.8m in height. On the downstream side of the ramp, the creek bank is protected by a rock revetment wall formed from conglomerate rock up to 600mm in diameter. On the upstream side of the ramp ad hoc bank protection is provided by a combination of rocks and concrete rubble (refer Figure 70).

At the time of inspection the boat ramp and adjacent parking was occupied by the contractors as a working area and site offices established for the bridge replacement works. This prevented direct access to the ramp.

Figure 69: View of Stingray Creek Bridge boat ramp looking downstream
Associated Facilities

Vehicular access to the site is provided by turning into River Street off Ocean Drive, with the ramp being located immediately adjacent to the bridge. Four designated car and trailer parking spaces are marked along River Street between the ramp and the toilet block. Further along River Street, 9 car spaces are provided, which locals use as trailer parking by reversing the trailer over the flat low-level kerb onto the grassed foreshore reserve. Further along River Street, parking of trailers on the foreshore reserve is not possible due to inadequate width. It is estimated that 11 additional car parking spaces are available along the remainder of the street. River Street ends in a cul de sac with a relatively tight turning circle.

No formalised pedestrian pathway exists along River Street.

Other facilities that are located in the vicinity of the boat ramp include:
- small toilet block located on the grass foreshore reserve downstream of the ramp;
- telegraph pole lighting over the crest of the ramp toilet block;
- concrete fish cleaning table with 3 taps is located adjacent to the toilet block;
- rubbish bin provided near the fish cleaning table;
- bench seats and picnic tables provided along the foreshore reserve;
- NSW fisheries legal size and bag limits sign; and,
- powerline crossing vessel height warning signage.

Condition

Although the construction site restricted direct access to the ramp, the boat ramp was observed remotely from the bridge and considered to be in a serviceable condition.
 Identified Issues

It was noted at the time of inspection and in discussions with community stakeholders that the ramp is subject to relatively high current velocities. Tidal currents were observed to be around 1m/s during inspection and were evidenced by tilting of navigation buoys against the ebb tide (refer Figure 71). The rock protection along the adjacent shoreline areas also indicates that the creek runs hard against the outside bend. As such, two-person launching is required in the absence of boat holding structures.

Figure 71: Tilting of navigation buoys against tidal currents at Stingray Creek boat ramp

Car and trailer parking is limited at the ramp. However, expansion is difficult due to the presence of residences on the eastern side of River Street and the narrow width of the foreshore reserve.

Potential Improvements

Potential improvements to the facility include (not in any order of priority):

- installation of an on-ramp pontoon to assist with boat holding. However, such an improvement would attract additional usage of the facility and need to be supported with additional car and trailer parking, which may not be feasible in this space constrained site with very limited existing parking; and,
- provision of engineered rock protection to replace ad hoc protection on the upstream side of the ramp.
3.2.9 North Haven Boat Ramp

Location
North Haven boat ramp (refer Figure 72) is located off the Ocean Drive, which is the main road through North Haven. The ramp provides boat access to the furthest downstream point along the Camden Haven River of all ramps in the region. As such, it is popular for vessels intending to travel offshore with the trained river entrance located approximately 2km downstream from the ramp. Community stakeholders have advised that boat owners travel from Port Macquarie to use the North Haven boat ramp for offshore access due to more favourable conditions provided at the Camden Haven River entrance bar.

![Figure 72: Aerial view of North Haven boat ramp](image)

The RMS Boating Map for the Camden Haven area indicates that lit starboard and port buoys mark the main river channel and that water skiing is prohibited in the area. In addition, signage at the boat ramp indicates that a no wash zone applies upstream and downstream of the ramp. The aerial photo provided on Figure 72 indicates that ramp toe is positioned on a shallow shoaled area with seagrass beds surrounding the ramp approach.

A channel is located to the east of the ramp behind the rock mound structure. This provides access to moorings along the shoreline opposite Club North Haven (formerly North Haven Bowling & Recreation Club).

Description
The North Haven boat ramp was upgraded 2 years ago and comprises a 2 lane grooved concrete ramp with a central on-ramp pontoon (refer Figure 73). Lane widths on either side of the pontoon are 4.4m to 4.5m and the ramp slope was measured during inspection at 6 degrees (1V:9.5H) in the upper portion of the precast planks, 5.9 to 5.5 degrees (1V:9.7H to 1V:10.4H) over the bottom and central cast in situ slab sections, and 4 degrees (1V:14.3H) at the top of the ramp slab. The ramp transitions into 1m by 0.2m precast concrete planks in its lower portion.
The water depths at toe of the ramp on the downstream and upstream side of the pontoon where measured at 1.3m and 1.2m respectively. Based on local tides at the time of inspection, these depths correspond to bed levels of -1.6m AHD to -1.5m AHD or around 0.8m to 0.9m below Indian Spring Low Water (ISLW at the North Haven tide gauge is -0.735m AHD). Water depths adjacent to the end of the pontoon were measured at 0.9m to 1.0m, which corresponds to bed levels of -1.2m AHD to -1.3m AHD or around 0.4m to 0.5m below ISLW. As such, it is considered that the deeper ramp toe depths are likely to represent a localised scour hole and water depths are relatively shallow in the ramp approach area.

The edges of the boat ramp were lined with a basalt rock wall at a 1V:3H or flatter slope with rock sizes ranging between 0.1m 0.35m in diameter. This basalt rock protection also extended over adjacent bank areas. Larger 0.5m diameter sandstone rock protection was placed further along the adjacent foreshore on either side of the ramp (refer Figure 74).

A ramped concrete abutment facilitates pedestrian access on to the 1.9m wide (1.8m clear inside edge beams and mooring cleats) on-ramp pontoon and provides an all ability access point. The pontoon is constructed from 530mm high HDPE floats with 50mm thick plastic decking. The pontoon has a 0.5m freeboard and is restrained by three piles. Two flexible plastic posts with reflective tape (refer Figure 73) are provided at the top of the concrete abutment to guide reversing trailers.
Figure 74: Bank protection at North Haven boat ramp

**Associated Facilities**

Vehicular access to the ramp is provided off Ocean Drive through a large parking area. This parking area provides both car only and trailer parking and caters for multiple user groups due to its close proximity to the boat ramp, foreshore reserve, netted swimming enclosure and businesses along Ocean Drive. The parking area has a total of 26 car and trailer spaces and 12 car only spaces (refer Figure 75). Two car and trailer spaces close to the carpark entrance have recently been designated as rigging bays (refer Figure 76) as part of recent improvements implemented by RMS, which also included re-marking of parking spaces.
Pedestrian access is facilitated along the foreshore by a 2.1m wide footpath (refer Figure 76) that crosses over the boat ramp manoeuvring area from the upstream side and continues along the foreshore of North Haven to the river training wall.
Other facilities that are located in the vicinity of the boat ramp include:

- concrete fish cleaning table (3.9m by 1.2m) with 3 taps, located on the upstream side of the ramp (refer Figure 77);
- toilet facilities located at the netted swimming enclosure further upstream from the ramp area;
- netted swimming enclosure;
- telegraph pole lighting provided at the crest of the boat ramp;
- rubbish bins located at the ramp and around the adjacent reserve area;
- NSW fisheries legal size and bag limits sign;
- boating safety information signs;
- sign indicating the location of an offshore Commonwealth Marine Reserve;
- no water skiing and no wake zone sign;
- vessel and PWCs prohibited within buoyed area of Pilot Beach sign; and,
- bar entry warning sign;
- sandy beach areas adjacent to the ramp are available for launching of non-powered craft (e.g. paddle boards, canoes and kayaks); and,
- picnic tables and bench seats along the foreshore reserve.

