

BALLINA SHIRE COUNCIL

Review of Environmental Factors: Shaws Bay Foreshore Upgrades



Draft Report

January 2017

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PROJECT 16-038 – SHAWS BAY CZMP IMPLEMENTATION

REV	DESCRIPTION	AUTHOR	REVIEW	APPROVAL	DATE
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EXECUTIVE SUMMARY

The Shaws Bay Foreshore Upgrades project is a highly beneficial project which seeks to implement key recommendations made by the Shaws Bay Coastal Zone Management Plan. The works will result in significant improvement in public safety, accessibility amenity and visitor carrying capacity. The project will address key areas of erosion, which are at the root of several issues identified in the CZMP and will lead to creation significant areas of valuable salt marsh habitat and help to the protect the Coastal Cypress Pine Forest EEC from continued *ad hoc* impacts. The project can be implemented with minor environmental and social impacts and is well supported by the local community.

Pursuant to the provisions of the *Environmental Planning and Assessment Act, 1979* (EP&A Act), this Review of Environmental Factors (REF) has been prepared by Hydrosphere Consulting on behalf of Ballina Shire Council. The REF assesses the potential environmental impacts associated with the proposal to implement numerous works identified by the Coastal Zone Management Plan for Shaws Bay, including foreshore pathways, boardwalks and erosion control.

The applicable environmental planning instrument for the proposed works is *State Environmental Planning Policy (SEPP) (Infrastructure), 2007*. Under this SEPP, the works do not require development consent and therefore have been assessed under Part 5 of the EP&A Act. Ballina Shire Council is the determining authority for the proposed works. Under Part 5 of the EP&A Act, Ballina Shire Council must examine and take into account to the fullest extent possible all matters which are likely to affect the environment if the activity goes ahead.

Consideration has been given to the likely impact of the activity on the environment, having regard to all relevant factors. The environmental impacts of the proposal have been identified as localised, short-term and minor. Site specific environmental control measures have been recommended to mitigate impacts.

Based on the outcomes of the assessment presented in this REF it is concluded that by adopting the identified safeguards, it is unlikely that the proposal would result in significant adverse environmental impacts.

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1. INTRODUCTION

This Review of Environmental Factors (REF) has been prepared by Hydrosphere Consulting on behalf of Ballina Shire Council (BSC) to assess the potential environmental impacts associated with the construction and use of Shaws Bay foreshore improvement works as outlined in the following sections.

The proposed works represent the implementation of a number of high priority actions recommended in the Shaws Bay Coastal Zone Management Plan. This plan was developed with the benefit of a significant amount of community and agency liaison, including a period of public display. The plan has been adopted by Council, certified the NSW Minister for Planning and was Gazetted on 24 June 2016. Significant support for implementation of the plan is apparent within the community and funding applications under various grant public grant schemes have been successfully applied for.

The project consists of a number of proposed works which are designed to greatly enhance the recreational potential of Shaws Bay, whilst providing for significant improvement in public safety, waterway accessibility and carrying capacity. The project will include significant measure for protecting environmental values and offers a number of environmental enhancement opportunities that are recommended as part of the project.

2. SUMMARY DESCRIPTION OF THE PROPOSED WORKS

BSC propose to undertake the following foreshore and reserve improvement works around Shaws Bay. Plans and drawings of the proposed works are provided in Appendix 1 and a detailed description of the works activities is provided below.

2.1 East Arm

There are four main elements to the work within the East Arm:

2.1.1 Eastern sinkholes

This work is to stabilise and backfill sinkholes that occur along the shoreward boundary of the 'North wall' training wall (see photos Appendix 2), where sand is being lost to the tidal movement of groundwater through the wall. This component of the project seeks to remove the public safety risk associated with the sinkholes, reduce illegal dumping, improve the ability for Council to maintain this area of the reserve and improve habitat values and scenic amenity.

The work is terrestrial in nature, largely undertaken by excavator and will involve:

- Stripping the grass and clearing of some minor vegetation occurring over the sinkhole areas. Woody material will be temporarily stockpiled onsite and wood chipped for landscaping re-use onsite;
- Excavating the area of sinkholes to the tidal groundwater elevation. Excavated material will be temporarily stockpiled onsite before being utilised as backfill of excavated areas;
- Installing geofabric matting with the base and side(s) of the excavation areas;
- Construction of rock weir/revetment wall to the north of the sink holes to prevent future intrusion of estuary water from Shaws Bay. Construction will reuse the existing ad-hoc rock erosion control material where suitable.
- Backfill with sand to match surrounding topography. This may require some additional importation of sand to the site; and
- Once construction work is complete, work areas will be turfed and also replanted with native vegetation to restore and improve the existing vegetated areas.

2.1.2 East Arm Rock revetment

This work is to reinstate the rock retaining/revetment wall on the northern bank of the East Arm opposite North Wall (see cross-sections in Appendix 1 and photos Appendix 2) that is currently failing in several areas due to poor design/construction. The work seeks to halt erosion, thereby reducing siltation of the waterway, whilst improving visual amenity by removing (and reusing) rockwork that currently lies ineffective, improving shore line accessibility and reduce the risk of treefall.

The work will be undertaken primarily from the water side of the wall primarily by excavator at low tide. Access from this direction is proposed in order to limit the amount of disturbance to bankside vegetation. The following will be undertaken:

- Opening up an access way to allow an excavator to access the inter-tidal bed of the waterway;
- Removal/gathering and stockpiling of existing rocks to be reused in the wall construction;
- Import of additional rock and sand fill material;
- The wall would be constructed in short sections (say 10m) at a time to allow completion of wall sections within low-tide windows. Construction work will involve the following:
 - Excavating a shallow trench (to around -0.3m AHD – the current ponded low tide of Shaws Bay);
 - Lay geofabric within the trench and to form the backing of the wall; and
 - Sequentially place rock work, adjust the geofabric and backfill using sand until the design level (current bank height) is achieved.
- In order to allow room for rock placement whilst avoiding damage to bankside trees, the alignment of the rock wall will be up to approximately 3m offshore from the current bank; however the wall will be at a shallower gradient than current;
- Once the wall has been completed, final fill levelling will be undertaken and a combination of turf and native planting will be used to stabilise the site;
- Any sand that was excavated as part of the foundation trench would be used to back fill over the water side of the rocks to fill voids and account for settlement.

2.1.3 East Arm sandy beach and saltmarsh habitat establishment

This work aims to provide sandy beaches at a natural grade in the nominated areas of the northern bank of East Arm, opposite North Wall. The sand would extend from the variable current bed level within the East Arm to the existing surface of the surrounding park and would allow for the natural establishment of saltmarsh.

Three beach areas separated by headland-like structures will be created. These 'headlands' will act as groynes and will consist of large feature rock prominences designed to anchor the beach curvature, provide recreational opportunities and visual interest. Beaches will be realigned in a shallow crescent shape between prominences and re-contouring of the beach face to approximately a slope of 1 in 10, supplemented with import of clean sand to balance net fill requirements.

The following works would be undertaken, primarily by excavator which would gain access from the landward side:

- Strip loam capping/fill between the current bank and the stripping boundary which will typically be located at a 1:10 slope back from the current toe of bank;
- All loam will be utilised elsewhere within the park land for planting mounds, etc. but is not be used for any bankside works as the material is not consistent with the desired beach-like sand;

- The underlying sand will be graded to the design slope/configuration;
- A low-level rock wall is to be installed in one area to protect the toe of one section of the beach from channel scour. The wall will be constructed by a placing rounded loose rock (200-400mm ND) with a shallow trench and building to a crest level of around 0m AHD;
- Additional sand may be brought in and used to supplement the volume of the beach and backfill to the crest of the low level wall. This sand will need to be consistent with 'clean marine sand';
- A mowing edge will be established at the upper margin of the beach, and access between the grass and the sand will have . Low-level fencing will be installed along the mowing line to guide people to the main access points;
- The upper levels of the beach (say +0.3 to +1.0m AHD) that aren't frequently trafficked are expected to be colonised by areas of saltmarsh; and
- Some strategic planting of native shade trees is to be undertaken.

2.1.4 East Arm boardwalk

This elevated boardwalk will approximately follow the existing track through the saltmarsh/mangroves and will consist of a 2 to 2.5m wide boardwalk elevated on piers. The boardwalk is intended to replace an existing low-tide path through the mangroves and provide the opportunity for public appreciation of the mangrove/saltmarsh habitat, allow installation of low-key informative signage and provide for all-tide access through this area. Although the boardwalk will initially impact on marine vegetation during construction, there will be regeneration of saltmarsh areas through contouring of current minor erosion and a reduction in ad hoc trampling of mangroves/saltmarsh, thereby proving environmental benefit.

Exact materials for the boardwalk are to be determined but will be in keeping with the natural setting. The deck will be either a timber or composite construction with wooden/stainless steel hand rails. The deck level is intended to be dry at all tides (say +1.1m AHD, to be confirmed). The length of the boardwalk is approximately 75m, will have steps to the sand flat at the western extremity and will join the Eastern Pathway via a concrete access path at either end (Appendix 1). The following works are envisaged:

- Installation of piers;
- Installation of structural members, decking and handrails;
- Installation of low-profile signage and information boards; and
- Re-contouring of a section of eroded bank to match in with adjoining salt marsh and establish a mowing boundary.

The installation of the boardwalk and access paths will require the removal of a number of juvenile mangroves.

2.2 Eastern Pathway

This component aims to create a continuous level surface pathway that extends from the existing shared path on Lighthouse Parade to the east, approximately following the eastern shoreline of Shaws Bay and adjoining the existing footpath along Compton Drive at the northern end of Shaws Bay (Appendix 1). The pathway will provide low-gradient, shared access, along the entire eastern side of Shaws Bay. The pathway will generally be 2.5m wide and 100 to 200mm in depth, of concrete slab construction set slightly above existing ground level.

The eastern pathway starts at Lighthouse Parade where it will join to the existing pathway to North Wall. The path will run adjacent to Fenwick Drive through the public reserve adjacent to the east arm of Shaws Bay. Approximately 150m from Lighthouse Parade the path will leave Fenwick Drive and meander through the reserve between Lakeside Holiday Park and Shaws Bay. To the west of Lakeside Holiday Park the East Arm Boardwalk (see Section 2.1.4) will join the main path at two locations. The path then passes to the west of

Lakeside Holiday Park meandering through the public reserve via a route with the least impact on vegetation (no trees will require removal).

To the north of the holiday park the path will then enter Pop Denison Park passing through an area of vegetation. At this point the construction of the path will require the removal of minimal understorey vegetation. No mature or significant trees will be removed however some trees may require trimming. The path will intersect a number of informal existing tracks. Some of these tracks will be blocked by new planting, whereas others accessing the beach areas will be 'tidied up' through removal of dead vegetation, minor pruning and some planting along track boundaries to discourage new track creation off the path.

The pathway will continue in a north east direction from the vegetated area through Pop Denison Park traversing grassed areas (clearing of vegetation will not be required). The route will generally follow parallel to the shoreline through the park to the west of the existing access road into Pop Denison Park before joining the existing pathway adjacent to Compton Drive.

The overall length of the main pathway will be approximately 1.3km.

2.3 Pop Denison Park

In addition to the Eastern Pathway, Stage 1 works of the Pop Denison Park Masterplan are to be undertaken (see overview maps Appendix 1), which will involve:

- Extension of the main access road and incorporation of car parking at the southern end of this road. The existing road will be extended to form a loop around a grove of large trees. The road will follow existing clear ground/grass. Car parking may be implemented in a minimal fashion initially, but will be scalable as demand increases. Bollards/fencing will be installed around the perimeter of the road and parking area. The road will be bitumen surface to match existing. Stormwater from the parking area will be captured in infiltration pits. No clearing of trees will be necessary however minor trimming of some low-lying overhanging branches may be required;
- Upgrade of the existing toilet block. Facilities will be plumbed in to the Council sewerage system and runoff from the building roof and surrounding hard surfaces will be captured by bioretention/infiltration pits;
- Infilling of an apparent erosion gully near the forest shoreline. Clean sand would be transported by mini-loader following existing pathways and the Eastern Pathway route and deposited in the eroded area. Some minor mangrove seedling growth would be removed (discussed in section 7.4.3)
- Two areas adjacent to the east beach will be cleared and improved for recreational use. Current low lying vegetation will be removed and grassed areas will be established with the provision of picnic tables and seating. Each table area will be approximately 15 m² and will be strategically placed for maximum recreational benefit and minimum environmental footprint (e.g. in shade and close proximity to beach but in areas not requiring excessive vegetation removal). One of the sites will be the filled area described in the point above.

These works are intended to increase the visitor carrying capacity of Pop Denison Park, whilst enhancing the value of the Cypress Pine Endangered Ecological Community and reducing ad hoc impacts associated with track formation and littering. Importantly this work is designed to complement the gradual refocussing of visitor activity such that water activities are more likely to occur in the better water quality away from the North Arm, whereas the North Arm itself will become more of an ecological zone as envisaged by the Shaws Bay CZMP.

2.4 Western Foreshore Improvements

These works will redevelop the existing car parking and improve water access to Shaws Bay along Compton Drive. The key aims are to improve parking arrangements, separate shared path users from vehicular traffic, improve aesthetic appeal, provide for improved interception and treatment of stormwater flows, increase

waterway accessibility and provide additional amenities. Improvement works are illustrated in Appendix 1 and include installation of new access ramp and steps, extension of stormwater drain, upgrading of existing stormwater pits to bioretention basins, improved bitumen car parking areas, turfing of foreshore area, realignment of footpath, provision of picnic shelters, BBQ's and shower facilities, planting of trees along foreshore, provision of pedestrian traffic refuge island and renourishment and grading of existing beach. The construction works include:

- The existing concrete ramp will be demolished and removed and existing stormwater pipe/outlet will be extended to allow the construction of the new timber ramp.
- Construction of a timber/recycled plastic ramp on the eastern end of existing 'cove'. The ramp will be at a slope of 1 in 14, running east to west. Construction of the ramp will include removal of a small area of saltmarsh, installation of piles and construction of deck and railings. Large round rocks or concrete planks will be placed underneath and in front of the eastern end of the ramp in a step like formation to prevent access under the ramp.
- At the western end of the cove large steps will be constructed from neutral timber coloured recycled plastic materials.
- The beach within the cove will be regraded and renourished to approx. +1.0m AHD to re-establish beach access to the water. Additional future sand nourishment may occur in the future during planned dredging works which will be assessed as a separate project.
- Approximately 250m of the existing concrete pathway will be re-aligned. This will involve demolition and disposal of existing pathway and construction of a new concrete pathway which will generally be 2.5m wide however will be wider around foreshore access areas. The realigned path will deviate to the south of the current path to allow the provision of parking space between the pathway and Compton Drive.
- The existing stormwater drain at this location will be rerouted to discharge further to the south of the current location.
- Two bitumen parking areas will be constructed providing 35 parking spaces. Parking spaces will be line marked and bollards/bump stops installed to prevent vehicle access over pathway. Stormwater from the two parking areas will be directed to two existing stormwater pits which will be upgraded to appropriately designed bioretention pits.
- Between the realigned pathway and the existing foreshore revetment wall, topsoil will be imported and turf laid to provide a grassed area. A number of trees will also be planted to provide shade and increase aesthetics of the area. The top of the existing revetment wall will be concrete capped.
- Two shower facilities will be constructed. A number of picnic tables/shelters/BBQ's will be installed in various locations around the revegetated grassed areas.

3. REASONS FOR THE ACTIVITY AND CONSIDERATION OF ALTERNATIVES

The Shaws Bay Coastal Zone Management Plan (CZMP) was adopted by Council in 2015. The overall management goal for the Shaws Bay CZMP is: *"to improve the recreational amenity of Shaws Bay and to ensure that the habitat and ecological values of the Bay are maintained within an acceptable range."* The plan identifies a number of environmental and recreational issues in Shaws Bay and discusses the processes behind these issues. A number of options and alternatives were considered in the plan with a list of key optimum actions to address the identified issues and protect and enhance Shaws Bay. Each of the proposed works are part of or directly aligned with key actions outlined in the CZMP (See Section 5.3).

3.1 East Arm Erosion Control

Erosion of the East Arm of Shaws Bay was one of the key management issues identified by the CZMP which has linkages to several other issues such as poor water quality, sedimentation, restricting community access to the waterway and public safety issues.

Erosion of the east arm bank was originally identified as a management issue in the Shaws Bay EMP (2000). A number of options for the management of the east arm erosion since have been considered since with the current design being developed since 2009 with the involvement of a number of agencies including NSW OEH, Fisheries and Ballina Shire Council and consultants (GeoLINK, 2009; Hydrosphere Consulting, 2016). The current proposed design is considered to be the optimum design to achieve a wide range of outcomes including rehabilitating previous erosion, preventing future erosion, improving public safety and community access whilst having minimal environmental impact.

3.2 Eastern Pathway

Community foreshore access and a community desire for improved foreshore recreational facilities around Shaws Bay were two of the top six major management issues identified in the CZMP. Currently, the only pathways that exist in the vicinity of Shaws Bay are the path along North Wall and the Compton Drive pathway, both of which provide only very limited access (one access point) to Shaws Bay. No pathways are provided on the eastern foreshore of the bay with access limited to unformed access ways across grassed and vegetated areas and informal access tracks through sensitive vegetation (saltmarsh, mangroves, Cypress Pine Forest) providing limited access opportunities for visitors.

The provision of the Eastern Pathway will provide a continuous concrete path linking the North Wall pathway to the south east and Compton Drive pathway to the north providing access opportunities along the entire eastern foreshore of Shaws Bay. The path will allow users to access areas of the eastern foreshore and associated park areas from a pathway. The pathway will also complement existing pathways in East Ballina providing a network of pathways within the vicinity of Shaws Bay. Auxiliary paths from the main eastern pathway will provide formed foreshore beach access ways through sensitive vegetation which will improve user experience and provide ecological protection.

The alternative to the pathway and associated access tracks is to not construct the paths or only limited access ways. This would lead to continued disappointment of users, poor access and continued degradation of sensitive vegetation areas. The proposed works are considered the best option for providing improved community access and foreshore facilities and protection of sensitive ecological areas.

3.3 Pop Denison Park

As discussed previously, community foreshore access and a community desire for improved foreshore recreational facilities around Shaws Bay were two of the top six major management issues identified in the CZMP. Subsequently, a priority improvement action developed in the CZMP was '*Expansion of Pop Denison Park and improvement of access to the eastern foreshore*'. This action has been progressed by the development of a Pop Denison Park Masterplan (Amos, 2016) and preparation of the proposed Pop Denison Park works.

Facilities and parking areas within Pop Denison Park are ageing and limited, particularly during peak summer usage with limited foreshore recreational and access areas. The proposed Pop Denison Park works are Stage 1 of the masterplan and will provide increased parking areas, improved facilities (amenities block), improved recreational areas and improved foreshore access. Other alternatives were considered including that proposed in the master plan which was refined to avoid vegetation clearing. The current proposal is considered the best option for improving the recreational experience of Pop Denison whilst maintaining and enhancing ecologically sensitive areas.

3.4 Western Foreshore Improvements

Due to restricted foreshore access, limited facilities and public safety concerns 'Western foreshore improvements' was considered to be a priority action within the CZMP. The proposed works will:

- Improve foreshore access by providing ramp and stair access to the water;
- Improve facilities through the provision of showers, BBQ's and picnic tables and grassed areas; and
- Improve public safety by formalising parking areas relocating pathway.

4. COMMUNITY AND AGENCY CONSULTATION

A significant amount of consultation has been undertaken during the planning of the Shaws Bay foreshore improvement works being considered in this REF. These consultation activities have ranged from public meetings, liaison with individual residents, discussions with regulatory agencies, provision of information and documentation on Council's website and public exhibition of plans.