**Condition**

The ramp and on-ramp pontoon were in good condition having been recently upgraded.

**Identified Issues**

A common issue raised in discussions with community stakeholder was the limited water depth at the ramp. This has been caused by the build-up of sand shoals along the shoreline in the vicinity of the ramp and is thought to be related to the construction of the downstream rock mound around 40 years ago. This ramp is used by larger boats seeking to travel offshore. However, shallow water depths along the approach to the ramp and at the ramp toe result in larger vessels hitting bottom. This is shown on the aerial photo (refer Figure 72) where lines have been cut through the Zostera seagrass beds in the vicinity of the ramp.
The lower portion of the ramp was noted to be slippery during the inspection and this was also raised as an issue in discussions with community stakeholders. It was noted that cleaning was not always undertaken at low tide, which limited the extent of the ramp that was treated.

The ramp was also measured to be relatively flat (around 1V:10H) in comparison to recommended slopes within the RMS guidelines (1V:7H to 1V:9H). This supports advice provided during community stakeholder discussions that the ramp was not steep enough and required users to ‘drown’ their trailer to launch boats.

The limited availability of parking was also raised as an issue. This is caused by competition for use of the car park by other user groups due to the close proximity of other facilities including the foreshore reserve and netted swimming enclosure and numerous businesses along Ocean Drive. During site inspections a number of cars were observed to be parked in designated car and trailer spaces (refer Figure 75). It was reported that during peak season boat ramp users are unable to secure trailer parking spaces and are forced to use other ramps. As a result, most of the other ramps in the area are used as overflow facilities during peak times. It is not possible to expand the parking facility provided for boat ramp users due to space constraints and multi-use of the existing carpark for surrounding areas.

Potential Improvements

Potential improvements to the facility include (not in any order of priority):

- dredging of the shoaled areas at the ramp toe and approach, although this may be problematic for environmental reasons due to the presence of seagrass beds in the dredging footprint. In addition, such an improvement would attract additional usage of the facility and exacerbate existing problems with parking availability;
- steepening of the ramp to the recommended RMS guideline slope of 1V:8H, however the ability to regrade the ramp is likely to be limited by the available water depth (without dredging) at the ramp toe and would require significant earthworks to raise the ramp crest level and adjoining parking area;
- cleaning of the ramp surface at low tides; and,
- increased Council Ranger presence to improve policing of parking.
3.2.10 Henry Kendall Reserve Boat Ramp

Location

Henry Kendall Reserve boat ramp (refer Figure 78) is located in a remote area in the middle reaches of Stingray Creek. From this launching point boats are able to navigate to Queens Lake or to the Camden Haven River through a marked channel.

Vehicular access to the boat ramp is provided along Henry Kendall Drive, which is accessed off Ocean Drive.

![Figure 78: Aerial view of Henry Kendall Reserve boat ramp](image)

The RMS Boating Map for the Camden Haven area indicates that water skiing is prohibited within Stingray Creek. A no wash zone has also been applied in the creek to limit bank erosion and damage to oyster leases. The deep water channel through Stingray Creek in the vicinity of the ramp is marked by starboard pipe beacons.

Description

The boat ramp comprises 10m wide earth ramp that is accessed via a 4m wide unsealed road that runs along the southern foreshore of Stingray Creek. The access road ends in a cul de sac with a small car parking area and an open grassed reserve.

A 0.6m high sandstone conglomerate rock ramp (refer Figure 79) with rock sizes of 0.2m to 0.4m diameter provides access to the sandy foreshore from the cleared area adjacent to the road access. The slope of the rock ramp was measured at approximately 15 degrees (1V:3.7H). The cleared approach to the rock ramp is 8.6m wide and has a measured slope of approximately 4.4 degrees (1V:13H). The sandy beach launching area (refer Figure 80) has a measured slope of 8.5 degrees (1V:6.7H).
The creek bank upstream of the boat ramp area is protected with a 1.5m high sandstone rock wall (refer Figure 81) with rock sizes ranging between 0.3m and 0.5m in diameter.
Figure 81: Bank protection upstream of Henry Kendall Reserve boat ramp

Associated Facilities

No formal car or trailer parking is provided in the vicinity of the ramp with timber bollards linked with chain preventing parking alongside the access road (refer Figure 82).

Figure 82: View of foreshore areas upstream (left) and downstream (right) of Henry Kendall Reserve boat ramp

At a short distance to the west (upstream) of the boat ramp, three (3) parking bays are located alongside the access road (refer Figure 83). These provide overall capacity for around 20 car spaces, with car spaces varying in length from 8.2m in the first 2 bays to 7m in the last bay. Measured offsets from the existing fence line to mature trees along the shoreline indicate that sufficient space may exist to extend these car spaces further into the foreshore reserve to accommodate car and trailer parking. This would
need to be assessed by Council’s Arborist in relation to the current tree population health and applicable Tree Protection Zones.

Further upstream (approximately 200m west) from the boat ramp, designated car parking areas alongside the access road are provided on a grassed reserve area with approximately 16 parking spots available in total. Several sheltered picnic tables and toilet facilities are provided at this reserve.

**Condition**

The earth ramp was considered to be in serviceable condition and functional for its predominant use by 4WD vehicles.

**Identified Issues**

The rugged nature of the ramp surface and steep drop off into the creek reported by community stakeholders limits its use to 4WD vehicles only.

Relatively strong tidal velocities, estimated to be approximately 0.8m/s, were observed within the creek around 15m from the shoreline. This may create difficult conditions for boat launching/retrieval at times, however the sandy beach area is available for boat holding.

No designated car and trailer parking is provided in the vicinity of the ramp.

Council have advised that this area is subject to environmental vandalism and the ramp has a low level of usage. Theft has also been identified by community stakeholders as being an issue in other remote areas of Henry Kendall Reserve with no passive surveillance from surrounding land use (e.g. nearby picnic areas).
Potential Improvements

Potential improvements to the facility include provision of a trailer parking area in close proximity to the ramp. This could be achieved by extending the length of existing car spaces further into the foreshore reserve and would be subject to assessment of applicable Tree Protection Zones.

3.2.11 Queens Lake Reserve Boat Ramp

Location

Queens Lake Reserve boat ramp (refer Figure 84) is located off Ocean Drive in West Haven. The ramp is positioned close to the Queens Lake Sailing Club building and provides boating access from the southern shoreline of Queens Lake.