An agency consultation letter has been sent to DPI-Fisheries, Office of Environment & Heritage, Department of Industry- Lands, Jali Local Aboriginal Land Council and NTSCorp. This letter outlines the scope of the project and invited comments on the proposal. Responses were received by NSW Fisheries, DI-Lands and OEH and are provided in Appendix 3.

Specific consultation activities undertaken for the project include:

4.1 Shaws Bay CZMP

The following key consultation activities were undertaken:

- Community survey – To engage the community and obtain input into the CZMP development, a survey was developed. The survey was available on-line and hard copy with 105 on-line and 18 hard copy surveys (123 total surveys) completed. Section 4.3, Volume 2 of the CZMP provides a summary of the survey results;
- Project webpage – A project webpage was used to introduce the project, provide a link to the on-line community survey, project updates and contact details for further information. The webpage address was communicated to community and stakeholders in media and other correspondence and a link was provided on the Ballina Shire Council as well as Hydrosphere Consulting's websites;
- Community drop-in session 1 – Wednesday 9 April 2014 (during community survey period). The aim of the session was to encourage community involvement and completion of the survey and facilitate ideas for the CZMP development;
- Media and advertising – various forms of media were utilised to advertise the project and encourage community involvement in the survey and drop-in sessions. This included:
 - Media release - 24 March 2014 distributed to print, TV, radio and web-based media;
 - Council notices in the Advocate newspaper – 26 March 2014 and 2 April 2014; and
 - Article in Community Connect – distributed to Ballina Shire residents 7 April 2014.
- Targeted stakeholder consultation with key stakeholder groups. This included a phone call, email or letter informing stakeholders of the survey, webpage and inviting input. Follow-up meetings were held with the major stakeholders where necessary to discuss and clarify comments;
- Meetings with the Project Reference Panel (relevant Council staff and representatives from Fisheries NSW and the Office of Environment and Heritage, OEH) and ongoing liaison as required;

- Follow-up discussions with the relevant stakeholders as necessary on issues as they arise. This included members of the public who raised concerns or suggested approaches that had not been considered by the project team;
- Councillor workshop – The development of the draft CZMP was presented to Ballina Shire Councillors on 11 August 2014;
- Public Display - The Final Draft CZMP was placed on public exhibition for 21 days (as per legislative requirement) during September 2014. Formal (written) submissions on the Draft CZMP were sought from the community and stakeholder groups. Submissions were considered in the development of the Final CZMP; and
- Community drop-in session 2 – Thursday 11 September 2014 (during the public exhibition stage). This was an opportunity for informal discussions between the community, stakeholders and the project team to discuss issues and obtain feedback prior to formal submissions.
- The project was advertised in Council's newsletter, Community Connect and in the Advocate newspaper as well as media releases to other media outlets.

4.2 Pop Denison Park Masterplan

This plan was developed towards the end of the Shaws Bay CZMP development and was focussed on providing specific direction to facilities to be developed within this high use area of Shaws Bay. The community consultation activities undertaken as part of the development of this plan included:

- A 3½ hour public information drop-in session at Pop Denison Park on Saturday, 27 June 2014;
- An additional 3 hour public information drop-in session near the Wigmore Arcade, River Street Ballina on Saturday 8 August 2014;
- An online survey that was made available via Council's website;
- Media articles promoting the plan and encouraging community feedback and participation at the drop-in sessions;
- Specific meetings with interest groups, including a Youth Council meeting; and
- Exhibition of the draft masterplan, including facility for community feedback.

During the course of the plan development the following groups/organisations were identified and invited to provide input:

- DPI – Fisheries;
- DPI – Crown Lands;
- NSW Police;
- Lakeside Holiday Park;
- Existing park users; and
- Adjoining and nearby residents.

4.3 NSW Department of Primary Industries – Fisheries

Balanced protection of the aquatic estuarine environment is a key concern for the project and there has been ongoing liaison with DPI-Fisheries with respect to infrastructure planning at Shaws Bay. Consultation activities have included:

- Liaison during the development of the Shaws Bay CZMP and Pop Denison Park Masterplan (as detailed above);
- Site visits with DPI-Fisheries offices on a least two occasions to discuss overall concepts for foreshore development around Shaws Bay to gain input on specific design elements and regulatory requirements; and
- Council liaison with DPI-Fisheries regarding estuarine vegetation management and adjustments to Council's permit for managing mangrove growth around the Bay in the context of the abovementioned plans.

4.4 Adjoining Property Owners/Residents

Council is currently developing a project newsletter/factsheet which will be sent to all neighbouring and nearby residents and will be available on Council's webpage. Specific landowners, including the Lakeside Caravan Park have been contacted regarding the project and will be sent a copy of the fact sheet as an invitation to provide comment prior to works commencing. A copy of the draft fact sheet is provided in Appendix 4.

4.5 Aboriginal Community

The Jali Local Aboriginal Land Council and NTSCorp have been sent introductory information regarding the project and have specifically been invited to register interest or provide feedback. No feedback on the proposal has been received from either agency by the nominated date.

No comments of specific relevance to the planned works were received from the Aboriginal community during consultation for the Shaws Bay Coastal Zone Management Plan.

The current project will be presented for discussion and input during the February 2017 meeting of Council's Aboriginal Community Committee. Any comments received during that discussion will be documented and acted upon as relevant.

5. REGULATORY CONSIDERATIONS

5.1 Planning Provisions

5.1.1 Ballina Local Environmental Plan 2012 (BLEP)

The area of the proposed works is located within the Ballina Shire Council (LCC) Local Government Area. Land use is governed by the Ballina Local Environmental Plan 2012. The LEP zoning for the works sites are as follows (Figure 1):

- East Arm - The works sites are located on land zoned RE1 – "Public Recreation" except for the boardwalk also traverses a small area zoned as W2 – "Recreational Waterway. Environmental Protection works are permitted without consent in RE1 zones and Jetties/ water recreation structures are permitted with consent within W2 zones.
- Eastern Pathway - RE1 – "Public Recreation"
- Pop Denison Park - RE1 – "Public Recreation"
- Western Foreshore Improvements - RE1 – "Public Recreation" and W2 – "Recreational Waterway"
- North Wall Pathway - RE1 – "Public Recreation" , W2 – "Recreational Waterway" and B1 Neighbourhood



Figure 1: Ballina LEP 2012 land zoning

Acid sulfate soil mapping

Ballina LEP 2012 ASS mapping classes for the works areas are as follows (Figure 2):

- East Arm – Class 3
- Eastern Pathway – Class 1 and 3
- Pop Denison Park - Class 3
- Western Foreshore Improvements – Class 5
- North Wall Pathway – Class 5

Under the BLEP works on the following ASS classes require development consent:

- Class 1 – Any works.
- Class 3 – Works more than 1 metre below the natural ground surface.
Works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface.
- Class 5 – Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.

To obtain development consent for works requiring consent (as above) an acid sulfate soils management plan must be prepared unless a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual indicates that an acid sulfate soils management plan is not required for the works. Development consent is not required if the works are carried out by a public authority and the works are minor works, being work that costs less than \$20,000 (other than drainage work) or the works that involve the disturbance of less than 1 tonne of soil and are not likely to lower the water table.



Figure 2: Ballina LEP 2012 ASS mapping

5.1.2 State Environmental Planning Policy (Infrastructure) 2007

The *State Environmental Planning Policy (Infrastructure) 2007* (known as the Infrastructure SEPP) assists in providing infrastructure by modifying planning provisions to improve efficiency and service delivery.

Under Part 3 Division 12, Clause 65 of the Infrastructure SEPP:

“Development for any of the following purposes may be carried out by or on behalf of a council without consent on a public reserve under the control of or vested in the council.... including roads, cycleways.... viewing platforms.... environmental management works.”

Further, under Division 25, Clause 129 of the Infrastructure SEPP:

“.... development for the purpose of waterway or foreshore management activities may be carried out by or on behalf of a public authority without consent on any land.”

Under the Infrastructure SEPP - **waterway or foreshore management activities** means:

- (a) *riparian corridor and bank management, including erosion control, bank stabilisation, resnagging, weed management, revegetation and the creation of foreshore access ways, and*
- (b) *instream management or dredging to rehabilitate aquatic habitat or to maintain or restore environmental flows or tidal flows for ecological purposes, and*
- (c) *coastal management and beach nourishment, including erosion control, dune or foreshore stabilisation works, headland management, weed management, revegetation activities and foreshore access ways, and*
- (d) *coastal protection works, and*
- (e) *salt interception schemes to improve water quality in surface freshwater systems, and*
- (f) *installation or upgrade of waterway gauging stations for water accounting purposes.*

It is understood that the reserve improvement components of the works are permitted without consent under Part 3 Division 12, Clause 65 of the Infrastructure SEPP and erosion control and foreshore access works are permitted without consent under Division 25, Clause 129 of the Infrastructure SEPP.

BSC is the proponent and determining authority responsible for deciding whether to approve or proceed with the activity. This REF has been prepared in accordance with Part 5 of the *Environmental Planning and Assessment Act, 1979* (EP&A Act) and Section 111 of the Act, which requires that the proponent (BSC) take into account to the fullest extent possible all matters affecting or likely to affect the environment due to the proposed activity.

5.1.3 State Environmental Planning Policy No. 14 – Coastal Wetlands

The aim of SEPP 14 is to ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of NSW. No SEPP 14 wetlands are mapped within Shaws Bay.

5.1.4 State Environmental Planning Policy No. 70 – Coastal Protection

SEPP no. 71 – Coastal Protection is designed to protect sensitive coastal values and provide a coordinated assessment and management process for the coastal zone. The proposal is located within the coastal zone as defined by SEPP 71. Clause 8 of the SEPP provides matters to be taken into account by a consent authority when determining an application to carry out a development in the coastal zone. These matters are addressed in Attachment 3.

5.1.5 Fisheries Management Act 1994

The objectives of the *Fisheries Management Act 1994* (FM Act) are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. To meet the primary objectives,

Part 7 of the FM Act deals with the protection of aquatic habitats and Part 7A deals with threatened species conservation.

Under Section 201 of the FM Act, a permit is required for dredging or reclamation work carried out by a local government authority, unless these works are authorised by a relevant public authority (other than a local government authority) or under the *Crown Lands Act 1989*. If any marine vegetation (saltmarshes, mangroves, seagrass and seaweeds) is considered to be affected by the proposal, a permit to harm (cut, remove, damage, destroy, shade, etc.) marine vegetation under s205 would be required. Fisheries NSW policy and guidelines outline types of Key Fish Habitats (Table 1).

Table 1: Key Fish Habitats outlined in *Policy and guidelines for fish habitat conservation and management (NSW DPI, 2013)*

**Table 1 – Key fish habitat and associated sensitivity classification scheme
(for assessing potential impacts of certain activities and developments on key fish habitat types)**

TYPE 1 - Highly sensitive key fish habitat:

- *Posidonia australis* (strapweed)
- *Zostera*, *Heterozostera*, *Halophila* and *Ruppia* species of seagrass beds >5m² in area
- Coastal saltmarsh >5m² in area
- Coral communities
- Coastal lakes and lagoons that have a natural opening and closing regime (i.e. are not permanently open or artificially opened or are subject to one off unauthorised openings)
- Marine park, an aquatic reserve or intertidal protected area
- SEPP 14 coastal wetlands, wetlands recognised under international agreements (e.g. Ramsar, JAMBA, CAMBA, ROKAMBA wetlands), wetlands listed in the Directory of Important Wetlands of Australia²
- Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in two dimensions, snags greater than 300 mm in diameter or 3 metres in length, or native aquatic plants
- Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act
- Mound springs

TYPE 2 – Moderately sensitive key fish habitat:

- *Zostera*, *Heterozostera*, *Halophila* and *Ruppia* species of seagrass beds <5m² in area
- Mangroves
- Coastal saltmarsh <5m² in area
- Marine macroalgae such as *Ecklonia* and *Sargassum* species
- Estuarine and marine rocky reefs
- Coastal lakes and lagoons that are permanently open or subject to artificial opening via agreed management arrangements (e.g. managed in line with an entrance management plan)
- Aquatic habitat within 100 m of a marine park, an aquatic reserve or intertidal protected area
- Stable intertidal sand/mud flats, coastal and estuarine sandy beaches with large populations of in-fauna
- Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in TYPE 1
- Weir pools and dams up to full supply level where the weir or dam is across a natural waterway

TYPE 3 – Minimally sensitive key fish habitat may include:

- Unstable or unvegetated sand or mud substrate, coastal and estuarine sandy beaches with minimal or no in-fauna
- Coastal and freshwater habitats not included in TYPES 1 or 2
- Ephemeral aquatic habitat not supporting native aquatic or wetland vegetation

Water Management Act 2000

In stream works are regulated by the controlled activity provisions of the *Water Management Act 2000* (WM Act). The NSW Office of Water administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to waterfront land as a consequence of carrying out the controlled activity. Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary.

Under Section 38 of the *Water Management (General) Regulation, 2011* a public authority is exempt from Section 91E (1) of the Act in relation to all controlled activities that it carries out in, on or under waterfront land.

5.2 Other Statutory Considerations

Threatened Species Conservation Act 1995

The objectives of the *Threatened Species Conservation Act 1995* (TSC Act) are to conserve biological diversity and promote ecologically sustainable development by preventing the extinction and promoting the recovery of threatened species, populations and ecological communities.

Environment Protection and Biodiversity Conservation Act, 1999 (Commonwealth)

The *Environment Protection and Biodiversity Conservation (EPBC Act) Act 1999* provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places defined in the EPBC Act as matters of national environmental significance. The Act lists threatened species or ecological communities that are recognised as a matter of national environmental significance.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974 (NPW Act)* provides for the statutory protection of Aboriginal cultural heritage places, objects and features.

Heritage Act 1977

All non-Aboriginal archaeological relics across NSW (including NPWS estate) over 50 years old are managed under the *Heritage Act 1977*. Any works or activities that may disturb non-Aboriginal archaeological relics must have an Excavation Permit, which is a separate approval under the *Heritage Act 1977*.

5.3 Coastal Zone Management Plan

The Shaws Bay Coastal Zone Management Plan was adopted by Council in 2015, certified the NSW Minister for Planning and was Gazetted on 24 June 2016. The CZMP contains a number of recommended management actions to address key issues and protect and enhance the Bay. The overall management goal for the Shaws Bay CZMP is: *“to improve the recreational amenity of Shaws Bay and to ensure that the habitat and ecological values of the Bay are maintained within an acceptable range.”* Nine improvement actions were recommended in the CZMP. The proposed works directly address or are significantly aligned with six of the CZMP actions as outlined in Table 2.

Table 2: Relevant Shaws Bay CZMP Actions and relevant proposed works

CZMP Action	Proposed works aligned with/addressing action
1 – Control of East Arm bank erosion and creation of sandy beach.	East Arm works – directly addressing action by providing erosion control and creation sandy beach.
2 – Dredging of Main Section of Shaws Bay	Pop Denison Park – improving foreshore access to future planned sandy beach areas created from dredged material. The planned works take account of and are intended to maximise the benefits of future dredging of Shaws Bay.
3 – Review and upgrade of stormwater treatment controls	Western foreshore improvements – upgrade of existing stormwater pits within works area to bioretention/infiltration basins. Pop Denison Park – improvement of car park stormwater management and gully erosion.
4 – Western foreshore improvements	Western foreshore improvements – directly addresses CZMP action by upgrading western foreshore access and amenity.
5 – Expansion of Pop Denison Park and improvement of access to eastern foreshore.	Pop Denison Park and Eastern Pathway works – provision of expanded car parking and improved foreshore access and recreational areas.
6 – Development of Fenwick Drive foreshore area	East Arm works and Eastern Pathway works – erosion control, improvement of foreshore access and recreational amenity of Fenwick Drive foreshore area.

5.4 East Ballina Reserves Vegetation Management Plan

The East Ballina Reserves Vegetation Management Plan (VMP) provides strategies and actions to assist in the restoration of native vegetation communities throughout Public Reserves in East Ballina. The plan included vegetation within the vicinity of Shaws Bay. A number of recommendations were made for the management of Shaws Bay reserves vegetation (within this study area). Recommendations for *Zone 2c - Patches of vegetation within Denison Park and foreshore vegetation around the eastern edge of Shaws Bay up to the North Wall* are provided in Table 3. The proposed works directly addresses the recommendation to investigate options to prevent further erosion of foreshore opposite North Wall (East Arm) and are consistent with the other recommendations.

Table 3: Blackwood Ecological Services (2014) Zone 2c vegetation management recommendations.

Recommendation	Priority
Control exotic and invasive non-local native species within patches of native vegetation.	Medium
Consolidate clumps of vegetation by supplementary plantings in open areas and where Coast wattles have died.	Low
Consultation with Lakeside Holiday Park required regarding planted exotics within parkland areas	Low
Patch of Resurrection plant outbreak and sailor boy daisy along foreshore (between North Wall and caravan park) should be controlled through spraying to prevent spread	High
Sporadic Treasure flower occurs along the foreshore areas and should be sprayed to suppress the spread of this weed	Low
Investigate options to prevent further erosion of the foreshore opposite the north wall.	Medium
There is a planted area of the parkland (opposite #52 Fenwick Drive) which has been planted by a local resident most likely and is irrigated. Investigate option of consulting local resident and negotiating to remove the highly invasive weeds such as Mother-in-laws tongue and Umbrella tree.	Low

6. DESCRIPTION OF THE EXISTING ENVIRONMENT

6.1 General Site Description

Shaws Bay is a popular recreational area of great importance to the local community. Shaws Bay and the adjoining foreshore areas have a long association with the leisure time pursuits of the residents of Ballina and visitors to the area stretching back to the early 1900's. The natural assets attract visitors to the area and the Bay is strategically important as part of Ballina's tourism industry, which is a key driver of the local economy.

Popular community uses of Shaws Bay are focussed on low impact aquatic activities such as swimming, snorkelling, and paddle boarding. Nature appreciation, utilisation of barbeque and picnic facilities as well as family use of playgrounds are also popular. Recreational use of the Bay is increasing due to an expanding population and proximity to SE Qld, particularly following the Pacific Highway upgrade. It also provides an alternative to local beaches, given the recent shark activity, and to Lake Ainsworth, which is sometimes affected by algal blooms.

6.2 Site Location and Ownership

All proposed works sites are located on public reserves within the vicinity of Shaws Bay, East Ballina (Table 4, Figure 3).

Table 4: Location of proposed works sites

Site	Lot & DP	Reserve No.	Reserve Purpose/Land Use
East Arm	Lot 497 DP 729703	R88004	Public Recreation/ Public Reserve and Ballina Coast Guard
Eastern Pathway	Lot 497 DP 729703	R88004	Public Recreation/ Public Reserve and Ballina Coast Guard
	Lot 439 DP 43825	R88004	Public Recreation/ Public Reserve
Pop Denison Park	Lot 7016 DP 1068899	R88004	Public Recreation/ Public Reserve
Western Foreshore Improvements	Lot 7017 DP 1064314	R1010068	Public Recreation & Coastal Environmental Protection/ Public Reserve
		Partially on road reserve	



Figure 3: Crown Reserve locations and Lot & DP's

6.3 Topography and Soils

Current topography of the Shaws Bay catchment includes a steep heavily vegetated escarpment to the west and north and flat delta shoals, back barrier beach and washover deposits which have been compacted for urban development. The escarpment above Shaws Bay represents former sea cliffs of basalt rock with a thin sand cover, remnant from former transgressive dune development and Aeolian sand accumulation. The urban development and reserve areas have a natural substrate of marine sand with imported marine sand and loamy material with a thickness of 0.5m used as fill (PBP, 2000a).