The RMS Boating Map for the Camden Haven area indicates that very shallow water exists within Queens Lake and that the area should be navigated with caution. The restrictions on water skiing within Stingray Creek do not apply within Queens Lake.

Description

Queens Lake Reserve boat ramp comprises a single lane grooved concrete ramp with a concrete dish drain on its eastern side (refer Figure 85). The ramp is 4.5m wide and its upper portion is formed by a 125mm thick concrete slab. The grooves in the ramp are orientated towards the 0.9m wide dish drain. Below the water line the ramp transitions into precast concrete planks. Measured ramp slopes were 6.6 degrees (1V:8.6H) at the top of the precast planks, 7.2 degrees (1V:7.9H) at the bottom of the concrete slab section, 6.5 degrees (1V:8.8H) in the middle of the concrete slab, and 6 degrees (1V:9.5H) at the top of the ramp slab. A low-level bank vegetated with grass and trees and a cobble shoreline exists on either side of the boat ramp (refer Figure 86).
Queens Lake Sailing Club utilises the 40m long flat sandy beach area to the east of the boat ramp for launching of sailing boats (refer Figure 87). The beach is accessed via a sealed asphalt track delineated with timber posts linked with chain (refer Figure 88).
Figure 87: Use of beach area by Queens Lake Sailing Club members

Figure 88: Sandy beach area to the east of Queens Lake Reserve boat ramp
Associated Facilities
Access to the ramp is provided via a sealed accessway (refer Figure 89), which was sealed in 2010 as part of the Better Boating Program along with boat ramp surface upgrades. A one-way loop road is provided to the ramp manoeuvring area to manage traffic flow.

Parking throughout the facility is unmarked. However, vehicular access to areas adjacent to the sealed accessway is controlled by timber posts linked with chain. It was estimated that there were 9 car and trailer parking spaces behind the crest of the ramp and an additional 8 car and trailer spaces on the southern side of the Sailing Club building. Approximately 15 car only spaces are provided in several small bays provided on the southern side of the facility.

Figure 89: Sealed ramp access road at Queens Lake Reserve boat ramp

Other facilities at the site include:
- sheltered picnic tables in amongst the trees in adjacent reserve area;
- rubbish bin provided at the top of the boat ramp and rubbish bin provided in the reserve near a picnic table;
- Queens Lake Sailing Club building, which includes locked toilets;
- powerline crossing vessel height warning signage;
- sign indicating navigation restrictions associated with the Stingray Creek Bridge Replacement Project; and,
- sign advising prohibitions and warnings within Queens Lake Sailing Club Reserve.

Condition
The access roads throughout the facility were sealed and the boat ramp surfacing was recently upgraded in 2010. As such, the facility is in good condition.
Identified Issues

A limitation at the ramp is the available water depth at low tide. During inspections the water depth was estimated to be 0.4m based on observation of a 4m boat launching. However, as the water depths within Queens Lake are generally shallow, the ramp is likely to only be used by smaller boats with a shallow draft. It is understood from discussions with community stakeholders that the ramp is primarily used by locals and commercial fishermen, who launch their punts to go net fishing in the lake.

The ramp is exposed to large fetches across Queens Lake from the north-west to north-east and would be expected to experience adverse conditions for launching and retrieval during strong winds from these directions.

A limited amount of parking exists in the sealed areas of the facility. This may cater for the low level of usage of the ramp by locals and commercial fishermen. However, the Queens Lake Sailing Club holds races every Saturday from September to April and it is understood that vehicles and trailers associated with sailing boats occupy the beach foreshore, which is used as an overflow parking area.

Based on discussions with Sailing Club members, occupation of this beach area with boat trailers from motorised boat owners is a significant conflict at the site. It is understood that motorised boat owners prefer to use the beach area for launching and retrieval due to unfavourable conditions for boat holding at the boat ramp, which include a slippery ramp surface and rocky bed materials.

It was also noted by stakeholders that a scour hole has been created at the toe of the ramp as a result of propeller dredging. This is likely to be related to vessels motoring on to trailers in the limited water depth available at the ramp toe.

Potential Improvements

Potential improvements to the facility include (not in any order of priority):

- formalisation of trailer and car parking areas with line markings and signage;
- installation of an on-ramp pontoon (on the northern side of the boat ramp) to assist with boat holding and encourage motorised boat owners to use the boat ramp rather than the adjacent beach area; and,
- provision of rock protection at the toe of the ramp to fill in the scour hole and limit further propeller dredging.

3.2.12 Other Boat Ramp Facilities

Other boat ramps that were noted to exist by community stakeholders included those at:

- Lakewood village, off Sirius Drive; and,
- Henry Kendall Reserve, at the end of an unsealed road that provides access to oyster leases at the upstream limit of Stingray Creek.

The boat ramp at Lakewood village comprises a single lane, 3.5m wide concrete ramp with an fixed timber jetty for boat holding (refer Figure 90) and is accessed via a gravel accessway and turning area (refer Figure 91). It was reported by stakeholders to have poor water depths such that it cannot be used by 'v-bottom' boats. This was confirmed with measured water depths of 0.3m at the ramp toe, 0.4m midway along the jetty and 0.5m at the end of the jetty. Based on local tides at the time of inspection, these depths correspond to bed levels of between -0.2m AHD and -0.4m AHD or around 0.1m to 0.4m below Indian Spring Low Water (ISLW at the Lakewood tide gauge is -0.053m AHD). Dredging was noted by stakeholders as being required to improve water depths at the ramp. However, water depths at the ramp...
are likely to be indicative of the generally shallow water depths in that area of Queens Lake. This is indicated by the mapping of extensive seagrass beds in the area (refer Map 2.3).

Figure 90: Lakewood village boat ramp and jetty

The ramp at Henry Kendall Reserve (refer Figure 92) comprises an informal beach ramp that is 6m wide and mainly used by oyster farmers to access nearby lease areas. The beach slope was measured to be
around 6 degrees (1V:9.5H) at the waterline and suitable launching depths were observed within 5m to 10m off the shoreline. Stakeholders have advised that due to the remote location of the ramp, parked vehicles (4-5 vehicle capacity) in amongst the trees (refer Figure 93) are prone to theft.

Figure 92: Beach ramp used by oyster farmers at Henry Kendall Reserve

Figure 93: Cars parked amongst trees at Henry Kendall Reserve oyster farmer beach ramp
3.3 Identification of Boating Improvement Sites

3.3.1 General

The above appraisal of existing boating facilities indicates that potential improvements exist at most sites and relate to deterioration of existing infrastructure, management of foreshore erosion, improving functionality (e.g. boat holding) and expansion of capacity. It should be noted that these potential improvements represent a long list of opportunities for future consideration subject to availability of suitable funding and priorities for allocation at specific boating infrastructure sites. Low cost improvements relating to ongoing maintenance activities on existing infrastructure (e.g. oyster removal) should be considered for implementation in the short term.

To assist with the initial prioritisation of future development, two boating improvement sites have been identified as outlined below. Development of these selected sites would still be subject to availability of suitable funding for design and construction of any proposed works and the associated approval process.