Acid sulfate soil risk is discussed in Section 5.1.1.

6.4 East Arm

The east arm erosion control works are situated on the foreshore of Fenwick Drive Park. The park is utilised for a range of leisure activities. On the northern side of the park is a residential area. Shaws Bay and the Richmond River are located to the south and west of the works site. Ballina Lakeside Holiday Park is located directly adjacent to the north-west.

6.5 Eastern Pathway

The entire length of the pathway is located on public reserve which is zoned/used for public recreation.

- Southern extent - The marine rescue tower is located directly to the south. Residential houses are located on the opposite side of Fenwick Drive.
- Middle section – Ballina Lakeside Holiday Park is located directly to the north and east of the middle section of the pathway. Shaws Bay is directly to the west.
- Northern extent – The northern section of the pathway is located within Pop Denison Park (public recreation). A residential area is situated to the east of Pop Denison Park.

6.6 Pop Denison Park

The works for this area will occur entirely within Pop Denison Park (public recreation). A residential area is located approximately 100m to the east of the proposed works area and Ballina Lakeside Holiday Park is located immediately to the south.

6.7 Western Foreshore Improvements

The area is currently used for public recreation. Several residential properties are located approximately 40m north on the opposite side of Compton Drive.

6.8 Waterways

Shaws Bay is a modified tidal embayment that was once part of the Richmond River channel. It was created by construction of the northern river training wall and reclamation of land for urban development. The Bay is connected to the Richmond River and tidal flows enter and exit through the rockwork of the training wall. The oceanic tidal influence on Shaws Bay is due to the open (porous) structure of the training wall separating Shaws Bay from the Richmond River estuary. The influence of the tide is visually apparent, particularly in the East Arm, where tidal flows can be observed, depending on the tide state, to be entering or exiting through the rockwork of the training wall.

During incoming tides, the main tidal flow, particularly in the early stages of the rise, originates along the eastern half of the training wall, where water freely flows from distinct locations, often creating small scour holes and channels. The flow is not constant but tends to arrive in pulses, corresponding to changing water levels due to wave action in the Richmond River propagating through the wall. The transmission of these long-period waves through the wall contributes to bank erosion issues in the East Arm. The large tidal

exchange and concentration of much of this flow in the East Arm, means that tidal flows are highly directional in this part of Shaws Bay, with velocities up to 0.3m/s in the sandy channel of the East Arm (PBP, 2000a).

6.9 Terrestrial Vegetation

Blackwood Ecological Services (2014) assessed terrestrial vegetation communities with the vicinity of Shaws Bay. Results from Blackwood Ecological Services (2014) indicate a number of vegetation types exist within the proposed works area and are as follows (Figure 4).

- East Arm:
 - Mixed native woodland/shrubland (Coastal banksia/Screw pine/ Horsetail she-oak/ Swamp oak/ Coastal wattle);
 - Coastal banksia woodland/ shrubland;
 - Saltmarsh;
 - Mangroves.
- Eastern pathway:
 - Mixed native woodland/shrubland (Coastal banksia/Screw pine/ Horsetail she-oak/ Swamp oak/ Coastal wattle);
 - Coastal banksia woodland/ shrubland;
 - Coastal Cypress Pine Open Forest (Endangered Ecological Community).
- Pop Denison Park:
 - Mixed native woodland/shrubland (Coastal banksia/Screw pine/ Horsetail she-oak/ Swamp oak/ Coastal wattle);
 - Coastal cypress pine open forest (Endangered Ecological Community);
 - Slash pine forest (exotic);
 - Saltmarsh (foreshore access tracks);
 - Mangroves (foreshore access tracks).
- Western Foreshore Improvements:
 - Mixed native woodland/shrubland (Coastal banksia/Screw pine/ Horsetail she-oak/ Swamp oak/ Coastal wattle).
- North Wall Boardwalk/Pathway:
 - Coastal cypress pine open forest (Endangered Ecological Community) – See Section 6.9.1.



Figure 4: Vegetation communities within the vicinity of Shaws Bay (Blackwood Ecological Services, 2014)

6.9.1 Coastal Cypress Pine Forest Endangered Ecological Community

Blackwood Ecological Services (2014) mapping indicates the presence of several stands of Coastal Cypress Pine Forest within the vicinity of Shaws Bay including within the proposed alignment of the Eastern Pathway and associated Pop Denison access tracks (Figure 4). Mapping of this EEC was coarse around Shaws Bay and an additional site inspection was undertaken by Hydrosphere Consulting and Landmark Ecological Services representatives to verify the extent and condition of the Coastal Cypress Pine Forest. It was confirmed that this EEC is present and part of the planned pathway will intersect with areas considered EEC.

The condition of the CCPF was variable, with areas represented by virtually isolated mature pines surrounded by mown grass, through to areas of reasonably thick coverage, significant growth of immature pines as well as growth of various associated understorey species associated with this EEC. The EEC is currently impacted by non-endemic plantings, weed species, ad hoc track development, arson and illegal dumping. The area has previously been planted and not all of the vegetation is consistent with Coastal Cypress Pine Forest.

The site inspection confirmed that the planned works can be undertaken with minimal initial impact to the EEC, with substantial long-term benefits due to recommended vegetation rehabilitation to be associated with the works. This is discussed further in Section 7.3. A summary of species associated with Coastal Cypress Pine Forest and a 7-part test of significance of potential impacts is given in Appendix 8.

6.10 Estuarine Vegetation

Three broad types of estuarine vegetation are present within the proposed works area and broader Shaws Bay including seagrass, saltmarsh and mangroves. Hydrosphere Consulting (2015) undertook estuarine vegetation mapping of Shaws Bay which is presented in Figure 5 and discussed in the following sections.



Figure 5: Distribution of estuarine vegetation within Shaws Bay

6.10.1 Seagrass

Shaws Bay supports relatively large areas of seagrass meadows. Seagrass communities within Shaws Bay historically have consisted of two species, *Zostera capricorni* and *Halophila ovalis*. The communities are overwhelmingly dominated by *Z. capricorni* which appears as long grass like strands of seagrass (up to

50cm long). *H. ovalis* is a much smaller and delicate species which has small ovate leaves which grow very close to the bottom substrate, appearing generally around the margins of *Z. capricorni* meadows.

Aerial photography (2013) mapping of seagrass indicated approximately 31,129m² of seagrass present within Shaws Bay (Figure 5). The largest seagrass meadows in Shaws Bay occur in the East Arm, directly adjacent to the proposed East Arm works. Seagrass areas within the vicinity of the East Arm works area were mapped in April 2016 using RTK GPS. This mapping indicates seagrass occurs in close proximity to East Arm works area and a small area of seagrass is within the construction footprint of the works around the existing stormwater drain. Figure 5 indicates that seagrass meadows (Type 1 key fish habitat) occur directly adjacent (within 15 m) to the Western Foreshore Improvements works site.

6.10.2 Saltmarsh

Saltmarsh communities are comprised of low growing hyper-saline adapted plant species and are often zoned within the community according to tide levels and frequency of inundation and subsequently salinity levels. Dominant species that are indicative of a saltmarsh community in NSW include Samphire (*Sarcocornia quinqueflora*) at the lower more frequently inundated levels, Saltwater Couch (*Sporobolus virginicus*) dominating the mid-level saltmarsh and Sea Rush (*Juncus kraussii*) which is usually dominating the drier plant communities at higher elevations (DPI, 2013). However, with over 200 plant species known to occur in Coastal Saltmarsh environments there are a number of possible combinations of plant species. Coastal Saltmarsh is currently recognised as being at very high risk of extinction in NSW and is classified as an Endangered Ecological Community (EEC) under the NSW Threatened Species Conservation Act 1995.

Mapping conducted as part of the Shaws Bay CZMP (Hydrosphere Consulting, 2014) shows saltmarsh extending in fringing communities along much of the eastern foreshore of Shaws Bay as well as the western foreshore to a point approximately level with the Shaws Bay Hotel (Figure 5). Saltmarsh communities were mapped using 2013 aerial photography with the presence and composition of communities verified through on-ground survey in May 2014. The total mapped area of saltmarsh in Shaws Bay was approximately 9,302m².

The saltmarsh communities in Shaws Bay are dominated by Saltwater couch (*Sporobolus virginicus*) and the succulent Shoreline purslane (*Sesuvium portulacastrum*). Other commonly occurring succulent species were Samphire (*Sarcocornia quinqueflora*) and Astral Seabite (*Suaeda australis*). Small patches of sedge and rush species including Club Sedge (*Schoenoplectus spp*) and Sea Rush (*Juncus kraussii*) were observed sporadically around the perimeter, with one large sedge area just north of the beach area in front of the Shaws Bay Hotel.

Saltmarsh occurs within the proposed construction footprint of the East Arm, Eastern Pathway (foreshore and board walk access tracks), Western Foreshore Improvements and North Wall Boardwalk/Pathway works. See section 7.4 for additional details.

6.10.3 Mangroves

Mangrove communities can comprise several species that inhabit the intertidal shores of sheltered subtropical and tropical waterways. Mangroves are adapted to saltwater, anoxic and sulfidic environments exhibiting several adaptations which allow them to thrive in such environments. Figure 5 provides an overview of the mangrove distribution mapped in the Shaws Bay CZMP (Hydrosphere Consulting, 2014). The total mapped area of mangroves in Shaws Bay was approximately 5,439m².

Mangroves occurring in Shaws Bay consist of two species: River mangrove (*Aegiceras corniculatum*); and Grey mangrove (*Avicennia marina*). Mangroves appear to be in relatively good condition in Shaws Bay and are successfully colonising new areas along the foreshore where they are not being actively removed (under a permit from DPI-Fisheries). Mangroves occur within the proposed construction footprint of the East Arm, Eastern Pathway and Pop Denison works areas.

6.11 Fauna

A search of the online Bionet database for threatened species recorded within Shaws Bay was undertaken. The search returned records of eight species, seven bird and one plant species (See Appendix 5). A search of the EPBC Act Protected Matters Search tool was also undertaken (Appendix 6), with 47 species 'known to occur' or with 'habitat known to occur' within Shaws Bay.

6.11.1 East Arm

A range of aquatic habitats are present within and within the vicinity of the proposed works area including intertidal and sub-tidal sandy habitats, seagrass, mangroves, saltmarsh and hard structure including rocks, stormwater infrastructure and woody habitat. These habitats are likely to support a large range of aquatic fauna species including Sea mullet, Flathead, School prawns, Snapping prawns, Sea cucumbers, Mud crabs, Moray eels and numerous gastropods including Sydney whelks and Moon snails, intertidal crustaceans such as Soldier crabs, Bream, Tarwhine, Whiting, Flathead, Giant trevally, Moses perch, Garfish, Mullet, Estuary cod and a range of smaller fish species. The training wall opposite the proposed works area provides habitat for Estuary cod (*Epinephelus coioides*) which is listed as a protected fish in NSW under the *Fisheries Management Act 1994*.

The sink hole and rock revetment works area is highly disturbed and provides marginal habitat. However, the areas are likely to provide some habitat for number of common species of birds, lizards and small mammals.

6.11.2 Eastern Pathway

The majority of the Eastern Pathway traverses predominantly mown/disturbed grassed areas which provide little habitat value.

6.11.3 Pop Denison Park

The forested area of south western Pop Denison Park is likely to provide some habitat for number of common species of birds, lizards and small mammals. Aside from the mangroves in various areas around Shaws Bay, the Coastal Pine Cypress Forest and associated bushland represents the main area of vegetation in the immediate surrounds of Shaws Bay, although significant bushland is found north of Compton Drive on the escarpment.

No threatened fauna species have been recorded from the Pop Denison Park area.

6.11.4 Western Foreshore Improvements

The works area is currently predominantly gravel, concrete, or bitumen which provides little to no habitat value. One large isolated eucalypt is present within the works area which would provide habitat to a number of bird species.

6.11.5 Koala Habitat

The Ballina Shire Koala Management Strategy (BSC, 2016) identifies koala habitat throughout the Ballina Shire and outlines strategies to effectively manage these areas and the local koala population. The strategy outlines koala planning areas and management precincts. The East Ballina Koala Management Precinct includes large areas of East Ballina including the East Ballina Escarpment located a short distance to the north east of Shaws Bay. The strategy also identifies preferred koala habitats throughout the Shire. A small area of preferred koala habitat is mapped at North Angels Beach with none recorded within Shaws Bay works areas.

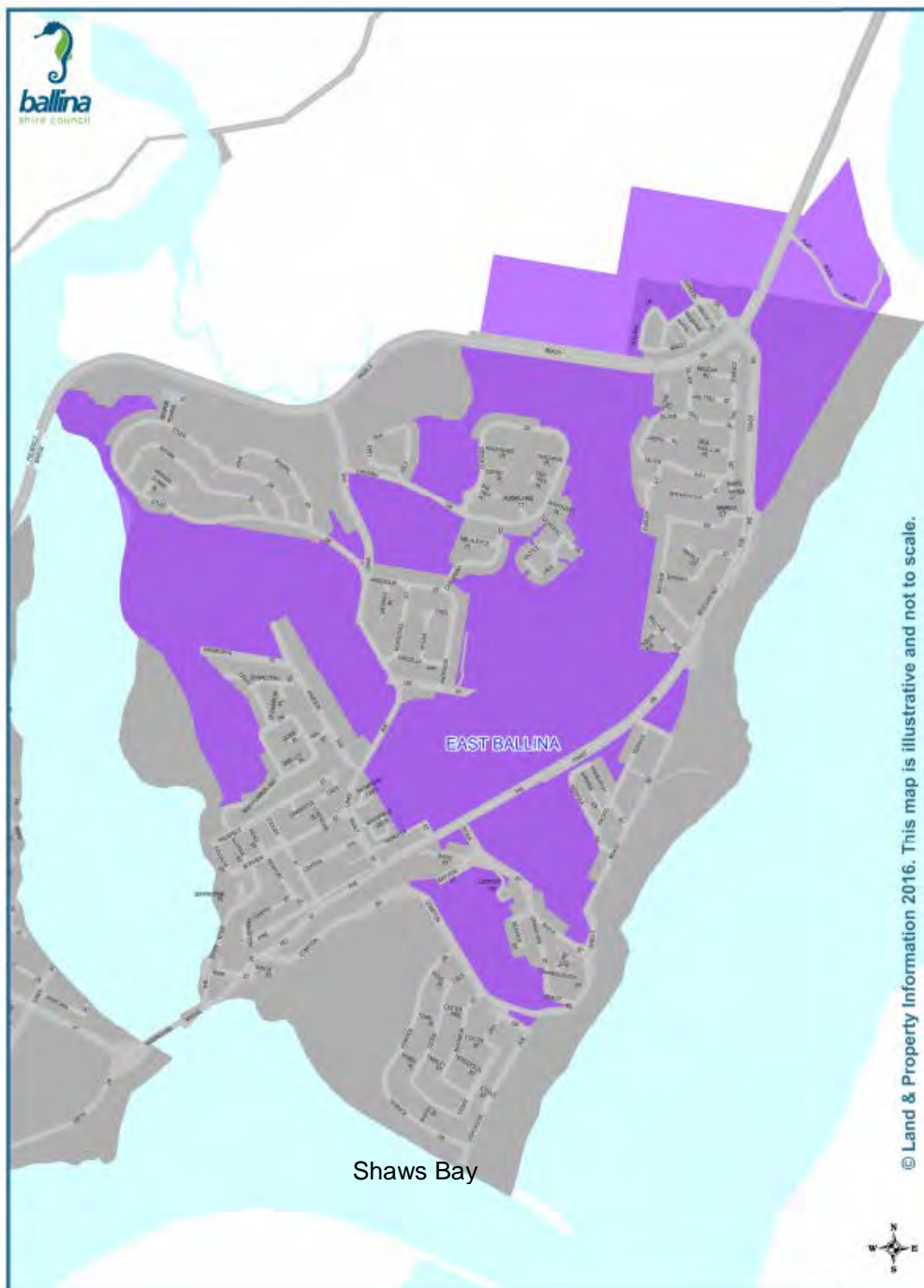


Figure 6: East Ballina Koala Management Precinct

6.11.6 Shorebirds

Shorebirds (often called waders) are birds that commonly feed by wading in shallow water or saturated substrate along the shores of lakes, rivers and the sea (Geering *et al.* 2007). Shorebirds are generally considered as either resident shorebirds (i.e. do not undertake large-scale migrations) or migratory shorebirds (i.e. undertake large migrations). Many migratory shorebirds that occur in Australia breed in the northern hemisphere during the southern winter before migrating to Australia for the summer to feed before migrating back north before the winter. Shorebirds migrating to and from Australia utilise what is termed the East-Asian Australasian Flyway.

Shorebirds utilise a range of habitats in estuaries and open beaches including intertidal sandflats and mudflats, supratidal sand banks, mangroves, intertidal and upper areas of sandy beaches and foreshores, and rocky foreshores. The Shaws Bay shoreline provides a variety of shorebird habitat including intertidal

sand and mud flats, rocky shorelines and mangrove areas. NSW Wildlife Atlas Bionet threatened species search results reveal a number of shorebirds species recorded within Shaws Bay (Appendix 5). Results from the EPBC Protected Matters Search Tool indicate that a number of shorebird species have habitat known to occur within Shaws Bay (Appendix 6).

Shorebird habitat directly within the works area includes intertidal sandflat in East Arm adjacent to the East Arm rock revetment works area. This sandflat may be used intermittently for foraging. Up to approximately 1200m² of sandflat may be within the excavator works area. The foreshore within the east arm revetment area is unlikely to provide shorebird roosting or nesting habitat due to the steep banks, vegetation and woody debris. The foreshore towards the northern end of the east arm (open, saltmarsh) may provide some potential for shorebird roosting habitat. The training wall directly opposite the East Arm works area provides foraging habitat for the Sooty Oystercatcher.

The intertidal flat directly adjacent to the Western Foreshore Improvement works area is also potential shorebird foraging habitat, particularly during lower tides.

6.12 Heritage and Archaeology

All of the works areas have been subject to significant previous disturbance through construction of the training walls, revetments, previous dredging and sand placement, import of fill and clearing. Much of the land around Shaws Bay was created due to isolation of the Bay from the shifting channel and shoals of the Richmond River by the construction of the training walls.

Despite this, all of East Ballina and the Richmond River estuary retain a cultural connection for Aboriginal people because of historic events known to have taken place there, and because for countless generations ancestors were known to have maintained and managed the food resources available in the area. Shaws Bay was an important source for gathering shellfish on the shallow sand flats and for traditional fishing practices in river channels. Despite the surrounding density of urban settlement, evidence for these traditions remains on the adjacent ridges of East Ballina, where numerous registered sites of camping places and middens are recorded including the East Ballina Aboriginal Place. Results from a search of the AHIMS database reveals no aboriginal heritage sites are recorded within the vicinity of Shaws Bay and the proposed works areas (Appendix 7).

Searches of the NSW State Heritage Database and Ballina LEP 2012 did not identify any cultural sites or places occurring in the proposed works areas (Appendix 7).

7. IMPACT ASSESSMENT

This section identifies and characterises the likely potential environmental risks and impacts associated with the proposal. Suitable environmental management procedures and control measures have been identified to reduce the level of risk to an acceptable level.

7.1 Water Quality

7.1.1 East Arm

The East Arm works will provide a long term positive impact on water quality within Shaws Bay by reducing erosion and associated turbidity and sedimentation. Potential for water quality impacts may arise during the construction works phase through fuel or oil spillages from plant and/or vehicles or through soil excavation and subsequent runoff. During construction, excavation areas and material stockpiles will be more susceptible to erosion. In particular, during east arm rock revetment works there will be sections of bank more susceptible to erosion particularly under adverse weather conditions conducive to erosion (e.g. large storm event with swell propagating through the wall into the east arm).

The installation of boardwalk pilings and construction of the boardwalk has the potential to mobilise finer sediments associated with mangrove areas during construction generating turbid water. There is also potential for spillage of materials (paints, glues, oils, construction materials) during the construction of the boardwalk.

The risk of construction phase soil disturbance and turbid runoff generation is present but is limited to excavated areas and minor surface disturbance by tracks of plant and vehicles and can be managed effectively given the recommended mitigation measures in Section 8.2. The risk of fuel and material spills is considered to be low and controls/safeguards are provided in Section 8.2.

The importation of fill material for the sink hole and rock revetment works is a potential source of nutrients and sediments and therefore a long term water quality risk. However, given the recommendations in Section 8.2 the risk of fill being a long term nutrient or sediment source and subsequent water quality risk is low.

7.1.2 Eastern Pathway

There is potential during the construction phase for erosion and associated turbid runoff to be generated from excavated/formed and stockpile areas. Potential for water quality impacts may also arise during the construction works phase through spillage of fuel, concrete or other construction materials. However, given the mitigation measures outlined in Section 8.2 risks to water quality are considered to be temporary and low.

No long term water quality impacts are expected as a result of the construction of the Eastern Pathway.

7.1.3 Pop Denison Park

Construction phase water quality risks are similar to that outlined in Section 7.1.2 and appropriate mitigation measure are outlined in Section 8.2.

A small gully is located at the south western extent of Pop Denison Park (draining west from holiday park boundary) with gully erosion present. The gully erosion in its current state is likely to continue regardless of the proposed works however the installation of a small bridge over the gully has the potential to exacerbate erosion within the small gully. Mitigation measures outlined in Section 8.2 will be adopted to manage this and therefore the risk to ongoing gully erosion is considered to be low.

The Pop Denison Park car park will increase hard surface area and has the potential to reduce infiltration and increase velocity of surface runoff causing erosion. The car park is also a potential ongoing source of turbid runoff, litter, fuel/oils and other contaminants. The cumulative impacts of these risks should be considered in context of other current and future planned carparks within the vicinity of Shaws Bay. However, with the adoption of mitigation measures outlined in in Section 8.2 and 8.3, no adverse water quality impacts are expected from the construction and use of the proposed Pop Denison Park parking area.

7.1.4 Western Foreshore Improvements

Construction phase water quality risks are similar to that of the other proposed works. Potential for water quality impacts may arise during the construction works phase through fuel or oil spillages from plant and/or vehicles or through soil excavation and subsequent runoff. Water quality mitigation measures outlined in Section 8.2 and 8.3 should be adopted and as such no adverse water quality impacts are expected from the construction phase.

Currently, the majority of the western foreshore area is gravelled with stormwater discharging directly into Shaws Bay. As such, the area is a likely source of sediments and contaminants to the bay. Despite the works incorporating a large area of bitumen parking, the works will transform a large area of the previously gravelled area into grassed/landscaped areas and the provision of two bioretention basin stormwater treatment devices. These features are likely to improve water quality of runoff from this area (compared to current state), having a positive impact on water quality in the long term.

7.2 Soils

The East Arm, Eastern Pathway and Pop Denison Park works areas are located on ASS risk areas as outlined in Section 5.1.1. Excavation in these areas may pose potential ASS risks although the risk is considered unlikely. A preliminary ASS assessment prepared in accordance with the Acid Sulfate Soils Manual should be undertaken on soils within ASS risk areas (East Arm, Eastern Pathway, Pop Denison Park) to confirm this and determine the need for an ASS management plan/ASS control measures.

7.3 Terrestrial/Riparian Flora

7.3.1 East Arm

Sinkholes

No significant terrestrial vegetation is present within the sinkhole works area, however a number of shrubs and small trees (Coastal Wattle *Acacia sophorae*, *Leptospermum lanigerum*, *Casuarina sp.*) will need to be trimmed or removed to complete the works. Given the small area affected and measures outlined in Section 8.4 impact on the vegetation is considered to be minor and temporary. The rehabilitation and revegetation of the sinkholes will increase vegetation in the area having a long-term positive impact on terrestrial flora at the site.

Rock revetment

No significant terrestrial vegetation is present within the sinkhole works area, however a number of individual trees (*Banksia integrifolia*, *Acacia sophorae*, *Casuarina app.*, *Cupaniopsis anacardioides*) will be trimmed or juveniles removed to install the rock revetment. Considering the mitigation measures outlined in Section 8.4 and the relatively small number of individual plants affected the impact on vegetation is considered to be minor and temporary. A small number of trees which are currently at risk of falling into the water through bank recession will be protected through reestablishment of the rock wall and back-filling around roots. Other trees which cannot be salvaged in this manner will be removed to ensure they do not destabilise the bank through treefall at a later date. The revegetation of the bank post works and increased planting of trees through the general foreshore area is expected to have a long-term positive impact on vegetation at the site.

Sandy beach establishment

Works are only expected to remove areas of currently mown grass. The project will involve planting of new shade trees (endemic natives) and increase the potential for saltmarsh establishment (see section 7.4) both of which are considered to be substantial benefits.

East Arm boardwalk

No removal of terrestrial vegetation is envisaged. All impacts are related to marine vegetation as discussed in section 7.4.

7.3.2 Eastern Pathway

The majority of the eastern pathway traverses mown grassed areas. Reserves within the vicinity of Shaws Bay contain large areas of similar grassed areas and therefore the removal of this area is considered to be insignificant. Further, the pathway will provide improved community access to other grassed areas around Shaws Bay.

A number of sections of the pathway traverse through mixed native woodland/shrubland, Coastal banksia woodland/ shrubland and within Coastal Cypress Pine Forest (Endangered Ecological Community). For the majority of the length of the pathway the construction will not require any clearing except for short sections at the southern end of Pop Denison Park. Through this area of vegetation the proposed route generally follows that of a previously cleared informal track however a small number of understorey plants (particularly *Lomandra longifolia*) will need to be removed and replanted nearby. Some planted (non-endemic) *Leptospermum lanigerum* will need to be cleared. No large trees will be removed. It is expected that the

creation of the pathway will formalise community access through this area of vegetation reducing trampling that currently occurs through informal access tracks. It is expected that through the formalised access and impact mitigation measures provided in Section 8.4, the pathway will result in an overall positive impact on this vegetation community.

7.3.3 Pop Denison Park

No vegetation will be removed for the extension of the access road, construction of the car park, upgrade of amenities. Some limbs of trees around the perimeter of the car park may need to be trimmed.

Foreshore access tracks and recreational areas will involve limited clearing of low lying (mostly weed) plants however will not involve the removal of any large trees. The recreational areas will be strategically placed to minimise the need for clearing. Given the current poor condition of vegetation and small extent of vegetation removal and mitigation measures outlined in Section 8.4, any impact on terrestrial vegetation is considered to be minor.

7.3.4 Western foreshore

The works area is primarily gravel, bitumen and grass. A large Eucalypt is present which within the works area and is to be removed. All other trees are to be retained.

7.4 Marine Vegetation

The project will result in direct and potential longer-term changes in marine vegetation (both positive and negative) and therefore will be subject to a permit to harm marine vegetation from DPI-Fisheries as identified in section 5.1.5.

7.4.1 East Arm

The East Arm has significant marine vegetation growth. Recognising the proximity of the planned works to some of these areas, a detailed RTK GPS survey was undertaken in April 2016 to determine the exact boundaries of marine vegetation and is shown below in Figure 7.

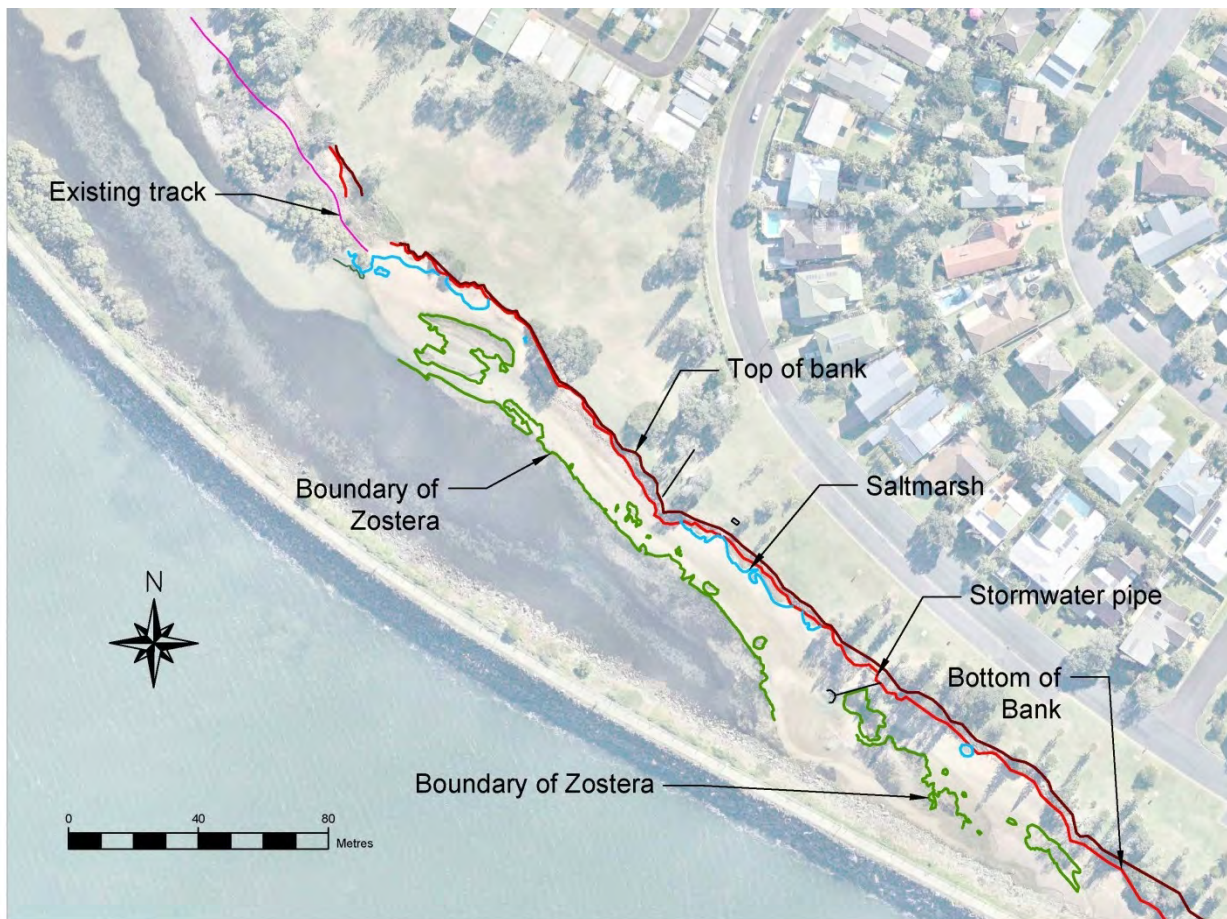


Figure 7. Surveyed East Arm marine vegetation boundaries April 2016. Top and bottom of bank lines denote the erosion scarp along this bank.

Sinkholes

No marine vegetation is planned to be disturbed as part of this work.

Rock revetment

Several sections of rock wall building will be undertaken in close proximity to seagrass that is growing offshore from the existing wall. Apart from the section near the storm water pipe discussed below, there is sufficient space such that an excavator will be able to work at low tide to rebuild the rock wall without directly impacting seagrass, although a number of measures as discussed in section 8.4 will need employed to ensure that this is the case.

A direct impact on poor quality seagrass immediately eastward of the protruding storm water pipe will occur due to placement of rock in this area. Approximately 9.5m² is likely to be affected. The seagrass in this area is adjacent to a scour hole created by tidal flows past the pipe, but is located on silty, anoxic substrate. The impact on seagrass at this location is considered negligible in the context of the large areas of high quality seagrass in nearby areas of the East Arm.

There are no post-construction impacts envisaged for seagrass in the vicinity of the rock revetment.

Some seaweeds (brown macroalgae) exist in association with the end of the storm water pipe. Placement of rock along the edge of the pipe is not likely to impact macroalgae growth, and it is likely that the increased presence of hard substrate will allow for increased macroalgae growth over time.

There is one patch of saltmarsh (10.8m²) which is represent at the western end of this works area which would not be able to be avoided during construction. This material would be replanted elsewhere but would be counted as a direct impact in this location.

Sandy beach establishment

As excavator access to the works areas will be from the landward side the potential for impacts on seagrass is reduced. The planned works do however have potential to affect the boundaries of the seagrass through subtle changes in tidal flow paths as a result of the 'headlands' between beaches and through potential movement of clean sand to be placed on the sand beaches.

The movement of seagrass to changes in the East Arm (principally through erosion) has shown that the area is highly suited to seagrass growth and that the boundaries of the seagrass are highly adaptive to changes in flow patterns. As such it is envisaged that some retreat of seagrass will occur around the scour holes created by the placement of the 'headlands', but minor expansion of seagrass is likely to occur in the intermediate areas. The potential impact on seagrass is considered to be minor.

Direct impacts to saltmarsh which occurs at the bottom of some of the eroded banks will occur due to the necessary regrading of these areas. Approximately 200m² of saltmarsh occurs in these locations and in many cases the landward boundary of this saltmarsh is constrained by the steep eroding bank. The density and species composition varies within these areas – hence variable quality in the saltmarsh represented. There are numerous opportunities to avoid some impacts through selective earthworks in the vicinity of high quality patches, and also opportunities for replanting of excavated (see section 8.4) at appropriate locations/elevations. It is estimated that less than 50m² will be directly affected, and it is considered that replanting of this material, as well as the significant opportunity for expansion of saltmarsh as a result of beach re-contouring and removal of the upslope saltmarsh boundary constraint will result in a substantial positive impact as a result of the project. The additional area for saltmarsh growth is estimated to be at least double the current area. The project also seeks to reduce ad hoc trampling of saltmarsh through low-key formalisation of access ways, hence improving the overall value of this habitat.

East Arm boardwalk

The boardwalk will replace an existing track that runs through saltmarsh and juvenile mangroves. The boardwalk will be wider than the current track and therefore will represent an impact on juvenile mangroves, however the path of the boardwalk will be adjusted from the current track location to avoid a large area (~300m²) of saltmarsh which is currently bisected by the track and will also lead to the regrading of an eroded bank and regeneration of salt marsh (~80m²) at the eastern end of the board walk. This will allow the enhancement and protection of one of the larger contiguous areas of saltmarsh around Shaws Bay.

The impact on mangroves will be as a result of removal of the juveniles (<1m height) along approximately 50m of the boardwalk alignment. The boardwalk will vary between 2 and 2.5m in width and will exclude the growth of mangroves over an estimated 115m² of which approximately 50m² could be considered to already be impacted by the existing track. The boardwalk will therefore cause a long-term reduction in the number of mangroves through this area, but this impact will be offset by the saltmarsh benefits discussed above as well as discouraging further ad hoc track development and increasing public appreciation and acceptance of mangroves in this popular recreational area.

7.4.2 Western Foreshore Improvements

The construction of the foreshore ramp and stairs will result in the permanent loss of up to 71m² of saltmarsh which occurs within the affected embayment (Figure 8). This saltmarsh was primarily saltwater couch and Shoreline purslane which was often sparse and was buried by seagrass wrack at the time of survey. This saltmarsh is constrained in terms of upslope movement by the presence of the vertical retaining wall that surrounds the embayment.

There is considerable potential to increase saltmarsh growth further to the east and south-west of the embayment by placing sand to create elevated beaches along other areas of the vertical revetment wall, however that is not part of the current project. Future works related to dredging of Shaws Bay, to be assessed separately, are likely to include this offset.

A mature mangrove tree and some saltmarsh occur at the SW end of the works area, but will not be impacted by the steps and rockwork planned in this area. Measures to ensure this area remains protected are included in section 8.4.

Seagrass occurs along fringes of the works area with the closest being within 10m of the planned works (Figure 8). No negative impacts on seagrass are envisaged.

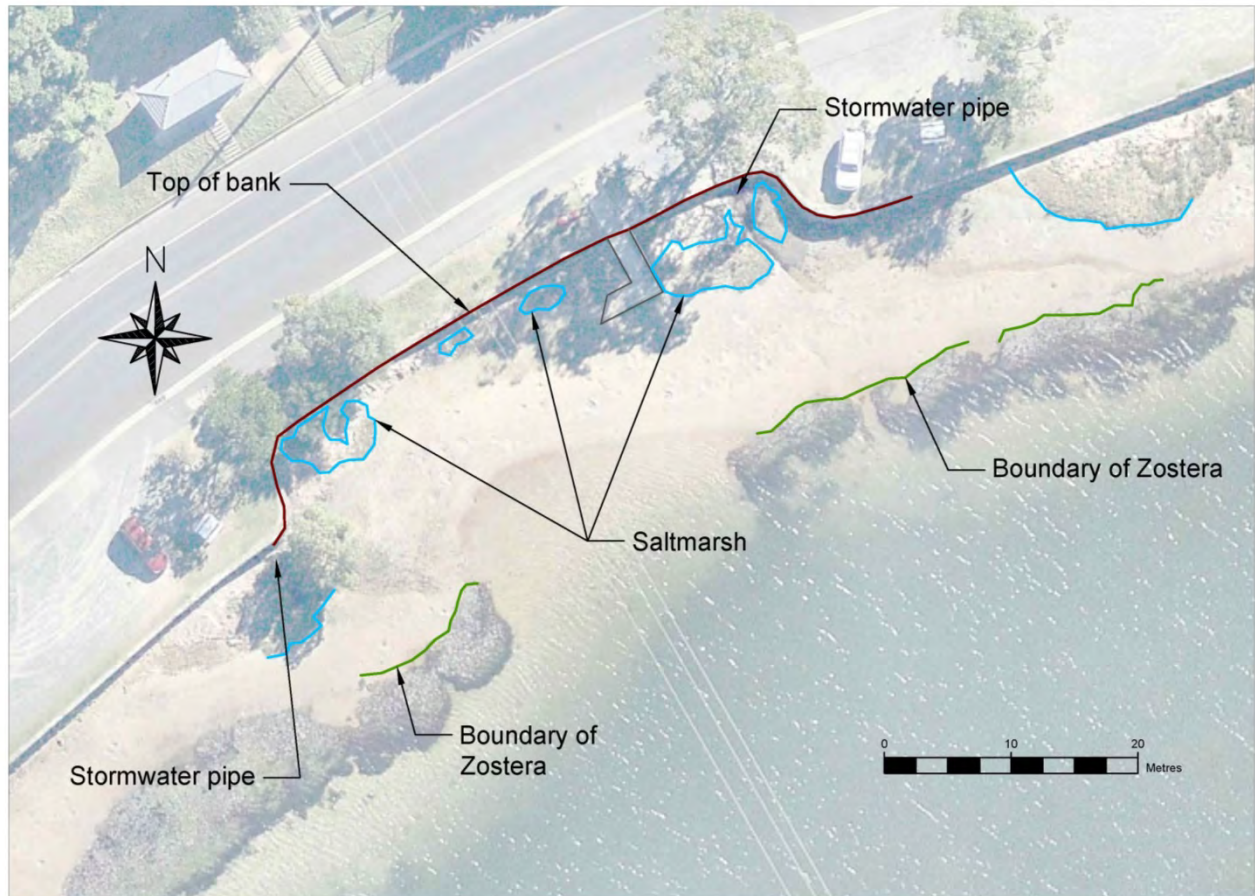


Figure 8. Surveyed western foreshore marine vegetation boundaries January 2017.