3.3.2 Existing Boating Facilities

It is understood that at peak times the boat ramp facilities that attract the most usage from holidaymakers and people visiting from outside the area (e.g. from Port Macquarie) include North Haven Boat Ramp, Laurieton United Servicemen’s Club Marina Reserve and Dunbogan Reserve Boat Ramp. Other boat ramps, particularly those in the North Haven and Laurieton areas, are used as overflow facilities when the popular ramps are congested or have no remaining trailer parking spaces. North Haven boat ramp is particularly congested due to the competing uses of the site to access the foreshore reserve, swimming enclosure and nearby shops along Ocean Drive. It is considered that congestion at these popular ramps could be alleviated by expansion of their existing trailer parking capacity or improving the capacity of other nearby ramps in the area to attract users away from space constrained facilities.

From the popular ramps listed above, only the Dunbogan Reserve Boat Ramp is considered to have the potential for expansion of trailer parking capacity and is nominated as the first boating improvement site. The existing trailer parking, comprising approximately 8 spaces, significantly under caters for the capacity of the two-lane boat ramp facility. 25 to 30 trailer parking spaces per lane is recommended within the NSW Boat Ramp Facilities Guidelines (RMS, 2015). As such, any increase in trailer parking spaces at this facility would greatly improve its capacity to support additional boat launchings and retrievals. This ramp is also in a favourable position for offshore access, being at a similar downstream position within the river to the popular North Haven boat ramp. Based on stakeholder feedback, boat holding pontoons at boat ramps (e.g. North Haven and Laurieton United Servicemen’s Club Marina Reserve) are highly valued infrastructure, particularly at sites where rocky shorelines, rock protection, oyster growth and strong river currents make boat holding difficult. As such, floating pontoons are proposed as an option at Dunbogan Reserve Boat Ramp to facilitate boat holding. The adjacent seawall and fish cleaning table platform are also in need of repair.

The second boating improvement site was selected from the remaining lower usage boat ramps on the basis that capacity for expansion of trailer parking was available to support the increased usage of the upgraded facility. There are a number of existing boat ramps that are space constrained and do not allow further trailer parking to be provided, including:

- Stingray Creek Bridge Boat Ramp;
- Bay Street Boat Ramp; and,
- Queens Lake Reserve Boat Ramp.
It was considered that the most strategic benefit could be realised with upgrading of a boat ramp along the Laurieton shoreline due to the improved linkage with North Haven provided by the Stingray Creek Bridge replacement project and positioning within the popular waterway area of the Camden Haven River. Other ramps in more remote locations are less likely to be utilised at their capacity in peak times by boaters other than locals and commercial fishermen (e.g. within Queens Lake and Stingray Creek) due to their lack of passive surveillance and distance away from popular tourist areas, shops and offshore access through the Camden Haven River entrance.

The Marine Rescue Boat Ramp at Laurieton has been selected as the second boating improvement site due to several advantages and opportunities provided by the site including:

- cleared manoeuvring area available behind the existing boat ramp;
- large open reserve area available for trailer parking alongside Tunis Street;
- close proximity of accessible public amenities provided 100m from the jetty in Short Street;
- passive surveillance and potential assistance to boaters offered by the close proximity of the Marine Rescue base;
- poor condition of the existing single lane ramp and opportunity to replace with a new two-lane ramp; and,
- access to deep water for launching due to the position of the site on the outside of the river bend.

It is acknowledged that the Marine Rescue Boat Ramp is periodically not accessible due to events held at Bruce Porter Reserve (e.g. Laurieton Riverwalk Markets). The management of parking for these events would need to be managed in conjunction with development of the site.

The Apex Park Boat Ramp was also considered to be in the shortlist of potential boating improvement sites, however it was considered to be less favourable than the Marine Rescue Boat Ramp for the following reasons:

- its position in the strongest running (narrowest) section of the Camden Haven River;
- exposure to significant wind fetches to the north-east and south-east;
- expansion of the parking area further into the reserve may be limited by the presence of a number of mature trees located within the reserve, although there may be an opportunity to provide an area of formalised car and trailer parking within the area of Council-managed Crown Reserve on the other side of Reid Street directly opposite the entry to Apex Park; and,
- potential for competing use of parking areas by other non-boating users of Apex Park due to provision of other facilities in the reserve including a toilet block, sheltered electric BBQ facilities, picnic tables and shelters, and a community garden.

3.3.3 Additional Boating Facilities

Although the development of additional/new boating facilities is outside the scope of the current investigation, it was noted in discussions with RMS operational staff that an opportunity exists to install a new boat launching site upstream of the Dunbogan Bridge (outside the study area). As water skiing is prohibited within the river from the Dunbogan Bridge to the entrance, this section of the river is reported to be heavily used in summer by water skiers and personal water craft (PWC) riders. It is understood that an informal sand ramp is located along the eastern side of the river, approximately 500m upstream of the bridge. This ramp is reported to be used for launching by skiers and the adjacent cleared reserve provides an informal parking and picnicking area. The formalisation of the launching and parking facilities in this area would provide significant benefit to this waterway user group and would also service...
recreational and commercial fishermen seeking upstream access to Watson Taylors Lake. The demand for such a facility should be assessed in consultation with local stakeholders, including water skiers, PWC riders, recreational/commercial fisherman and other boaters.

In addition, RMS operational staff have also identified a potential need for formalised dinghy storage (e.g. dinghy racks) to cater for access to the swing moorings located off the Dunbogan foreshore in the vicinity of the Dunbogan Boatshed.

3.4 Rationalisation of Facilities

3.4.1 Boat Ramps

As noted above, discussions with local stakeholders have indicated that although the less popular boat ramps at North Haven, Laurieton and Dunbogan experience a low level of usage outside of peak times they are used as overflow facilities during peak times. These smaller facilities assist to ease congestion at other larger facilities (e.g. North Haven Boat Ramp) and ramps that provide overflow capacity (e.g. Stingray Creek Bridge Boat Ramp, Apex Park Boat Ramp) should be maintained to cater for peak demand and future increase in demand from proposed residential development within the region. In addition, boat ramps in remote locations (e.g. Queens Lake Reserve) are reported to be used by fishermen to access specific parts of the waterway that are used for commercial fishing purposes. Other ramps located away from popular boating areas service local communities (e.g. Lakewood village boat ramp).

Boat ramps that are in poor condition and reported to have low levels of usage include facilities at Laurie Street and Bay Street. It is recommended that a monitoring program is established to establish the level of usage at these ramps. This information should be used to assess whether the expense of maintenance or upgrades can be justified when the facilities reach the end of their service life and/or considered to pose a risk to public safety. Users should be consulted to determine the impacts of any proposed closure of these facilities and to establish the feasibility of alternative water access options that are available at other existing ramps.

3.4.2 Wharves

There are several public wharf facilities provided along the Laurieton side of the Camden Haven River. These include those at Mill Street, Laurie Street, Laurieton United Servicemen’s Club Marina Reserve and adjacent to the Marine Rescue base. The Mill Street public wharf is considered to be a highly valued asset as it provides access to a 24 hour self-serve sewage pumpout point for larger boats such as cruising yachts and offshore fishing vessels. It is also used as a temporary mooring area for vessels using the adjacent slipway and fuel supply is also available nearby from the Laurieton Fishermen’s Co-op. Public wharves that service cruising yachts and fishing vessels are reported to be valuable assets along the NSW coast by RMS operational staff.

Cruising yachts are also serviced by the wharf at the Laurieton United Servicemen’s Club Marina Reserve, which provides a mooring area for a maximum length of stay of 5 days and includes water supply and complimentary use of toilet and shower facilities at the Laurieton United Servicemen’s Club. RMS is also planning to provide 2 courtesy moorings on the eastern side of the river channel near the Laurieton United Servicemen’s Club facility and an emergency mooring on the eastern side of the river channel adjacent to the Marine Rescue base. These other facilities increase the attractiveness of the Camden Haven River as a sheltered stop-over location for cruising yachts and support the continued demand for the public wharf at Mill Street.
The public wharf at the Marine Rescue base is designated with signage as a loading/unloading facility (maximum 1 hour mooring) for larger vessels and provides a length of 20m along the berthing piles for mooring. The wharf is reported to be used by large yachts and police launches for pick up/drop off of passengers and is also used as a fishing platform. In addition, there has been an instance when a stricken vessel has been temporarily moored at the wharf, which was used as an emergency tie-up point after the vessel was retrieved.

The public wharf at Laurie Street is reported to receive the lowest level of usage in the area. However, it is still used by locals and provides an additional loading/unloading point to cater for congestion at the more popular facilities during peak times. It may also be used as a fishing platform. Although the wharf is currently in a serviceable condition, it should be considered as a low priority for future investment.

It is considered that the existing public wharves provide a range of different functions for the areas including sewage pumpout, loading/unloading points, emergency tie-up, overnight moorings and fishing platforms. As such, these assets should continue to be periodically inspected and maintained in a serviceable condition.
4 Boating Improvement Site Concept Plans

4.1 Boating Improvement Site 1 – Dunbogan Reserve

4.1.1 Opportunities and Constraints

Dunbogan Reserve is Lot 7018 DP 1024347 and it is Crown Land under Council’s care, control and management (refer Map 2.1 in Appendix A). The State Environmental Planning Policy (Infrastructure) 2007 states that, “development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land.” The definition of a boating facility includes facilities for boarding vessels, launching facilities, car parks, lighting and fencing for the primary purpose of boating. Therefore, development consent is not required and the works are classified as an activity under Part 5 of the EP&A Act, which would require a Review of Environmental Factors (REF) to be approved prior to carrying out any work. Government Agencies including Crown Lands, Roads and Maritime Services and the Department of Primary Industries would be consulted during preparation of an REF.

Under the Port Macquarie-Hastings LEP 2011, the reserve is zoned as RE1 – General Recreation and Gogleys Creek is zoned W1 – Natural Waterways (refer Map 2.2 in Appendix A). Development permitted with consent in Zone RE1 includes car parks, community facilities, environmental protection works, marinas and water recreation structures. Development permitted with consent in Zone W1 includes environmental facilities, environmental protection works and jetties. The LEP allows development for water recreation structures in the reserve. However, it currently prohibits water recreation structures including pontoons and boat ramps in Gogleys Creek. It is suggested that Council rezones the waterway in the vicinity of the boat ramp to W2 – Recreational Waterways. The objective of Zone W2 includes allowing for water-based recreation and related uses, which is consistent with the current use of the area as a boat launching facility.

Vegetation mapping indicates Zostera seagrass beds and mangroves near the site (refer Map 2.3 in Appendix A). A Part 7 permit to harm marine vegetation would be required from the NSW Department of Primary Industries (Fisheries) under the Fisheries Management Act 1994 if the works are to impact on seagrass or mangroves.

As mentioned in Section 3.2.1, the Dunbogan Reserve boat ramp provides access to Gogleys Creek, which joins Gogleys Lagoon to the main channel of the Camden Haven River. Gogleys Creek is a shallow waterbody and it is understood that the water depth limits the size of vessels that can access boat ramp. As such, it is understood that the ramp is predominantly used by locals with small tinnyis up to say 5m. The water depth could be increased by dredging. However, the presence of seagrass beds and the designation of Gogleys Creek and Gogleys Lagoon as a SEPP14 Coastal Wetland are likely to represent significant constraints to dredging in the area.

The boat ramp is a grooved, concrete two lane ramp and it is 7.73m wide. The slope of the ramp varies between 1V:6.3H and 1V:10.4H. The ramp is in good condition. The ramp width is slightly less than the recommended width of 8m for a double lane ramp in the NSW Boat Ramp Facility Guidelines (RMS, 2015). However, it is suitable for smaller vessels. Minor undercutting of the boat ramp slab was noted along its southern edge. The boat ramp would be suitable to retain.

The foreshore immediately north of the boat ramp is retained by a near-vertical concrete seawall, which is backed by a 30m long pedestrian pathway. A double fish cleaning table is provided immediately landward of the seawall and supported on a concrete slab. The concrete slab and seawall structure are in a dilapidated condition with cracking, settlement and corrosion of reinforcement observed. The seawall would need to be repaired or replaced.
The foreshore on the southern side of the boat ramp comprises a 6.5m wide gravel beach area adjacent to a localised stand of mature mangroves. The gravel beach enables boats to be pulled up on the foreshore. However, it is noted that gravel readily damages vessels, particularly those with fibreglass hulls.

Vehicular access to Dunbogan ramp is achieved via a one way sealed bitumen road (The Boulevarde), which is accessible from Camden Head Road. The current parking arrangement within the reserve provides space for:

- five (5) car and trailer spaces near the community hall (Jubilee Hall);
- three (3) car and trailer spaces located opposite the boat ramp manoeuvring area;
- approximately 18 car only parking spaces alongside the foreshore reserve on the northern side of the boat ramp;
- approximately 4 car only spaces within a small parking area adjacent to the community hall (Jubilee Hall); and,
- approximately 35 to 40 car only parking bays along the accessway into Dunbogan Reserve.

It is noted that the number of car and trailer parking spaces is low compared to the recommendations in the NSW Boat Ramp Facility Guidelines (RMS, 2015), which recommends approximately 25 to 30 spaces per lane. However, the lack of parking has not been reported in complaints to Council. Notwithstanding, it is considered prudent to increase parking capacity to accommodate future population increase and increase in demand generated by any upgrades/improvements to the facility.

Dunbogan Reserve is a flat expanse of grassland interspersed with large mature trees and extends along the foreshore on the northern side of the ramp and behind the ramp manoeuvring area. The reserve is popular for passive recreation activities and other infrastructure within the reserve includes:

- rubbish bins located at the crest of the boat ramp and throughout Dunbogan Reserve;
- telegraph pole lighting at the crest of the boat ramp and throughout the parking area;
- a netted swimming area;
- ‘t-shaped’ accessible fishing platform with timber handrails (recently built);
- community hall (Jubilee Hall);
- toilet block (including mens and ladies disabled toilets and a disabled car space positioned immediately adjacent to the toilet block);
- playground;
- seats along the creek foreshore,
- sheltered picnic tables and barbeque facilities; and,
- flood markers.