7.4.3 Pop Denison Park

Infilling of an erosion gully will result in the removal of small number (<10) of juvenile mangroves and very patchy saltmarsh (<3m²). The habitat value of these plants is considered very low and removal is considered to represent negligible impact.

It should be noted that future works in this area (to be assessed under a separate project at that time) will include placement of additional sand along the beach at this location which is likely to have negative implications for seagrass, but positive impacts on saltmarsh.

7.5 Fauna

7.5.1 Terrestrial

Generally, terrestrial fauna habitat will be improved through increased planting, weed management and reduction of ad hoc tracks.

No significant terrestrial fauna habitat values have been identified within the immediate work sites. Given the highly modified existing state of the site, no impacts to threatened species and communities are anticipated as a result of the works. As such seven part tests for assessment of significance for threatened species (under the TSC Act) are not required.

7.5.2 Estuarine

The construction of the East Arm rock revetment works will require machinery to access the works area from the intertidal sand flat adjacent to the proposed revetment wall. The area of intertidal sand flat impacted by machinery is expected to be approximately 0.1ha. The use of machinery on the sand flat has the potential to directly impact benthic macroinvertebrates by directly crushing individuals and indirectly by temporarily compacting the sand. However, any impact on benthic fauna is expected to be minor and temporary.

The intertidal sandflat adjacent to the East Arm works is also considered to be shorebird habitat. A number of shorebirds may potentially intermittently utilise the sand flat and rock wall for foraging, and for the former, most likely during the summer months. However, these habitats are not considered to be important or significant shorebird habitats. Birds utilising this area may temporarily be disrupted during construction works. Due to the relatively small area of habitat affected, temporary nature of disruption and large areas of nearby similar better quality habitat (North Creek and Richmond River) any impact on foraging shorebirds is considered to be negligible.

Scouring around the end of the storm water pipe in the East Arm creates a small relatively deep hole which consists of rocky habitat and macroalgae with some poor quality seagrass on the eastern edge of the pipe. The placement of rock fill along the edge of the storm water pipe will marginally alter this habitat by offering additional hard substrate which is likely to support macroalgae and provide rock crevices for estuarine fauna.

The training wall opposite the proposed East Arm works area provides habitat for Estuary cod (*Epinephelus coioides*) however no impacts on this area are expected.

No significant impacts to threatened species and communities are anticipated as a result of the works. As such seven part tests for assessment of significance for threatened species (under the TSC Act) are not required.

7.6 Traffic and Access

The construction phase of a number of components of the works, particularly Western Foreshore Improvements, may cause temporary localised traffic disruptions. Construction work on the Western Foreshore Improvements car parking areas will temporarily cause changes to Compton Drive traffic. However, if managed using mitigation measures outlined in Section 8.1, impact on Compton Drive traffic is expected to be minor, localised and temporary. The construction of new parking areas and provision of a pedestrian refuge island is expected to improve traffic conditions in the area over the long term.

The Western Foreshore Improvements construction phase will temporarily restrict access to Shaws Bay at the site. However, any impact to access is expected to be minor and temporary with post construction access expected to be a vast improvement to current access having a long term positive impact on access to Shaws Bay.

The extension of the Pop Denison access road and construction of extra car parking spaces is likely to temporarily disrupt traffic and restrict access to this area of Pop Denison Park during construction. However the provision of extra parking is expected to improve traffic conditions and access in the long term.

The East Arm works will temporarily restrict community access to this section Shaws Bay during construction however will greatly improve foreshore access in the long term. The Eastern Pathway will significantly improve community access to the eastern foreshore of Shaws Bay.

7.7 Air Quality

The potential for minor air quality impacts may arise during the construction phase from generation of exhaust from trucks and plant and airborne dust from exposed earthworks (particularly Pop Denison Park and Western Foreshore Improvements). With the control measures in place during construction (Section 8.1), these short-term and minor air quality impacts are not expected to significantly impact the community.

7.8 Noise

The level of construction noise at the site is likely to be above the ambient noise level at all proposed works sites location. Noise monitoring has not been conducted at the site but it is reasonable to assume that background noise levels are low to moderate given the urban residential nature of the area. Distances to nearest residences for the proposed works are presented in Table 5.

Table 5: Distance to nearest residence to works sites

Works Site	Approximate distance to nearest residence
East Arm	45m (Fenwick Drive)
Eastern Pathway	25 m (Fenwick Drive) 10 m (Caravan park residents)
Pop Denison Park	80 m (Fenwick Drive)
Western Foreshore	25 m (Compton Drive)

The noise level and duration of 'noisy works' generated by the construction works is governed by the contractor's choice of methodology, plant and equipment. Typical noise levels from construction equipment likely to be used are outlined in Table 6. An increase in the noise levels provided can be expected when multiple equipment are operating concurrently. No noise monitoring or modelling has been undertaken for this REF.

Table 6: Typical noise levels (dB[A]) of construction equipment. Source: NSW Public Works (2011)

Construction Equipment	Sound Power Level (SPL)	SPL at 10 m	SPL at 20 m	SPL at 50 m	SPL at 100 m	SPL at 200 m	SPL at 300 m
Excavator	110	82	76	68	62	56	50
Backhoe	107	79	73	65	59	53	47
Concrete pump	114	86	80	72	66	60	64
Concrete truck	117	89	83	75	69	63	57
Delivery truck	117	89	83	75	69	63	57
Light vehicle	98	70	64	56	50	44	38
Tip truck	111	83	77	69	63	57	51
Generator	107	79	73	65	59	53	47
Rock hammer	119	91	85	77	71	65	59
Hammer drill	118	90	84	76	70	64	58

Under the EPA's *Interim Construction Noise Guideline* (DECC, 2009) the noise affected construction noise level criteria is the rating background noise level plus 10 dB (represents the point above which there may be some community reaction to noise) and the highly noise affected criteria is 75 dB (represents the point above which there may be strong community reaction to noise). The background noise at the closest residences is

currently unknown however it is expected that noise levels at the residence will exceed the 'noise affected' criteria and possibly the 'highly noise affected' criteria at various stages throughout the duration of the construction works. Works will be limited to normal day light working hours.

7.9 Waste Management

There is potential for waste generation during the construction phase and operation phase of the proposed works. During the construction phase, waste will be generated through general construction waste and personnel waste which is expected to be minimal. The waste management measures recommended in Section 8.1 will manage these impacts.

Through the provision of improved foreshore facilities it is expected that the use of the Shaws Bay foreshore will increase and consequently waste production/litter within the area can also be expected to increase. However, the waste management measures recommended in Section 8.3 will manage any waste related impacts.

7.10 Visual Amenity

7.10.1 East Arm

Due to erosion and provision of ad hoc erosion controls on the East Arm foreshore the area is currently visually impacted. Similarly, due to the sinkholes and weedy vegetation, the area adjacent to North Wall is also currently visually unappealing. The construction of rock revetment, creation of sandy beaches and general landscaping and rehabilitation of the sink holes will result in the typical visual impacts of any construction/earthworks site, but have a significant positive impact on the long term visual amenity of the area.

7.10.2 Eastern Pathway and Pop Denison

The extension of the Pop Denison park access road and construction of car park may impact the perceived visual amenity of the area, particularly when viewing the park from Fenwick Drive. However the application of mitigation measures in Section 8.6 will reduce this risk. The extended road and car park is expected to complement the future visual amenity of the area upon the completion of the Pop Denison Masterplan.

The concrete Eastern Pathway may have a perceived impact on the 'natural' visual amenity of the eastern foreshore. The section of path between Lakeside Holiday Park and Shaws Bay may also be perceived to negatively impact the visual amenity (view from holiday park) of this area through both the construction of the path and the expected increase of users to this area as a result of the path. The impact on visual amenity during construction is expected to be temporary. The area the footpath is being constructed on is public reserve, reserved for public recreation. The presence of footpaths in public reserves and parks is conducive to the use and enjoyment of the area and generally accepted as a part of the visual landscape of such areas.

7.10.3 Western Foreshore

The Western Foreshore is currently generally considered as a visually unappealing area with a large gravel area and lack of vegetation. The area is likely to be significantly disrupted during works, however, the visual amenity of the Western Foreshore area will be significantly improved after the works are completed.

7.11 Cultural Heritage

No specific cultural heritage values/sites have been identified at the site (refer Appendix 7). However given the extensive indigenous history of the area and the location of the East Ballina Aboriginal Place within close vicinity of Shaws Bay there is potential for aboriginal cultural heritage values to exist within the proposed works areas. The measures recommended in Section 8 will inform the management of any potential Aboriginal Cultural Heritage Values.

8. PROPOSED ENVIRONMENTAL PROTECTION MEASURES

A Construction Environmental Management Plan (CEMP) is required to be developed and implemented that complies with the *NSW Government Environmental Management Systems Guidelines*. As a minimum, the following environmental protection and safety management measures will be incorporated in the CEMP.

8.1 General Measures

- Adjoining property owners and residents to be informed at least 1 week in advance that construction is about to commence;
- Construction hours of operation for any noise generating activity (Monday to Friday 7.00am to 6.00pm, Saturday 8.00am to 1.00pm);
- Works should not be undertaken during peak use periods such as school holidays and long weekends to reduce impacts on public amenity and usage of key facilities/areas;
- All waste including construction waste and litter, food scraps, etc. are to be removed from site and disposed of at appropriate waste management facilities;
- At completion of works, all equipment, signage, fencing, waste and any other materials will be removed from the site; and
- Any damage to vegetation and/or public infrastructure (including roads etc.) caused by access to the site will be restored to the pre-works condition.

8.2 Water Quality, Erosion and Sediment Controls

- An application for a permit for dredging and reclamation should be made to DPI-Fisheries. This permit is required for any earthworks within tidal areas.
- A construction erosion and sediment control plan should be prepared by the earthworks contractor and approved by the supervising engineer;
- Stormwater management and sediment and erosion controls across all works areas to be established as applicable from *"The Blue Book" Managing Urban Stormwater: Soils and Construction, 4th Edition Landcom, 2004* prior to commencement of works;
- A preliminary ASS assessment prepared in accordance with the Acid Sulfate Soils Manual should be undertaken on soils within ASS risk areas (East Arm, Eastern Pathway, Pop Denison Park) to assess the risk and determine the need for an ASS management plan/ASS control measures.
- Earthworks not to be undertaken during heavy rainfall;
- Material (excavated material) stockpiles to be appropriately contained to avoid sediment and turbid water discharge to waterways;
- All imported fill to be used for erosion control and sink hole backfill to be certified clean sand (or other suitable low nutrient, low fines content material);
- All works below or where access is required below MHWM to be undertaken during low tide only (i.e. works and/or access area is not to be inundated during works);
- All works below or where access is required below MHWM where susceptible to erosion is to be undertaken in small sections so as works can be completed during one low tide event;
- Loam capping to be stripped from shoreline along the East Arm is to be utilised away from water's edge for landscape mounds within reserve;

- Works areas should not be left in a condition susceptible to erosion, or in a manner that may pose a risk to public safety
- The design of the Pop Denison Car Park is to include waster sensitive urban design features such as bioretention basins and gross pollutant traps to treat stormwater runoff. Gully receiving stormwater from Pop Denison Park to include erosion control measures;
- Gully erosion in gully at south western extent of Pop Denison Park to be rehabilitated and appropriately vegetated (e.g. *Lomandra longifolia*) and boardwalk bridge to be designed to minimise further erosion;

8.3 Pollution

- A spill contingency plan is to be developed and adopted as part of the CEMP;
- Appropriate spill kits (aquatic and land spills) to be present on site and/or within all vehicles.
- No refuelling and maintenance (except emergency repairs) is to be conducted within 50 m of waterway or drains leading to a waterway;
- Any storage of fuel, lubricants or other compounds to occur within appropriately bunded/secured areas.
- A sufficient number of rubbish bins should be provided throughout improved foreshore areas (including parking areas) and an appropriate service plan implemented to reduce potential for increased litter entering Shaws Bay due to higher usage of the areas.

8.4 Protection of Flora and Fauna

- An application for a permit of harm marine vegetation should be made to DPI-Fisheries. The permit requires exact documentation of saltmarsh, mangroves and seagrass that may be affected. No works of potential relevance should be undertaken until this permit is secured.
- Where possible and appropriate, all endemic native vegetation to be removed for works (e.g. *Lomandra*) should be reused/replanted at a suitable location on site;
- All trimmed vegetative matter (except weeds) and removed plants/trees that cannot be replanted should be mulched and reused on site for appropriate landscaping purposes;
- Any weedy vegetation cleared would be removed from the site and disposed of in an appropriate facility;
- Noxious weeds would be controlled as per Ballina Shire Council/ Far North Coast Weeds guidelines;
- The sink hole area to be revegetated using suitable native species and/or turfed to stabilise the area;
- Strategic planting of appropriate native shade trees long East Arm foreshore should be undertaken;
- Pop Denison Park vegetation
 - A specific vegetation management/rehabilitation plan should be developed for the Pop Denison Park forest. This plan should identify the weed management, planting and maintenance requirements to maximise the condition and extent of the Coastal Cypress Pine Forest, whilst allowing for public use and access through this area;
 - Work area within the Coastal Cypress Pine Forest to be clearly demarcated/ flagged prior to works by a suitably qualified ecologist to minimise damage to EEC species.
 - Construction footprint and movement of equipment within forest to be minimised;

- Rehabilitate vegetation through weed control and planting of appropriate native species to improve condition of vegetation community. This should include (for instance) gradual replacement of non-endemic *Leptospermum lanigerum* with the local *L. polygalifolium*.
 - Plant deterrent species (e.g. *Lomandra longifolia*) along margin of vegetation and alongside footpath through vegetation to discourage informal access through vegetation and encourage use of pathways.
- All bare/excavated surfaces will be reinstated with appropriate vegetative cover as soon as possible following works to minimise weed colonisation;
- A weed management program should be incorporated;
- Construction of any concrete paths should seek to avoid disturbance of tree roots, particularly within the Coastal Cypress Pine Forest. Placement of a protective layer of sand, and forming the concrete path above this layer, rather than excavation below ground level should be undertaken in these instances;
- All works areas will be inspected for the presence of fauna prior to the commencement of works each day. Fauna species detected in the immediate works area will be removed and relocated to suitable adjacent habitat. A suitably qualified ecologist should be utilised to relocate fauna as appropriate.

8.5 Aboriginal/Cultural Heritage:

- Engage an appropriate Jali Local Aboriginal Land Council Representative to inspect all proposed works sites for Aboriginal Cultural Heritage value prior to commencement of works. This is to ensure that all on-ground risks are considered and communicated directly project personnel. Any factors identified at this stage will need to be documented and addressed following the appropriate guidelines;
- Ensure that site personnel are aware of the requirements in the case of an unexpected find of an item of Aboriginal Heritage. The procedures as set out on page 13 of the NSW Office of Environmental and Heritage (OEH) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (OEH, 2010) must be followed; and
- Any suspected artefacts or human remains should be protected and notified to NPWS and NSW Police (for remains) in accordance with this code of practice.

8.6 Visual Amenity:

- Any signage required (e.g. parking areas, informational signage, etc.) should be low-key and in keeping with the generally natural habitat of Shaws Bay;
- Consideration should be given to colours utilised for concrete paths to facilitate blending with the natural environment;
- Appropriate landscaping around the Pop Denison car park to reduce impacts on line of sight visual amenity from Fenwick Drive.
- Any public lighting (car park, pathway) to be designed and constructed under relevant guidelines as to reduce light nuisance to residents.

9. CONSIDERATION OF FACTORS UNDER CLAUSE 228 OF THE EP&A REGULATION 2000

Clause 228 of the *EP&A Regulation 2000* indicates, for purposes of Part 5 of the Act, the factors that must be taken into account when consideration is being given to the likely impact of an activity on the

environment. The various factors and findings following the environmental impact assessment and considering the environmental control measures of the proposed works are presented below.

a) Any environmental impact on a community

Construction phase of the works will have a temporary impact on visual amenity, traffic and community access across the work sites. The works are expected to have significant long term positive impacts for the community through the provision of vastly improved foreshore access and improved foreshore facilities and amenities.

b) Any transformation of a locality

The works are expected to significantly improve and increase the attractiveness of the areas for recreational activities.

c) Any environmental impact on the ecosystem of the locality

The construction phase of the project will have localised minor temporary impacts on terrestrial vegetation and sandflat communities. The works will have a low adverse impact on the various estuarine vegetation habitats.

d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality

The works are expected to have a significant positive impact on the recreational value of Shaws Bay. The works may have minor temporary impacts on the environmental quality of the area during construction however will improve the environmental quality over the long term through restricting access to sensitive vegetation, vegetation rehabilitation, provision for opportunities of increased saltmarsh habitat, increased stormwater treatment and erosion control.

e) Any effect on a locality, place or building having aesthetic, anthropological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations

No impacts anticipated.

f) Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)

No significant impacts anticipated.

g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air

No significant impacts anticipated.

h) Any long-term effects on the environment

No impacts anticipated.

i) Any degradation of the quality of the environment

No impacts anticipated. The project is anticipated to lead to a long-term improvement of the environment.

j) Any risk to the safety of the environment.

No impacts on public safety are anticipated. Significant improvement in public safety is envisaged.

k) Any reduction in the range of beneficial uses

No impacts anticipated. Significant improvement in beneficial use is envisaged.

l) Any pollution of the environment

No impacts anticipated. All pollution risks during construction can be managed through standard measures.

m) Any environmental problems associated with the disposal of waste

No impacts anticipated.

n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.

No impacts anticipated.

o) Any cumulative environmental effect with other existing or likely future activities.

No impacts anticipated. Other projects will be implemented over time in order to improve facilities, public amenity or the environment at Shaws Bay, however there are no cumulative effects that are considered to be significant.

p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions.

No impacts anticipated. All works have considered climate change impacts.

10. CONCLUSION

The Shaws Bay Foreshore Upgrades project is a highly beneficial project which seeks to implement key recommendations made by the Shaws Bay Coastal Zone Management Plan. The works will result in significant improvement in public safety, accessibility amenity and visitor carrying capacity. The project will address key areas of erosion, which are at the root of several issues identified in the CZMP and will lead to creation significant areas of valuable salt marsh habitat and help to the protect the Coastal Cypress Pine Forest EEC from continued ad hoc impacts. The project can be implemented with minor environmental and social impacts and is well supported by the local community.

Pursuant to the provisions of the *Environmental Planning and Assessment Act, 1979*, an environmental assessment of the proposed Shaws Bay foreshore improvement works has been undertaken. Consideration has been given to the likely impact of the activity on the environment, having regard to all relevant factors. On the basis of the information presented in this REF it is concluded that by adopting the safeguards identified in this assessment there would be no significant adverse environmental impacts associated with the proposed works and an Environmental Impact Statement is not required.

The following approvals are required:

- Ballina Shire Council will consider this REF and determine the proposed activity under Part 5 of the EP&A Act.
- A Permit to Harm Marine Vegetation and for Dredging and Reclamation will be required under Part 7 of the Fisheries Management Act.
- Land owners consent from the Department of Industry – Lands will be required for works on inter-tidal lands.

11. REFERENCES

Amos, J. (2016). Pop Denison Park Master Plan. Prepared for Ballina Shire Council.

GeoLINK (2009) Review of Environmental Factors, Shaws Bay Erosion Control Works: East Arm Stabilisation Compton Drive, East Ballina. Prepared for Ballina Shire Council.