4.1.2 Initial Concept Plan

The initial concept design for Dunbogan Reserve is shown on Map 3.1 (refer Appendix A and Map 3.0 for concept plan location).

The main objectives of the concept plan include:

- increasing the number of car and trailer parking bays;
- address undercutting of the boat ramp slab;
• repair/replace the seawall, concrete slab and fish cleaning table on the northern side of the ramp; and,
• provide a boat holding structure in the form of a pontoon.

The development would seek to retain the existing:

• number of car only parking spaces;
• manoeuvring area;
• rubbish bins;
• telegraph pole lighting at the crest of the boat ramp and throughout the parking area;
• netted swimming area;
• ‘t-shaped’ accessible fishing platform;
• community hall (Jubilee Hall);
• toilet block and disabled parking space;
• playground;
• seating along the creek foreshore.
• sheltered picnic tables and BBQ facilities;
• flood markers; and,
• mature vegetation including trees and shrubs.

The current manoeuvring area is approximately 30m long and would not be upgraded or altered under the current arrangement. “No Standing” signs would be installed to restrict parking in the manoeuvring area. The area is relatively large and could be used for rigging and de-rigging bays. Wash down facilities could be incorporated into the de-rigging bay. Wash down facilities may include a fee for use, which would reduce the wastage of water.

Car and trailer parking is proposed north of the boat ramp comprising:

• 16 additional 90 degree, rear to kerb, car and trailer parking spaces along The Boulevarde. This parking would replace some of the existing car only parking spaces; and,
• Approximately 16 car only parking spaces orientated at 90 degrees to The Boulevarde to compensate for the loss of parking due to the additional car and trailer parking spaces.

The five (5) existing angled car and trailer spaces near the community hall (Jubilee Hall) would be retained. It is noted these spaces do not conform to the current guidelines. However, they are suitable for smaller vessels with shorter car and trailer combinations. The three (3) car and trailer spaces located behind the ramp manoeuvring area would be removed to provide an area for rigging and de-rigging. In total, 21 car and trailer parking spaces would be provided. The number of car only parking spaces provided at the reserve would not change.

It is noted that the number of car and trailer parking spaces is low compared to the recommendations in the NSW Boat Ramp Facility Guidelines (RMS, 2015), which recommends approximately 25 to 30 spaces per lane. However, the proposed upgraded parking configuration is deemed sufficient based on anecdotal evidence for demand at the facility. Additional rear to kerb parking spaces could be provided within the grassed reserve area. However, this would impact on the passive recreation amenity provided by the reserve.

The dimensions of the car and trailer parking bays would be 12.5m long and 3.5m wide and the new car only parking spaces would be 5.4m long and 2.6m wide. The dimension of the parking bays conforms to the NSW Boat Ramp Facility Guidelines (RMS, 2015), which is based on a vessel length of 7.5m, and
Australian/New Zealand Standard for Parking facilities. It is noted that water depths near the boat ramp may restrict the size of vessels that use the facility and car and trailer parking dimensions could be reduced accordingly. The design vessel length should be determined in consultation with Council and stakeholders during the detailed design phase of the project and following completion of a bathymetric survey.

The width of the accessway in the vicinity of the car and trailer parking bays would be 9m to provide sufficient manoeuvring area for rear to kerb parking and to enable vehicles travelling in opposite directions to pass. This would require minor widening of The Boulevard at the northern end where car and trailer parking is proposed. The width of the accessway in the vicinity of the car only parking would be 5.8m to enable sufficient manoeuvring. The existing accessway near the proposed car only parking is sufficiently wide at approximately 7.5m. The accessway would be one-way, except in the vicinity of the boat ramp and car and trailer parking area where two-way access would be provided for convenience. Appropriate signage would be installed to control traffic.

Car parking spaces would be surfaced with asphalt or permeable/plantable pavement (e.g. Driveable Grass) while the trailer bays would be grassed. Grased areas and permeable paving are preferred to increase water infiltration, reduce runoff and improve aesthetics of the area. Timber bollards or log barriers would be installed at the rear of all parking bays to prevent vehicles driving into the reserve. This would reduce degradation of the reserve and improve safety of pedestrians in the reserve. All asphalt parking bays, including existing bays to be retained, would be delineated with line marking.

For the main car and trailer parking upgrade on the outside of the bend along The Boulevard, angled parking at either 60° or 45° was considered to facilitate parking. However, if angled parking was installed, car and trailers would be required to approach and leave the parking bays in the same direction. As such, car and trailer combinations would be required to drive around the block to access the parking area or boat ramp. 90° rear to kerb parking was preferred to simplify traffic flow and minimise congestion. However, angled car and trailer parking may be preferable alongside the community hall (Jubilee Hall), parallel to the existing angled kerb and to better facilitate the length of car and trailer combinations.

Minor undercutting of the boat ramp was observed. This could be addressed by placing geotextile material and riprap rock protection along the southern edge of the boat ramp. Similar alternative options including geotextile containers would also be suitable. Any protection works should not protrude above the surface of the ramp as there is potential for sediment to accumulate on the ramp.

The seawall and fish cleaning table is in a dilapidated state. It is recommended to repair or replace the seawall. It is considered that a full replacement would be required to ensure a suitable design life. The seawall could be replaced with like for like or replaced with an alternate structure such as a sheetpile wall or riprap revetment.

It is proposed to install a boat holding structure in the form of a pontoon. Two options have been presented, which are:

Option 1 - Widen the boat ramp and install an on-ramp pontoon. The pontoon is nominally proposed to be positioned to the south of the existing boat ramp. However, if the seawall is to be replaced, the pontoon could be located to the north of the boat ramp. On-ramp pontoons are generally preferable when boat users are launching by themselves because the boat tie up points are accessible next to the boat trailer and boats can be walked along the pontoon to a trailer. However, when a boat is tied up to an on-ramp pontoon, one lane of the boat ramp cannot be used, which may increase congestion and conflict between
users. On-ramp pontoons extend beyond the toe of the ramp, which may impinge on navigation in confined waterways.

Option 2 - Install a floating pontoon and aluminium gangway north of the boat ramp. The gangway would be connected to the seawall and would require the dilapidated seawall to be replaced to support this loading. This option would be less expensive than an on-ramp pontoon as it does not require the boat ramp to be widened to provide a foundation for the pontoon. The pontoon would not impinge on the launching or retrieval of vessels. However, the tie up point is not directly next to the boat ramp, which is less convenient when boat users are launching by themselves. The fish cleaning table would need to be relocated to provide for suitable access to the head of the gangway with this option.