Hydrosphere Consulting (2016). Shaws Bay East Arm Erosion Control Options. Prepared for Ballina Shire Council.

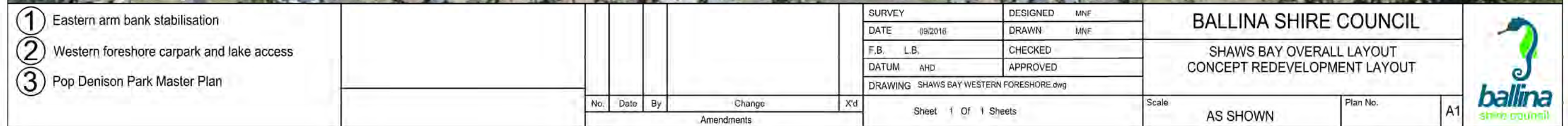
Hydrosphere Consulting (2014) Shaws Bay Coastal Zone Management Plan. Prepared for Ballina Shire Council.

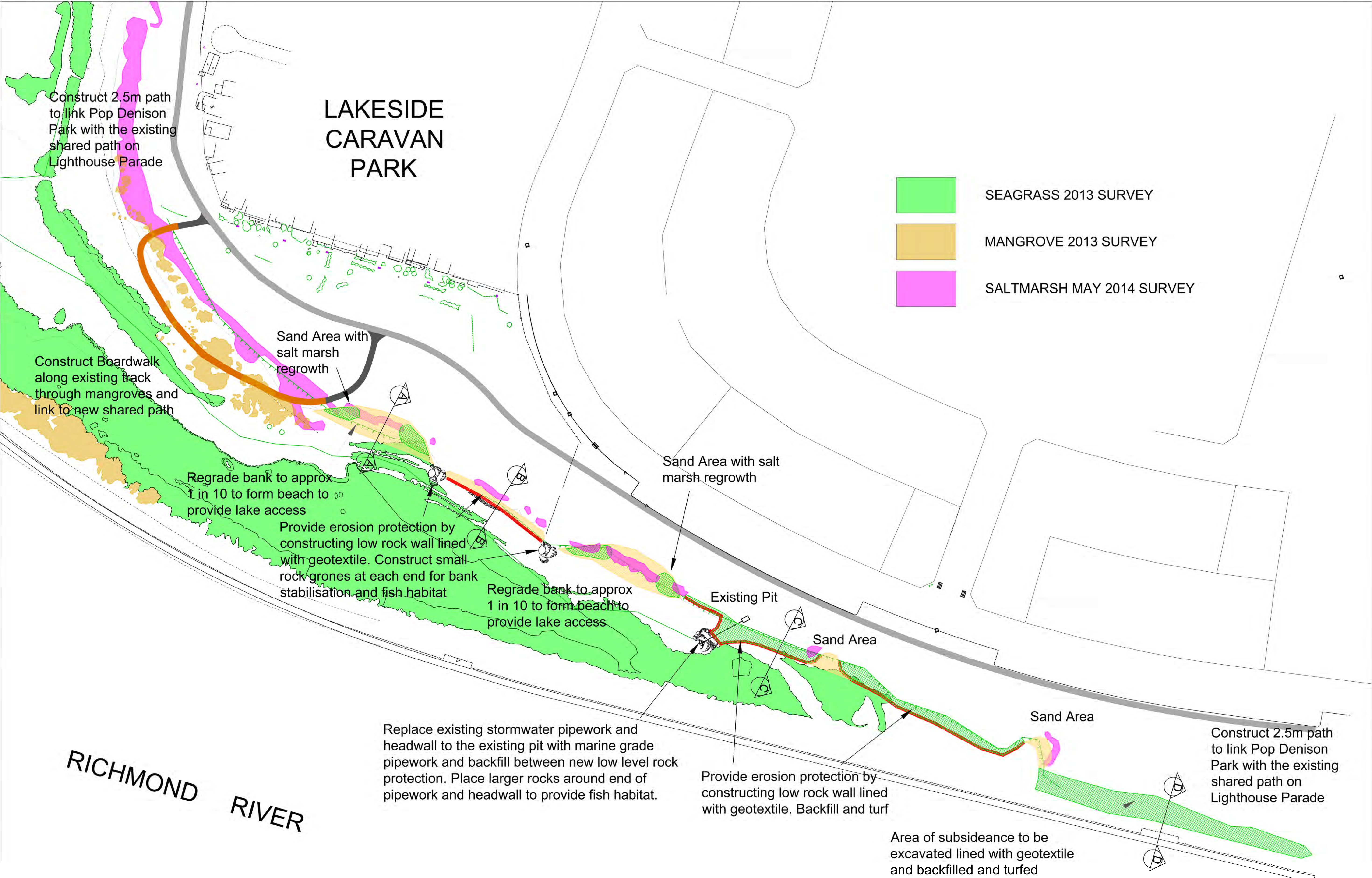
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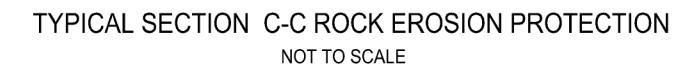
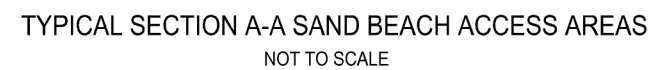
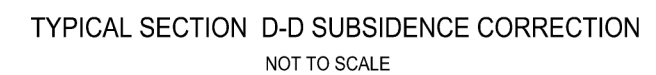
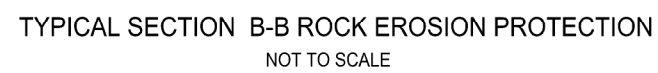
APPENDIX 1: PLANS/DRAWINGS




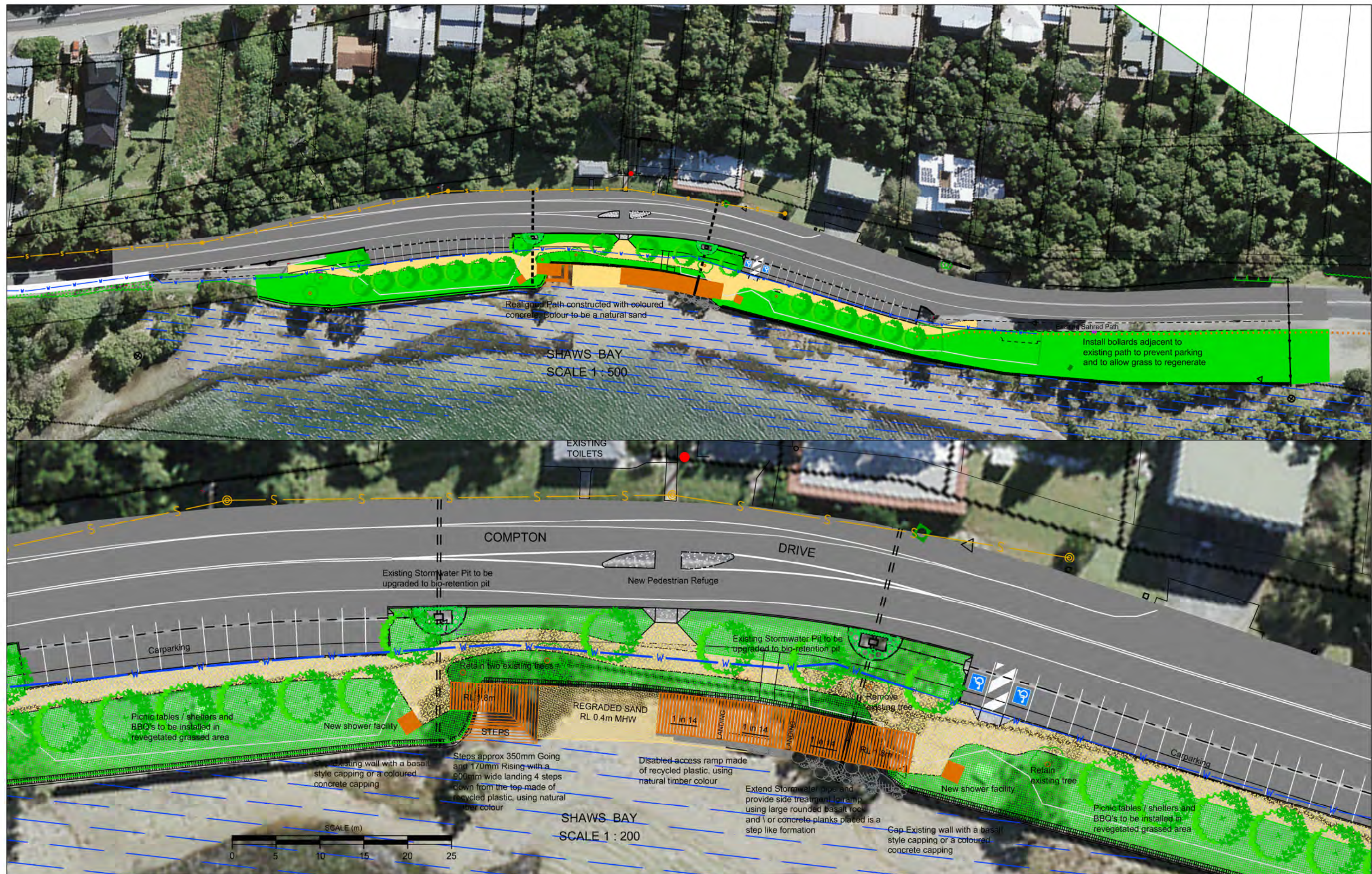



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					DATE	08/2016	DRAWN				MNF		
					F.B.	L.B.	CHECKED	SHAWS BAY EASTERN ARM EROSION PROTECTION WORKS AND CONCEPT PATH LAYOUT					
					DATUM	AHD	APPROVED						
					DRAWING		SHAWS BAY WESTERN FORESHORE.dwg						
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					Amendments								

ballina
shire council



						SURVEY	DESIGNED	MNF	BALLINA SHIRE COUNCIL	SHAW'S BAY EASTERN ARM EROSION PROTECTION WORKS TYPICAL CROSS SECTIONS		
						DATE	08/2016	DRAWN				MNF
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						DATUM	AHD	APPROVED				
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					SURVEY	DESIGNED	MNF	BALLINA SHIRE COUNCIL			
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					F.B.	L.B.	CHECKED	SHAWS BAY WESTERN FORESHORE CONCEPT REDEVELOPMENT LAYOUT			
					DATUM	AHD	APPROVED				
					DRAWING	SHAWS BAY WESTERN FORESHORE.dwg					
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APPENDIX 2: SITE PHOTOS



Figure 9: Eastern extent of sink hole area



Figure 10: Western extent of sink hole area



Figure 11: Eastern end of East Arm



Figure 12: Recent erosion at the head of the East Arm



Figure 1: East Arm erosion- location of proposed sandy beach



Figure 2: East Arm erosion and failed erosion control - location of proposed rock revetment wall



Figure 3: East Arm erosion showing rock wall to be reinstated



Figure 4: East Arm erosion with poor waterway access to be regraded to beach



Figure 5: Western foreshore improvement area



Figure 6: Erosion gully in Pop Denison Park to be filled.



Figure 7: Western side for extension of road/carpark showing low hanging Melaleuca branches to be trimmed.



Figure 8: Eastern side for extension of road/carpark showing clear access



Figure 9: Anoxic sediments and trampling of seagrass immediately east of East Arm stormwater pipe



Figure 10: Central section of Coastal Cypress Pine Forest showing path alignment. Dead vegetation due to previous arson as well control of *Lantana*.



Figure 11: Northern end of Coastal Cypress Pine Forest showing existing path



Figure 12: Exposure of Cypress Pine roots with existing walking track



Figure 13: Path alignment at southern end of Coastal Cypress Pine Forest.

APPENDIX 3: RESPONSES FROM AGENCIES

Our Ref: OUT17/883

25 January 2017

The General Manager
Ballina Shire Council
c/- Mr Mick Howland
Hydrosphere Consulting Pty Ltd
PO Box 7059
BALLINA NSW 2478
Via email: mick.howland@hydrosphere.com.au

Dear Mr Howland

Re: Notice of intention to carry out Foreshore Improvement Works within Shaws Bay, Ballina

I refer to your letter of 22 December 2017 providing notice on behalf of Ballina Shire Council of their intention to carry out Foreshore Improvement Works within Shaws Bay, Ballina in accordance with the *State Environmental Planning Policy Infrastructure* (the Infrastructure SEPP).

DPI Fisheries is responsible for ensuring that fish stocks are conserved and that there is “no net loss” of key fish habitats upon which they depend. To achieve this, the Aquatic Ecosystems Unit assesses activities under Part 4 and Part 5 of the *Environmental Planning and Assessment Act 1979* in accordance with the objectives of the *Fisheries Management Act 1994* (FM Act), the aquatic habitat protection and threatened species conservation provisions in Parts 7 and 7A of the FM Act, and the associated and *Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update)* (www.dpi.nsw.gov.au/fisheries/habitat/protecting-habitats/toolkit). In addition, DPI Fisheries is responsible for ensuring the sustainable management of commercial fisheries, quality recreational fishing and viable aquaculture within NSW.

The concept plan provided with your letter (refer to attachment 1) and previous on-site discussions between DPI Fisheries, Ballina Shire Council and Hydrosphere staff indicate that the above mentioned proposal is consistent with the intent of the endorsed Shaws Bay Coastal Zone Management Plan (the Management Plan). Given the strategic scope of the Management Plan, DPI Fisheries reiterates the importance of ensuring these and future works within Shaws Bay are consistent with the intent of the Management Plan.

It is noted that the works are likely to have direct impacts on key fish habitats. Although the Infrastructure SEPP permits these proposed works to be undertaken without consent, it does not affect the requirements of the FM Act. The table below indicates the types of actions that would require a permit under the FM Act for impacts to key fish habitats. DPI Fisheries’ standard minimum information requirements for environmental assessment are clearly detailed in section 3.3 (pg. 26) of *Policy and Guidelines for Fish Habitat Conservation and Management (2013 Update)*. Please ensure that these requirements are addressed as part of the environmental studies. This will facilitate effective assessment of the permit application and reduce delays.

Part 7 Fisheries Management Act 1994 Approvals

The table below outlines actions that trigger sections of the *Fisheries Management Act 1994*. Please consider whether components of the project involve these works.

Sections	Description of action	Legislative trigger
198-202	Dredge (digging) and / or reclamation (filling) of land permanently or periodically inundated by water (including wetlands).	Digging and / or filling below the Highest Astronomical Tide (~1m AHD) in estuaries. Digging and / or filling within the high bed of 3 rd order watercourses (based on 1:25,000 scale maps). Draining water from land for its reclamation. Activities described in cl 263 Fisheries Management (General) Regulation 2010
205	Harming marine vegetation (seagrass, mangroves and kelp)	Gather, cut, pull up, destroy, poison, dig up, remove, injure or otherwise harm marine vegetation or any part of it. Activities described in cls 260-262 Fisheries Management (General) Regulation 2010
218-220	Obstructing free passage of fish, in waterways	Construction or alteration of a dam, floodgate, causeways or weir or otherwise creation of an obstruction

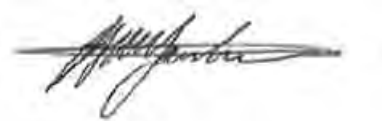
As a general principle, DPI Fisheries requires that proponents should, as a priority, aim to **avoid** impacts upon key fish habitats. Where avoidance is impossible or impractical, proponents should then aim to **minimise** impacts. Any remaining impacts should be mitigated and then **offset** with compensatory works. Compensation to offset fisheries resource or habitat losses will be considered *only after it is demonstrated that the proposed loss is unavoidable, in the best interests of the community in general and is in accordance with the FM Act, Regulations and the policies and guidelines*. It should be noted that the requirement for offsets in relation to unavoidable impacts to marine vegetation was previously indicated within DPI Fisheries' final comments on the Management Plan

It is highlighted that in the Department's policy and guidelines that saltmarsh and seagrass are considered TYPE 1 *Highly Sensitive Key Fish Habitat*, and mangroves are considered TYPE 2 *Moderately Sensitive Key Fish Habitat*. DPI Fisheries calculates habitat compensation on a minimum 2:1 basis for all key fish habitat. For disturbances to seagrass, monetary compensation is required due to a lack of scientifically proven on-ground offset techniques. Compensation for disturbances to seagrass is currently calculated at \$53.89/m² (which equates to \$107.78/m² to meet the 2:1 offset ratio). It is recommended that any proposed disturbance to key fish habitats is carefully considered in relation to the overall intent of the project, and that all environmental compensation costs are budgeted for as part of the cost of the development.

DPI Fisheries look forward to liaising with Council throughout all phases of the Shaws Bay Foreshore Improvement Works project and recommends frequent consultation regarding any changes to the project scope and all proposed compensation works.

If you have any further enquiries, please contact me on 0447 537 168 or jonathan.yantsch@dpi.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read "Jonathan Yantsch", with a long horizontal flourish extending to the right.

Jonathan Yantsch
Fisheries Manager, Aquatic Ecosystems (North Coast)

Attached: Ballina Shire Council plan titled *Shaws Bay Overall Layout Concept Redevelopment Layout*

Attachment 1



Figure 1: Ballina Shire Council plan showing the concept plan for Shaws Bay Foreshore Improvement Works.



Office of
Environment
& Heritage

Our Ref: DOC16/647803
Your Ref: 22 December 2016

Mr Mick Howland
Managing Director
Hydrosphere Consulting
PO Box 7059
Ballina NSW 2478

Dear Mr Howland

Re: Request for OEH Environmental Assessment Requirements (EARs) – Shaws Bay Foreshore Improvement Works Review of Environmental Factors (REF).

Thank you for your letter dated 22 December 2016 about the Shaws Bay foreshore improvement works and seeking comments from the Office of Environment and Heritage (OEH). I appreciate the opportunity to provide input.

We note that the project will be assessed in accordance with Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Review of Environmental Factors (REF) EARs provided by the OEH are limited to Aboriginal cultural heritage, biodiversity, OEH estate, historic heritage, acid sulfate soils, flooding, stormwater and coastal erosion.

The proponent should ensure that the REF will be sufficiently comprehensive to enable unambiguous assessment of all direct and indirect impacts of the proposal. The REF should include an assessment of the potential impacts on biodiversity, including threatened species, populations, ecological communities, or their habitats likely to occur on or near the subject site, as well as Aboriginal cultural heritage values and flooding. We consider that this information is necessary for a comprehensive REF for the proposal.


In particular, the REF should describe the:

1. impacts on endangered ecological communities (EEC) present within the improvement project footprint, inclusive of but not restricted to:
 - a) *Coastal Cypress Pine Forest in the NSW North Coast Bioregion*
 - b) *Coastal Saltmarsh in the NSW North Coast, Sydney Basin & South East Corner Bioregion*
2. impacts both direct and indirect on threatened and migratory shorebirds and their habitat.
3. planning in place to ensure significant tree protection accords with the relevant Australian Standards.
4. impacts on marine vegetation listed under the *Fisheries Management Act 1994* (refer all matters to DPI Fisheries).

The full list of our requirements that may need to be addressed in the REF is provided in **Attachment 1**. In preparing the REF, the proponent should refer to the relevant guidance material listed in **Attachment 2**.

If you have any further questions about this issue, Ms Rachel Binskin, Regional Operations Officer, Regional Operations, OEH, can be contacted on 6659 8247 or at rachel.binskin@environment.nsw.gov.au.

Yours sincerely



25/01/2017

ROSALIE NEVE
A/Senior Team Leader Planning, North East Region
Regional Operations

Contact officer: RACHEL BINSKIN 6659 8247

Enclosure: Environmental Assessment Requirements (EAR) are listed in Attachment 1 and supporting Guidance Material listed in Attachment 2.

Attachment 1

OEH's Recommended Environmental Assessment Requirements (EARs)

Review of Environmental Factors

Shaws Bay Foreshore Improvement Works

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A. The Proposal

The Review of Environmental Factors (REF) should identify the environmental objectives for the proposal and clearly describe the proposal. These environmental objectives will guide decisions on environmental controls and management throughout the life of the proposal.

The objectives of the proposal should be clearly stated and refer to:

1. the size and type of the proposal and its operation;
2. all anticipated environment impacts, both direct and indirect, including level of vegetation / habitat clearing
3. the anticipated level of performance in meeting required environmental standards;
4. threatened species, populations, ecological communities and their habitats impacted upon;
5. the staging and timing of the proposal; and
6. the proposal's relationship to any other proposal.

The REF should fully identify all of the processes and activities intended for the site and during the life of the proposal, including details of:

7. the location of the proposal and details of the surrounding environment;
8. the proposed layout of the site;
9. appropriate land use zoning;
10. ownership details of any residence and/or land likely to be affected by the proposal;
11. maps/diagrams showing the location of residences and properties likely to be affected and other industrial developments, conservation areas, wetlands, etc. in the locality that may be affected by the proposal;
12. all equipment proposed for use at the site;
13. chemicals, including fuel, used on the site and proposed methods for the transportation, storage, use and emergency management;
14. waste generation, storage and disposal;
15. a plan showing the distribution of any threatened flora or fauna species and the vegetation communities on or adjacent to the subject site, and the extent of vegetation proposed to be cleared should be provided; and
16. methods to mitigate any expected environmental impacts of the proposal.

B. Environmental Impacts of the Proposal

Impacts related to the following environmental issues need to be assessed, quantified and reported:

- Aboriginal cultural heritage
- Biodiversity
- OEH Estate (land reserved or acquired under the *National Parks and Wildlife Act 1974*)
- Historic heritage
- Acid Sulfate Soils
- Flooding, Stormwater and Coastal Erosion
- Cumulative Impacts

The REF should address the specific requirements outlined under each heading below and assess impacts in accordance with the relevant guidelines mentioned. A full list of guidelines is at **Attachment 2**.

C. Aboriginal Cultural Heritage

The REF should contain:

1. A description of the Aboriginal objects and declared Aboriginal places located within the area of the proposal.
2. A description of the cultural heritage values, including the significance of the Aboriginal objects and declared Aboriginal places, that exist across the whole area that will be affected by the proposal, and the significance of these values for the Aboriginal people who have a cultural association with the land.
3. A description of any consultation with Aboriginal people regarding the proposal and the significance of any Aboriginal cultural heritage values identified through that consultation. The OEH advises that the proponent may utilise the OEH's *Aboriginal Consultation Requirements for Proponents 2010* as best practice guidelines for such consultation (these OEH requirements for consultation must be followed if the proposal requires an Aboriginal Heritage Impact Permit or the Aboriginal heritage assessment requires archaeological testing).
4. The views of those Aboriginal people regarding the likely impact of the proposal on their cultural heritage. If any submissions have been received as a part of the consultation requirements, then the report must include a copy of each submission and your response.
5. A description of the actual or likely harm posed to the Aboriginal objects or declared Aboriginal places from the proposal, with reference to the cultural heritage values identified.
6. A description of any practical measures that may be taken to protect and conserve those Aboriginal objects or declared Aboriginal places.
7. A description of any practical measures that may be taken to avoid or mitigate any actual or likely harm, alternatives to harm or, if this is not possible, to manage (minimise) harm.

In addressing these requirements, the proponent must refer to the following documents:

- a) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (OEH, 2010) - www.environment.nsw.gov.au/resources/cultureheritage/ddcop/10798ddcop.pdf. These guidelines identify a process that could be used to prepare Aboriginal cultural heritage assessments for activities assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*.
- b) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (OEH, 2010) - www.environment.nsw.gov.au/licences/consultation.htm. This document further explains the consultation requirements that are set out in clause 80C of the National Parks and Wildlife Regulation 2009. The process set out in this document must be followed and documented in the REF if the proposal requires an Aboriginal Heritage Impact Permit or the Aboriginal heritage assessment requires archaeological testing.

- c) *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH, 2010) - www.environment.nsw.gov.au/licences/archinvestigations.htm. The process described in this Code should be followed and documented where the assessment of Aboriginal cultural heritage requires a archaeological testing to be undertaken.

Notes:

- An Aboriginal Site Impact Recording Form (<http://www.environment.nsw.gov.au/licences/DECCAHIMSSiteRecordingForm.htm>) must be completed and submitted to the Aboriginal Heritage Information Management System (AHIMS) Registrar, for each AHIMS site that is harmed through archaeological investigations required or permitted through these environmental assessment requirements.
- Under section 89A of the *National Parks and Wildlife Act 1974*, it is an offence for a person not to notify OEH of the location of any Aboriginal object the person becomes aware of, not already recorded on the Aboriginal Heritage Information Management System (AHIMS). An AHIMS Site Recording Form should be completed and submitted to the AHIMS Registrar (<http://www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm>), for each Aboriginal site found during investigations.

D. Biodiversity

Biodiversity impacts can be assessed using **either** the OEH BioBanking Scheme (Scenario 1) **or** a detailed biodiversity assessment (Scenario 2). The requirements for each of these approaches are detailed below.

The BioBanking Assessment Methodology can be used **either** to obtain a BioBanking statement under Scenario 1, **or** to assess impacts of a proposal and to determine required offsets without obtaining a statement under Scenario 2.

Under Scenario 2, if the required offset cannot be attained in its entirety, appropriate alternative options may be developed in consultation with OEH officers and in accordance with OEH policy to ensure that the final offset package adequately compensates biodiversity impacts.

I. Scenario 1 - Where a proposal is assessed under the OEH BioBanking Scheme:

The REF should include a biodiversity assessment undertaken in accordance with the OEH BioBanking Scheme. This assessment should address the matters included in the following sections.

1. Where a BioBanking Statement is being sought under Part 7A of the *Threatened Species Conservation Act 1995* (TSC Act), the assessment must be undertaken by an accredited BioBanking assessor (as specified under Section 142B (1)(c) of the TSC Act 1995) and done in accordance with the *BioBanking Assessment Methodology and Credit Calculator Operational Manual* (DECCW, 2008). To qualify for a BioBanking Statement a proposal must meet the improve or maintain standard.
2. The REF should include a specific Statement of Commitments that reflects all requirements of the BioBanking Statement including the number of credits required and any approved variations to impacts on Red Flags.
3. With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the REF should identify and assess any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

II. Scenario 2 - Where a proposal is assessed outside the OEH BioBanking Scheme:

The REF should include a detailed biodiversity assessment, including assessment of impacts on threatened biodiversity, native vegetation and habitat. This assessment should address the matters included in the following sections.

1. A field survey of the site should be conducted and documented in accordance with relevant guidelines, including:
 - a. the *Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna -Amphibians* (DECCW, 2009)
 - b. *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004),

- c. Threatened species survey and assessment guideline information on www.environment.nsw.gov.au/threatenedspecies/surveyassessmentgdlns.htm

If a proposed survey methodology is likely to vary significantly from the above methods, the proponent should discuss the proposed methodology with OEH prior to undertaking the REF, to determine whether OEH considers that it is appropriate.

Recent (less than five years old) surveys and assessments may be used. However, previous surveys should not be used if they have:

- been undertaken in seasons, weather conditions or following extensive disturbance events when the subject species are unlikely to be detected or present, or
- utilised methodologies, survey sampling intensities, timeframes or baits that are not the most appropriate for detecting the target subject species,

unless these differences can be clearly demonstrated to have had an insignificant impact upon the outcomes of the surveys. If a previous survey is used, surveys for any additional entities listed under the *Threatened Species Conservation Act 1995* since the previous survey took place, must be undertaken and documented.

Determining the list of potential threatened species for the site should be done in accordance with the *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft* (DEC, 2004) and the *Guidelines for Threatened Species Assessment* (Department of Planning, July 2005). The OEH Threatened Species website <http://www.environment.nsw.gov.au/threatenedspecies/> and the *Atlas of NSW Wildlife* database should be the primary information sources for the list of threatened species present. The BioBanking Threatened Species Database, the Vegetation Types databases (available on OEH website at <http://www.environment.nsw.gov.au/biobanking/biobankingtsdpd.htm> and <http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm>, respectively) and other data sources (e.g. PlantNET, Online Zoological Collections of Australian Museums (<http://www.ozcam.org/>), previous or nearby surveys etc.) may also be used to compile the list.

2. The REF should contain the following information as a minimum:
 - a. The requirements set out in the *Guidelines for Threatened Species Assessment* (Department of Planning, July 2005).
 - b. Description and geo-referenced mapping of study area (and spatial data files), e.g. overlays on topographic maps, satellite images and /or aerial photos, including details of map datum, projection and zone, all survey locations, vegetation communities (including classification and methodology used to classify), key habitat features and reported locations of threatened species, populations and ecological communities present in the subject site and study area.
 - c. Description of survey methodologies used, including timing, location and weather conditions.
 - d. Details, including qualifications and experience of all staff undertaking the surveys, mapping and assessment of impacts as part of the EIS.

- e. Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status.
 - f. Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect and construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor.
 - g. Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposal to avoid or minimise impacts, including details about alternative options considered and how long term management arrangements will be guaranteed.
 - h. Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity, then a biodiversity offset package is expected (see the requirements for this at point 4 below).
3. An assessment of the significance of direct and indirect impacts of the proposal must be undertaken for threatened biodiversity known or considered likely to occur in the study area based on the presence of suitable habitat. This assessment must take into account:
 - a. the factors identified in s.5A of the *Environmental Planning & Assessment Act 1979*, and
 - b. the guidance provided by the *Threatened Species Assessment Guideline – The Assessment of Significance* (DECCW, 2007) which is available at: <http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf>
4. The proposal must be designed to avoid and minimise impacts on biodiversity and offset remaining direct and indirect biodiversity impacts. In determining an appropriate offset package it is recommended that the REF should:
 - a. Accord with the 13 OEH offsetting principles available at <http://www.environment.nsw.gov.au/biodivoffsets/oehoffsetprincip.htm>.
 - b. Use the BioBanking Assessment Methodology to determine the quantum of offsets required to compensate for those remaining biodiversity impacts.
 - c. Identify the conservation mechanisms to be used to ensure the in-perpetuity protection and management of proposed offset sites.
 - d. Include a specific Statement of Commitments for the proposed offset package which is informed by a., b. and c. above and by any consultation with OEH.
5. With regard to the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the REF should identify any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action.

E. OEH Estate

The REF should address the following with respect to land reserved under the *National Parks and Wildlife Act 1974*.

1. Where appropriate, likely impacts (both direct and indirect) on any adjoining and/or nearby OEH estate reserved under the *National Parks and Wildlife Act 1974* should be considered. Refer to the *Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water* (DECC, 2010). The guideline is available at:
<http://www.environment.nsw.gov.au/protectedareas/developmntadjoiningdecc.htm>

Note: Proposals which may impact marine protected areas should be referred to the Department of Primary Industries to determine the assessment and approval requirements

F. Historic Heritage

The REF should address the following:

1. The heritage significance of the site and any impacts the proposal may have upon this significance should be assessed. This assessment should include natural areas and places of Aboriginal, historic or archaeological significance. It should also include a consideration of wider heritage impacts in the area surrounding the site.
2. The Heritage Council maintains the State Heritage Inventory which lists some items protected under the *Heritage Act 1977* and other statutory instruments. This register can be accessed through the Heritage Branch home page on the internet (<http://www.heritage.nsw.gov.au>). In addition, lists maintained by the National Trust, any heritage listed under the Australian Government's Environment Protection and Biodiversity Conservation Act 1999 and the local council should be consulted in order to identify any known items of heritage significance in the area affected by the proposal. These lists are constantly evolving and items with potential heritage significance may not yet be listed
3. Non-Aboriginal heritage items within the area affected by the proposal should be identified by field survey. This should include any buildings, works, relics (including relics underwater), gardens, landscapes, views, trees or places of non-Aboriginal heritage significance. A statement of significance and an assessment of the impact of the proposal on the heritage significance of these items should be undertaken. Any policies/measures to conserve their heritage significance should be identified. This assessment should be undertaken in accordance with the guidelines in the NSW Heritage Manual. The field survey and assessment should be undertaken by a qualified practitioner/consultant with historic sites experience. The Manager, OEH Heritage Division Conservation Team, can be contacted on telephone (02) 9873 8599 for a list of suitable consultants.

G. Acid Sulphate Soils

The REF should address the following:

1. The potential impacts of the proposal on acid sulphate soils must be assessed in accordance with the relevant guidelines in the Acid Sulphate Soils Manual (Stone et al. 1998) and the Acid Sulphate Soils Laboratory Methods Guidelines (Ahern et al. 2004).
2. Describe mitigation and management options that will be used to prevent, control, abate or minimise potential impacts from the disturbance of acid sulfate soils associated with the proposal and to reduce risks to human health and prevent the degradation of the environment. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

H. Flooding, Stormwater and Coastal Erosion

The REF should include an assessment of the following referring to the relevant guidelines in Attachment 2:

1. The potential effect of coastal processes and coastal hazards including potential impacts of sea level rise:
 - a. on the proposal; and
 - b. arising from the proposal.
2. Whether the proposal is consistent with any coastal zone management plans.
3. Whether the proposal is consistent with any floodplain risk management plans.
4. Whether the proposal is compatible with the flood hazard of the land.
5. Whether the proposal will significantly adversely affect flood behaviour resulting in detrimental increases in the potential flood affectation of other development or properties.
6. Whether the proposal will significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
7. Whether the proposal incorporates appropriate measures to manage risk to life from flood.
8. Whether the proposal is likely to result in unsustainable social and economic costs to the community as a consequence of flooding.
9. The implications of flooding over the full range of potential flooding, including the probable maximum flood, should be considered as set out in the NSW Government Floodplain Development Manual. This should include the provision of:
 - a. Full details of the flood assessment and modelling undertaken in determining any design flood levels (if applicable), including the 1 in 100 year flood levels.
 - b. A sensitivity assessment of the potential impacts of an increase in rainfall intensity and runoff (10%, 20% and 30%) and sea level rise on the flood behaviour for the 1 in 100 year design flood if applicable.
10. All site drainage, stormwater quality devices and erosion / sedimentation control measures should be identified and the onsite treatment of stormwater and effluent runoff and predicted stormwater discharge quality from the proposal should be detailed.

I. Cumulative Impacts

The EIS should include an assessment of the following:

1. The cumulative impacts, including both construction and operational impacts, from all clearing activities and operations, associated edge effects and other indirect impacts on cultural heritage, biodiversity and OEH Estate in accordance with the *Environmental Planning and Assessment Act 1979*.
2. The cumulative impacts, including both construction and operational impacts, of the proponent's existing and proposed development and associated infrastructure (such as access tracks etc.) as well as the cumulative impact of the development in the context of other developments located in the vicinity.

Attachment 2 – REF Guidance Material

<i>Title</i>	<i>Web address</i>
<u>Relevant Legislation</u>	
<i>Coastal Protection Act 1979</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+13+1979+cd+0+N
<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>	http://www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
<i>Floodplain Development Manual</i>	http://www.environment.nsw.gov.au/floodplains/manual.htm
<i>Environmental Planning and Assessment Act 1979</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
<i>Fisheries Management Act 1994</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
<i>Marine Parks Act 1997</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+64+1997+cd+0+N
<i>National Parks and Wildlife Act 1974</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
<i>Protection of the Environment Operations Act 1997</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
<i>Threatened Species Conservation Act 1995</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N
<i>Water Management Act 2000</i>	http://www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
<u>Aboriginal Cultural Heritage</u>	
Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (2005)	Available from DPE.
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/consultation.htm
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010)	http://www.environment.nsw.gov.au/licences/archinvestigations.htm
Aboriginal Site Impact Recording Form	http://www.environment.nsw.gov.au/licences/DECCAHiMSSiteRecordingForm.htm
Aboriginal Heritage Information Management System (AHIMS) Registrar	http://www.environment.nsw.gov.au/contact/AHiMSRegistrar.htm

Biodiversity

BioBanking Assessment Methodology (DECC, 2008)	http://www.environment.nsw.gov.au/resources/biobanking/08385bbassessmethod.pdf
BioBanking Assessment Methodology and Credit Calculator Operational Manual (DECCW, 2008)	http://www.environment.nsw.gov.au/biobanking/operationalmanual.htm
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna -Amphibians (DECCW, 2009)	http://www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC, 2004)	http://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
Guidelines for Threatened Species Assessment (Department of Planning, July 2005)	Draft available from DPE
OEH Threatened Species website	http://www.environment.nsw.gov.au/threatenedspecies/
Atlas of NSW Wildlife	http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp
BioBanking Threatened Species Database	http://www.environment.nsw.gov.au/biobanking/biobankingtspd.htm
Vegetation Types databases	http://www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm
PlantNET	http://plantnet.rbgsyd.nsw.gov.au/
Online Zoological Collections of Australian Museums	http://www.ozcam.org/
Threatened Species Assessment Guideline - The Assessment of Significance (DECCW, 2007)	http://www.environment.nsw.gov.au/resources/threatenedspecies/tsaguide07393.pdf
Principles for the use of biodiversity offsets in NSW	http://www.environment.nsw.gov.au/biocertification/offsets.htm

OEH Estate

Land reserved or acquired under the NPW Act

List of national parks	http://www.environment.nsw.gov.au/NationalParks/parksearchatoz.aspx
OEH Revocation of Land Policy	http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm
Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW, 2010)	http://www.environment.nsw.gov.au/resources/protectedareas/10509devadjdeccw.pdf

Water and Soils

Acid sulphate soils

Acid Sulfate Soils Planning Maps

<http://canri.nsw.gov.au/download/>

Acid Sulfate Soils Manual (Stone et al. 1998)

Manual available for purchase from:

<http://www.landcom.com.au/whats-new/the-blue-book.aspx>

Chapters 1 and 2 are on DPI's Guidelines Register at:

Chapter 1 Acid Sulfate Soils Planning Guidelines:

<http://www.planning.nsw.gov.au/rdaguidelines/documents/NSW%20Acid%20Sulfate%20Soils%20Planning%20Guidelines.pdf>

Chapter 2 Acid Sulfate Soils Assessment Guidelines:

<http://www.planning.nsw.gov.au/rdaguidelines/documents/NSW%20Acid%20Sulfate%20Soils%20Assessment%20Guidelines.pdf>

Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al. 2004)

<http://www.derm.qld.gov.au/land/ass/pdfs/lmg.pdf>

This replaces Chapter 4 of the Acid Sulfate Soils Manual above.