Additional items considered as part of the concept design included the installation of a dish drain between the proposed parking spaces and The Boulevarde. The dish drains would redirect water flow and minimise overland flow across the adjacent reserve area. Upgraded drainage to the carpark including dish drains could be incorporated in the future as part of a broader stormwater management plan for Dunbogan Reserve if required.

4.1.3 Estimate of Cost
To be completed following drop-in session consultation.

4.1.4 Summary of Consultation Feedback
To be completed following drop-in session consultation.

4.1.5 Final Concept Plan
To be completed following drop-in session consultation.
4.2 Boating Improvement Site 2 – Marine Rescue Boat Ramp and Wharf, Laurieton

4.2.1 Opportunities and Constraints

The site is located in Laurieton on the corner of Tunis Street and Short Street. The site encompasses Lot 7314 DP 1157140 and Lot 1 DP 758603, which are Crown Land under Council’s care, control and management and Lot 7315 DP 1157140, which is Crown Land (refer Map 2.1 in Appendix A). The road corridor of both Tunis Street and Short Street is approximately 30m wide and could be utilised for angled parking if required.

The State Environmental Planning Policy (Infrastructure) 2007 states that, “development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land.” The definition of a boating facility includes facilities for boarding vessels, launching facilities, car parks, lighting and fencing for the primary purpose of boating. Therefore, development consent is not required and the works are classified as an activity under Part 5 of the EP&A Act, which would require a Review of Environmental Factors (REF) to be approved prior to carrying out any work. Government Agencies including Crown Lands, Roads and Maritime Services and the Department of Primary Industries would be consulted during preparation of an REF.

Under the Port Macquarie-Hastings LEP 2011, Lot 1 DP 758603 and Lot 7315 DP 1157140 are zoned RE1 – General Recreation, the waterway is zoned W2 – Recreational Waterways and Lot 7314 DP 1157140 is zoned E2 – Environmental Conservation (refer Map 2.2 in Appendix A). Development permitted with consent in Zone RE1 includes car parks, community facilities, environmental protection works, marinas and water recreation structures. Development permitted with consent in Zone W2 includes boat sheds, charter and tourism boating facilities, emergency services facilities, environmental protection works, marinas and water recreation structures. Development permitted with consent in Zone E2 includes environmental protection works, recreation areas, research stations and roads. The LEP currently prohibits water recreation structures including pontoons and boat ramps in Zone E2. As such, development of Lot 7314 DP 1157140 for boating infrastructure would be avoided.

Vegetation mapping indicates Zostera seagrass beds near the site, particularly to the north (refer Map 2.3 in Appendix A). A Part 7 permit to harm marine vegetation would be required from the NSW Department of Primary Industries (Fisheries) under the Fisheries Management Act 1994 if the works are to impact on seagrass beds. In addition, a stand of mature vegetation west of the Camden Haven Marine Rescue base is noted to be an Endangered Ecological Community (EEC), which is protected under the Threatened Species Conservation Act 1995 (refer Map 2.3 in Appendix A). The works will avoid harming the EEC.

As mentioned in Section 3.2.6, the existing ramp comprises a single lane 3.65m wide concrete ramp with a slope of 1V:10.2H at the waterline and 1V:7.9H at the top of the ramp. The toe level at the end of the sealed concrete ramp slab was approximately -0.5 m AHD or around the level of Indian Spring Low Water (ISLW at the Laurieton tide gauge is -0.519 m AHD). The ramp was covered by a veneer of sand and could not be inspected. However, the ramp was reported to be cracking by Marine Rescue personnel. Community stakeholders noted that the ramp is avoided by large boats as it drops off into deep water from the toe. The width and toe depth of the ramp does not comply with the NSW Boat Ramp Facility Guidelines (RMS, 2015), which recommends a ramp width of 4.5m for a single lane ramp and toe level of 1m below ISLW (approximately -1.5m AHD).
The Camden Haven Marine Rescue base is located immediately upstream of the boat ramp and incorporates a private jetty/wharf structure and slipway. The foundations of the Marine Rescue building are protected with a sandstone and mass concrete revetment wall.

A public wharf is located downstream of the boat ramp and comprises a timber jetty with a wharf face provided by berthing piles extending over a 20m length. The public wharf was generally considered to be in poor condition. However, it has been used as an emergency tie up point for stricken vessels by Marine Rescue. There is an opportunity to develop or adapt the jetty to cater for smaller vessels.

The foreshore between the boat ramp and jetty was protected by a rock revetment. The shoreline had receded markedly behind the rock revetment resulting in loss of foreshore reserve area. Foreshore erosion is likely to be an issue at the site if it is not addressed in the design.

The accessway is unsealed and the manoeuvring area has not been formalised. No formalised trailer parking is provided at the ramp. There is an opportunity to formalise and seal accessways as part of the boating infrastructure upgrade.

A pedestrian footpath extends through the reserve on either side of the ramp manoeuvring area providing pedestrians with access along the Laurieton foreshore. Pedestrian safety and separation of users should be considered as part of the boating infrastructure upgrade.

Other facilities provided in the area include:

- seating and a sheltered picnic table north of the boat ramp;
- 2 rubbish bins located at the entrance to the jetty; and,
- lighting at the corner of Short Street and Tunis Street.

### 4.2.2 Initial Concept Plan

The initial concept design for the boat ramp next to the Marine Rescue base is shown on Map 3.2 (refer Appendix A and Map 3.0 for concept plan location).

The main objectives of the concept plan include:

- replace existing boat ramp with a new boat ramp complying with the NSW Boat Ramp Facility Guidelines (RMS, 2015);
- formalise accessways and manoeuvring areas;
- provide de-rigging bay next to accessway;
- formalise car and trailer parking;
- provide a boat holding structure in the form of an on-ramp pontoon; and,
- repair of foreshore protection works.

The development would seek to retain the existing:

- timber jetty;
- garbage facilities and lighting;
- pedestrian footpath; and,
- mature vegetation including trees and shrubs.
The sheltered picnic table would be retained. However, it would be relocated further north or to an alternate location specified by Council.

The boat ramp would be a double lane ramp and it would be 8m wide. The slope of the boat ramp would be selected to minimise regrading of the foreshore. It is expected the slope of the ramp would be relatively steep at between 1V:7H and 1V:8H, which would reduce the overall length and cost. This would be confirmed following detailed terrestrial and hydrographic survey. The boat ramp would be constructed from concrete and the lower section of the boat ramp would comprise precast concrete panels supported on piles. This would ensure suitable water depths are provided at the ramp toe, achieve a constant ramp grade and would eliminate issues related to undercutting and scour within the drop off area. A low level concrete kerb would be installed at the end of the ramp as a safeguard against trailers reversing over the edge of the suspended ramp slab.

The crest level of the boat ramp would be 0.5m above the Highest Astronomical Tide (HAT) and the toe level of the ramp would be 1.0m below the design low water level, which would be adopted as ISLW in accordance with the NSW Boat Ramp Facility Guidelines (RMS, 2015). This would result in a crest level of approximately 1.1m AHD and a toe level of approximately -1.5m AHD. The provision here of complying crest and toe levels provides for unencumbered launching and retrieval of power craft to about 7.5m in length. Minor regrading and filling would be required around the manoeuvring area and boat ramp crest to ensure adequate levels.

The manoeuvring area would be 8m wide and would be sited east of the pedestrian footpath. This location would ensure vehicles are not required to reverse across the pedestrian footpath. Timber bollards or a log barrier fence would be placed at the end of the manoeuvring area to delineate the footpath and improve pedestrian safety. The manoeuvring area would be asphalt.

The accessway would be 9m wide, to allow sufficient manoeuvring area for access to the adjacent 90 degree car and trailer parking (6 spaces), and situated in close proximity to the Marine Rescue building. It is strategically located to be utilised by Marine Rescue and boat ramp users, which reduces the number of vehicle routes across the pedestrian footpath. Pedestrian chicanes and warning signage would be installed across the footpath on both sides of the accessway and would be subject to assessment of sight lines for cyclists. A pedestrian crossing would also be installed to provide right of way to pedestrians and improve pedestrian safety. The accessway would be asphalt.

An asphalt de-rigging bay would be provided on the side of the accessway. The de-rigging bay would improve the amenity of the boat ramp by reducing congestion near the crest of the boat ramp. The de-rigging bay would be 3.5m wide and 20m long in accordance with the NSW Boat Ramp Facility Guidelines (RMS, 2015). A garbage facility would be located near the de-rigging bay. The garbage facility would be positioned close to the accessway so that it could be easily accessed by Council waste collection services. Wash down facilities could be incorporated into the de-rigging bay. Wash down facilities may include a fee for use, which would reduce wastage of water. It is envisaged that such a facility would be favoured by tourists who would be able to wash their boats before travelling home.

Formalised parking is proposed comprising 90 degree, rear to kerb, car and trailer parking next to the accessway and on the southern side of Tunis Street. In total, 25 car and trailer parking spaces would be provided with six (6) of these located next to the accessway and the remainder along Tunis Street. It is noted that the number of car and trailer parking spaces is low compared to the recommendations in the NSW Boat Ramp Facility Guidelines (RMS, 2015), which recommends approximately 25 to 30 spaces per lane. If required, additional rear to kerb parking spaces could be provided along Tunis Street or Short Street. Car only parking has not been included as there is ample space near the site for car only parking.
The dimensions of the car and trailer parking bays would be 12.5m long and 3.5m wide in accordance with the NSW Boat Ramp Facility Guidelines (RMS, 2015). The accessway and Tunis Street would be locally widened to 9m to provide sufficient manoeuvring area for rear to kerb parking. To ensure the required manoeuvring area is maintained, “No Standing” signs are proposed along the northern side of Tunis Street in the vicinity of car and trailer parking areas.

Speed control measures are proposed on Tunis Street and Short Street, at either end of the boat ramp and parking facility. These would comprise speed bumps with a narrowed road width in the vicinity of the speed bump, which may restrict vehicles travelling in opposite directions to pass. Slow down and caution signs would also be installed near the speed bumps noting reversing trailers. The speed bumps and road narrowing would:

- ensure vehicles slowdown in the vicinity of the boat ramp; and,
- deter thoroughfare traffic along Tunis Street and Short Street and encourage the use of alternate routes.

The speed bumps should not be of a slope and height as to interfere with car and trailers. Chicanes or similar traffic control measures were considered. However, these are not preferred as they are more difficult to negotiate with a car and trailer.

Car parking spaces would be surfaced with asphalt or permeable/plantable pavement (e.g. Driveable Grass) while the trailer bays would be grassed. Grassed areas and permeable paving are preferred to increase water infiltration, reduce runoff and improve aesthetics of the area. Timber bollards would be installed at the rear of all parking bays to prevent vehicles driving into the reserve or across the pedestrian footpath. This would reduce degradation of the reserve and improve safety for pedestrians.

Angled parking at either 60° or 45° was considered to facilitate parking. However, if angled parking was installed, car and trailers would be required to approach and leave the parking bays in the same direction. As such, car and trailer combinations would be required to drive around the block to access the parking area or boat ramp. 90° rear to kerb parking is preferred to simplify traffic flow and minimise congestion.

An on-ramp pontoon would be installed along the downstream side the boat ramp. It was considered that the positioning of an on-ramp pontoon along the upstream side of the ramp would impact navigation access to the adjacent Marine Rescue jetty. An additional advantage of installing an on-ramp pontoon on the downstream side of the ramp is that it provides a physical barrier to prevent vessels moored on the public wharf from encroaching into the boat launching/retrieval area. The pontoon would be 1.5m wide and provide a usable berth length at the Design Low Water Level of 1.5 times the length of the design vessel in accordance with the NSW Boat Ramp Facility Guidelines (RMS, 2015). The proposed boat ramp would be widened by 1.5m to provide a foundation for the on-ramp pontoon, resulting in an overall ramp width of 9.5m.

An alternative to the on-ramp pontoon would be to attach a gangway to the end of the existing public timber jetty that would provide access to a pontoon located south (upstream) of the jetty. The seaward berthing face of the pontoon would be positioned in line with the end of the timber jetty. The two (2) existing berthing piles south of the timber jetty would need to be removed. New berthing piles could be installed north of the jetty to retain a 20m berthing length if required.

On-ramp pontoons are generally preferable when boat users are launching by themselves because the boat tie up points are accessible next to the boat trailer and boats can be walked along the pontoon to a
trailer. However, when a boat is tied up to an on-ramp pontoon, one lane of the boat ramp cannot be used, which may increase congestion and conflict between users.

Engineered rock protection would need to be applied along the shoreline immediately downstream and possibly upstream of the proposed boat ramp to address existing foreshore erosion issues. It is noted that Council has already undertaken investigations into foreshore protections works in this area, including survey, concept design, and preparation of a cost estimate and construction drawings.

The existing sandy beach on the upstream side of the boat ramp is understood to be transient and would be retained where possible for beaching of craft and as an additional area for boat holding.

Additional geotechnical information would be required during detailed design to confirm:

- pavement design for the accessways and manoeuvring area;
- foundation design for the boat ramp; and,
- pile design to restrain the pontoon.

Additional items considered as part of the concept design included the installation of a dish drain between the parking spaces and Tunis Street. The dish drains would redirect water flow and minimise overland flow across the adjacent reserve area. Dish drains could be incorporated in the future as part of a broader stormwater management plan for the surrounding area if required.

**4.2.3 Estimate of Cost**
To be completed following drop-in session consultation.

**4.2.4 Summary of Consultation Feedback**
To be completed following drop-in session consultation.

**4.2.5 Final Concept Plan**
To be completed following drop-in session consultation.
5 References


NSW Department of Planning & Environment (2016), *Draft North Coast Regional Plan*, March.

NSW Maritime (2010), *NSW Boat Ownership and Storage: Growth Forecasts to 2026*, July.


Appendix A: Maps
Appendix B: Stakeholder Engagement Plan
Appendix C: Stakeholder Meeting Minutes
Appendix D: Cost Estimate