Flooding and Coastal Erosion

Reforms to coastal erosion management

<http://www.environment.nsw.gov.au/coasts/coastalerosionmgmt.htm>

Floodplain development manual

<http://www.dnr.nsw.gov.au/floodplains/manual.shtml>

Guidelines for Preparing Coastal Zone Management Plans

<http://www.environment.nsw.gov.au/resources/coasts/130224CZMPGuide.pdf>

Climate Change Impacts and Risk Management

<http://www.environment.gov.au/climate-change>

Water

Water Quality Objectives

<http://www.environment.nsw.gov.au/ieo/index.htm>

ANZECC (2000) Guidelines for Fresh and Marine Water Quality

http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

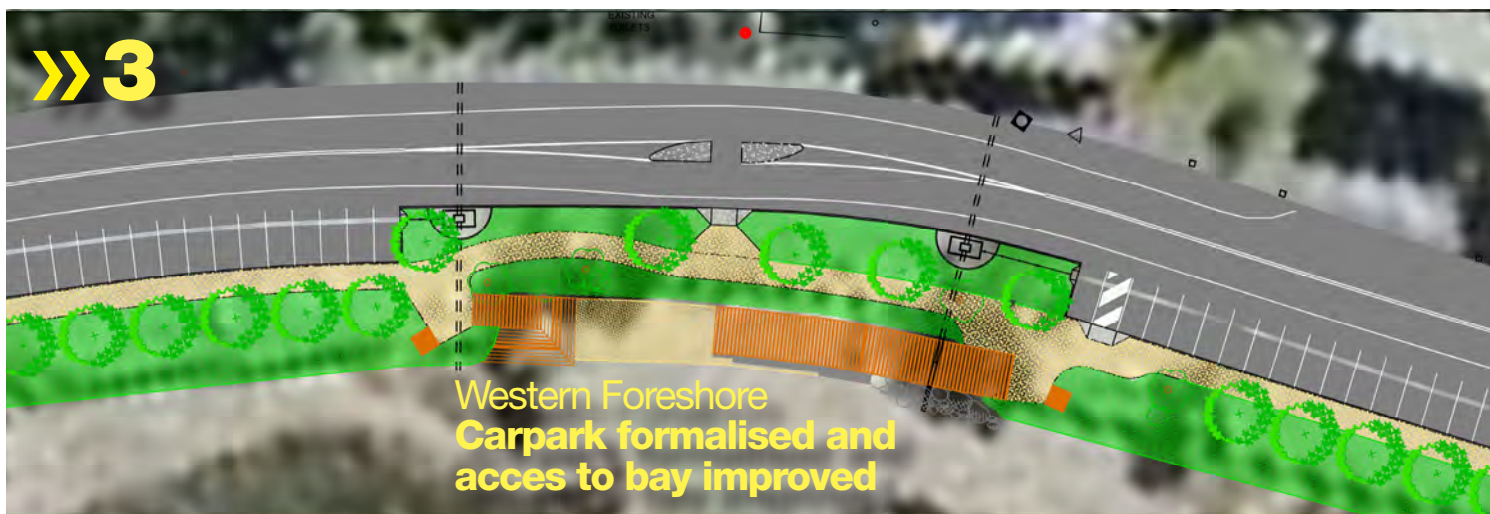
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones

<http://deccnet/water/resources/AWQGuidance7.pdf>

Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)

http://www.environment.nsw.gov.au/resources/legislation/approved_methods-water.pdf

APPENDIX 4: PROJECT COMMUNITY NEWSLETTER



» Shaws Bay Precinct water quality and amenity improvements

Update: January 2017



Ballina Shire Council is about to embark on a series of actions from the Coastal Zone Management Plan to improve the Shaws Bay precinct for the health of the ecosystem and our community.

» Background

Shaws Bay is the body of water that was formed when the northern training wall of the Richmond River was constructed near the river entrance at Ballina.

The bay comprises part of the former river course and exchanges water with the main river every day. It is a popular spot for leisure activities such as picnicking, swimming, snorkelling, canoeing and walking.

The area is very scenic and the landform varies from gently sloping beaches to a steep sandy escarpment which retains littoral rainforest species. The seagrasses in the bay are regarded as some of the best in northern NSW and provide a wonderful environment for safe snorkelling.

» Protecting the health of the bay and providing community access

A Shaws Bay Coastal Zone Management Plan (CZMP) has been developed to address management objectives, management issues and identify community desires for future management of Shaws Bay.

The CZMP was certified by the NSW Minister for Planning and was Gazetted on 24 June 2016 and includes a series of actions to achieve the plan's objectives.

Ballina Shire Council will progressively work through these actions, and has identified the following works to progress in 2017 (also illustrated overpage).

» Actions completed or currently underway

- Mangroves (juvenile and as per licence from Department of Primary Industries – Fisheries) removed from bay along training wall (completed December 2016).
- Weed and vegetation management and removal in adjacent reserves and along training wall (completed December 2016).
- Water testing and monitoring for recreational swimming quality under the Beachwatch Program (occurs weekly).

» Action 1: Control bank erosion and siltation into the bay

Objective: Improve the water quality of the bay and the recreational amenity of the reserves. Also improve access from the reserves to the bay.

An excavator will remove the existing rock, stabilise the bank and improve access. Sandy beaches will be created and other areas will be closed off to access to allow for revegetation. Much of this work will need to be carried out at low tide.

Timeline to commence: February/March 2017

Budget: \$510,000 (grant depending)

Funding partners: Ballina Shire Council, Office of Environment and Heritage, Department of Industry - Lands.

» If you have any questions please contact:

Ballina Shire Council, Development and Environmental Health Group ph 6686 1210 or view the Shaws Bay Coastal Zone Management Plan (CZMP) on Council's website www.ballina.nsw.gov.au (search Shaws Bay)



PUBLISHED JANUARY 2017

» see over

RICHMOND RIVER

SHAWS BAY

» 2

Dredging of
Shaws Bay

Western Foreshore
Carpark formalised and
access to bay improved

» 3

Mangrove Walk
Boardwalk

Pop Denison Park Precinct
Path to connect to the existing
Shared Path

Shaws Bay Eastern Arm
Stabilisation Works

» 1

» 4

Pop Denison Park Precinct
Expand Carpark

» Action 2: Dredging

Objective: Reduce infilling and improve water circulation.

This stage of the CZMP actions is of great importance for the health of the bay. Council is currently liaising and discussing proposals with Department of Primary Industries - Fisheries and Office of Environment and Heritage. Council has submitted a grant to OEH for funding to advance the investigation, studies, approvals and licences required to progress the dredging works.

Timeline to commence: ASAP but this is dependent on grant funding and other State government agency approvals and licences

Budget: to be determined, estimated to be up to \$500,000

Funding partners: Ballina Shire Council, Department of Industry - Lands, Office of Environment and Heritage.

» Action 3: Improve Compton Drive Foreshore

Objective: Enhance safety and recreational amenity of the foreshore and improve stormwater systems and treatments.

An excavator will remove the existing rock, stabilise the bank and improve access. Sandy beaches will be created and other areas will be closed off to access to allow for revegetation. Much of this work will need to be carried out at low tide.

Carparking on the foreshore will be formalised and safer shared path access through the foreshore will be provided.

Entry points to the bay will also be formalised to key locations and accessibility will be greatly improved with the installation of boardwalk and ramps.

Picnic recreational areas will be added, along with shower facilities.

Timeline to commence: July 2017

Budget: \$200,000

Funding partners: Ballina Shire Council.

» Action 4: Expand Pop Denison Park

Objective: Enhance ecological value, foreshore access and recreational amenity of the Park.

These works improve access to the eastern foreshore, new toilet facilities, the continuation of the shared path and additional and formalised carparking.

Timeline to commence: Early to Mid 2017

Budget: \$501,000

Funding partners: Ballina Shire Council, Department of Primary Industries - Lands

APPENDIX 5: BIONET SEARCH RESULTS

Table 7: NSW Wildlife Atlas Bionet search results (threatened species) within vicinity of study area (Figure)

Common Name	Species	Type	Habitat & Ecology	Conservation Status			Potential to be affected	Assessment of significance required?
				FM Act	TSC Act	EPBC		
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	Waterbird	Particular affinity with floodplains. Feed in floodplain swamps, wetlands, billabongs and watercourses. Construct large nests in tall trees situated close to water.	-	Endangered	-	Unlikely	No
Sooty Oystercatcher	<i>Haematopus fuliginosus</i>	Shorebird	Favours rocky headlands, rocky shelves, exposed reefs with rock pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for foods such as limpets and mussels. Breeds in spring and summer, almost exclusively on offshore islands, and occasionally on isolated promontories. The nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks	-	Vulnerable,	-	Unlikely	No
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	Waterbird	Particular affinity with floodplains. Feed in floodplain swamps, wetlands, billabongs and watercourses. Construct large nests in tall trees situated close to water.	-	Endangered	-	Unlikely	No
Pied oystercatcher	<i>Haematopus longirostris</i>	Shorebird	Favours intertidal flats of inlets and bays, open beaches and sandbanks. Forages on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish. The chisel-like bill is used to pry open or break into shells of oysters and other shellfish. Nests mostly on coastal or estuarine beaches although occasionally they use saltmarsh or grassy areas. Nests are shallow scrapes in sand above the high tide mark, often amongst seaweed, shells and small stones.	-	Endangered,	-	Unlikely	No
Mangrove Honeyeater	<i>Gavicalis fasciogularis</i>	Bird	The primary habitat of the species is mangrove woodlands and shrublands but Mangrove Honeyeaters also range into adjacent forests, woodlands and shrublands, including casuarina and paperbark swamp forests and associations dominated by eucalypts or banksias. Mangrove Honeyeaters eat nectar, from flowers, and invertebrates, including marine snails and crabs. Breed in late winter and early summer, from about August to December, nearly always building their nests in a densely foliated mangrove tree.	-	Vulnerable,	-	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	Conservation Status			Potential to be affected	Assessment of significance required?
				FM Act	TSC Act	EPBC		
Scented Acronychia	<i>Acronychia littoralis</i>	Plant	Found between Fraser Island in the north and Port Macquarie in the south. Occurs in transition zones between littoral rainforest and swamp sclerophyll forest; between littoral and coastal cypress pine communities; and margins of littoral forest.	-	Endangered	Endangered	Unlikely	No
Rainbow Bee-eater	<i>Merops ornatus</i>	Bird	Distributed across the entire continent. Diverse habitat from beach hind dunes, open forests, woodlands, open pastures and cleared areas, mangroves to inland dune systems. Feeds mainly on insects, in particular, bees and wasps.	-	-	Migratory	Unlikely	No
Curlew Sandpiper	<i>Calidris ferruginea</i>	Shorebird	This species occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. Curlew Sandpipers forage on mudflats and nearby shallow water. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. This species forages mainly on invertebrates, including worms, molluscs, crustaceans, and insects, as well as seeds. Breeds in Siberia, migrating to Australia between August and November for the summer before leaving again between March and mid-April. Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin.	-	Endangered	Critically Endangered Migratory Species	Unlikely	No



Figure 1: Bionet Search Results in the vicinity of the site (search completed 22nd November 2016)

APPENDIX 6: EPBC ACT SEARCH TOOL RESULTS

Table 8: EPBC Act Search results listed as 'known to occur within the area' surrounding the study site and assessment of likelihood of occurrence within the study site

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Waterbird	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes.	Endangered	Endangered	Unlikely	No
Curlew Sandpiper	<i>Calidris ferruginea</i>	Shorebird	This species occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. Curlew Sandpipers forage on mudflats and nearby shallow water. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. This species forages mainly on invertebrates, including worms, molluscs, crustaceans, and insects, as well as seeds. Breeds in Siberia, migrating to Australia between August and November for the summer before leaving again between March and mid-April. Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin.	Endangered	Critically Endangered Migratory Species	Unlikely	No
Red Goshawk	<i>Erythrotriorchis radiatus</i>	Bird	Occurs over forested and woodland areas close to permanent water. In NSW favoured habitat is mixed subtropical rainforest and melaleuca forest along coastal rivers, often in rugged terrain. Preys almost exclusively on birds.	Critically Endangered	Vulnerable	Unlikely	No
Eastern Curlew	<i>Numenius madagascariensis</i>	Shorebird	The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons. The Eastern Curlew is a migratory species, moving south by day and night, usually along coastlines, leaving breeding areas from mid-July to late September. They arrive in north-western and eastern Australia mainly in August. Large numbers appear on the east coast from September to November. Most leave again from late February to March. They eat mainly small crabs and molluscs, foraging mudflats by day and night.	-	Critically Endangered, Migratory	Unlikely	No
Fairy Prion (southern)	<i>Pachyptila turtur subantarctica</i>	Bird	The southern subspecies of the Fairy Prion is a marine bird, found mostly in temperate and subantarctic seas. Fairy Prions (including other subspecies) are often beachcast on the south-eastern coast of Australia, and are commonly seen offshore over the continental shelf and over pelagic waters.	-	Vulnerable	Unlikely	No
Koala	<i>Phascolarctos cinereus</i>	Mammal	Inhabit eucalypt woodlands and forests	-	Vulnerable	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Loggerhead Turtle	<i>Caretta caretta</i>	Reptile	Loggerhead Turtles are ocean-dwellers, foraging in deeper water for fish, jellyfish and bottom-dwelling animals. The female comes ashore to lay her eggs in a hole dug on the beach in tropical regions during the warmer months	Endangered,	Endangered	Unlikely	No
Green Turtle	<i>Chelonia mydas</i>	Reptile	Ocean-dwelling species spending most of its life at sea. Eggs laid in holes dug in beaches throughout their range.	Vulnerable,	Vulnerable	Unlikely	No
Leatherback Turtle	<i>Dermochelys coriacea</i>	Reptile	A pelagic feeder, found in tropical, subtropical and temperate waters venturing close to shore mainly during the nesting season in which they require sandy beaches to nest.	Endangered	Endangered, Migratory, Marine	Unlikely	No
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	Reptile	Hawksbills nest on insular and mainland sandy beaches throughout the tropics and subtropics. They are highly migratory and use a wide range of broadly separated localities and habitats during their lifetimes including major gyre systems, neritic developmental foraging habitat that may comprise coral reefs or other hard bottom habitats, sea grass, algal beds, or mangrove bays and creeks or mudflats.		Vulnerable	Unlikely	No
Flatback Turtle	<i>Natator depressus</i>	Reptile	The flatback turtle is endemic to Australia and all known breeding sites of this species occur only in Australia. Flatback turtles have a preference for shallow, soft-bottomed sea bed habitats away from reefs. Flatback turtles nest only in northern Australia on inshore islands and the mainland from Mon Repos in southern Queensland to Exmouth in northern Western Australia. On the east coast of Queensland, flatback turtles nest from Mon Repos in the south to Herald Island near Townsville in the north. Major rookeries include four islands on the inner shelf of the southern Great Barrier Reef, Peak, Wild Duck, Avoid and Curtis Islands. Nesting activity reaches a peak between late November and early December, and ceases by late January. Hatchlings emerge from nests from late December until about late March, with most hatching during February. The flatback turtle is carnivorous, feeding mostly on soft bodied prey such as sea cucumbers, soft corals and jellyfish. They feed mainly in subtidal, soft-bottomed habitats.	-	Vulnerable, Marine, Migratory	Unlikely	No
White-throated Needletail	<i>Hirundapus caudacutus</i>	Bird	Migratory terrestrial aerial bird that roosts in trees.	-	Migratory Species	Unlikely	No
Black-faced Monarch	<i>Monarcha melanopsis</i>	Bird	Migratory terrestrial bird species found in rainforests, eucalypt woodlands, coastal scrub and damp gullies. It may be found in more open woodland when migrating.	-	Migratory Species	Unlikely	No
Spectacled Monarch	<i>Monarcha trivirgatus</i>	Bird	The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	-	Migratory Species	Unlikely	No
Common Sandpiper	<i>Actitis hypoleucos</i>	Shorebird	In Australia, the Common Sandpiper is found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges or rocky shores. They are migratory, generally breeding in Eurasia during the Australian winter. Eats small molluscs, aquatic and terrestrial insects	-	Migratory Species	Unlikely	No
Great Egret	<i>Ardea alba</i>	Waterbird	Migratory wetland bird species that inhabits inland and coastal wetlands and frequents river margins, lakes shores, marshes and flood-plains.	-	Marine	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Ruddy Turnstone	<i>Arenaria interpres</i>	Shorebird	Found in most coastal regions and occasionally inland. Prefers open coastlines and beaches with exposed rock, stony or shell beaches, reefs or wave platforms. Also is known to inhabit estuaries, bays and lagoons. Feeds between lower supra-littoral and lower littoral foreshore zones, with a particular affinity with seaweed wrack.	-	Marine, Migratory	Unlikely	No
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	Shorebird	Prefers the grassy edges of shallow inland freshwater wetlands. It is also found around flooded fields, mudflats, mangroves, rocky shores and beaches. A summer migrant from Arctic Siberia, being found on wetlands throughout Australia.	-	Migratory Species	Unlikely	No
Sanderling	<i>Calidris alba</i>	Shorebird	Found on open sandy beaches at the edge of the waves, on sandbars and spits. They roost on bare sand in the dunes or behind piles of kelp. Migratory species breeding mostly in Siberia, moving south to Australia in mid-July to mid-August, staying for the summer before leaving by May (although some may overwinter in Australia). They eat mainly insects and other arthropods and small crustaceans	Vulnerable	Migratory Species	Unlikely	No
Red Knot	<i>Calidris canutus</i>	Shorebird	Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and saltworks, but rarely use freshwater swamps.	-	Endangered, Marine, Migratory	Unlikely	No
Curlew Sandpiper	<i>Calidris ferruginea</i>	Shorebird	This species occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. Curlew Sandpipers forage on mudflats and nearby shallow water. Curlew Sandpipers generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides and sometimes in saltmarsh. This species forages mainly on invertebrates, including worms, molluscs, crustaceans, and insects, as well as seeds. Breeds in Siberia, migrating to Australia between August and November for the summer before leaving again between March and mid-April. Occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin.	Endangered	Critically Endangered Migratory Species	Unlikely	No
Pectoral Sandpiper	<i>Calidris melanotos</i>	Shorebird	Breeds in the northern hemisphere, northern Russia and North America, before migrating to Australia for the southern summer. Prefers shallow fresh to saline wetlands that have open fringing mudflats and low, emergent or fringing vegetation,. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	-	Marine, Migratory	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Red-necked Stint	<i>Calidris ruficollis</i>	Shorebird	Mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on sandy or coralline shores. Occasionally they have been recorded on exposed or ocean beaches, and sometimes on stony or rocky shores, reefs or shoals. An omnivorous species, it forages on bare wet mud on intertidal mudflats or sandflats, or in very shallow water on a range of marine worms, molluscs, snails and slugs, shrimps, spiders, beetles, flies and ants.	-	Marine, Migratory	Unlikely	No
Long-toed Stint	<i>Calidris subminuta</i>	Shorebird	Breeds in the northern hemisphere before migrating to Australia for the southern summer. Forages in the shallows of freshwater and brackish wetlands and less commonly in estuaries. More often around cover of low vegetation than on open flats.	-	Marine, Migratory	Unlikely	No
Great Knot	<i>Calidris tenuirostris</i>	Shorebird	Often recorded on sandy beaches with mudflats nearby, sandy spits and islets and sometimes on exposed reefs or rock platforms. Migrates to Australia from late August to early September, although juveniles may not arrive until October-November. Most birds return north in March and April, however some individuals may stay over winter in Australia. Forages for food by methodically thrusting its bill deep into the mud to search for invertebrates, such as bivalve molluscs, gastropods, polychaete worms and crustaceans.	Vulnerable,	Critically Endangered, Marine, Migratory	Unlikely	No
Double-banded Plover	<i>Charadrius bicinctus</i>	Shorebird	found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands, pasture and seagrass areas. The species breeds only in New Zealand in July-September, with part of the population migrating to Australia in non-breeding season. It eats molluscs, insects, worms, crustaceans and spiders and sometimes seeds and fruits	0	Marine, Migratory	Unlikely	No
Greater Sand Plover, Large Sand Plover	<i>Charadrius leschenaultii</i>	Shorebird	The species is almost entirely coastal, inhabiting littoral and estuarine habitats. Breeds in the northern hemisphere and heads south for the boreal winter. apparently rare on the east coast, usually found singly. In NSW, the species has been recorded between the northern rivers and the Illawarra, with most records coming from the Clarence and Richmond estuaries. Greater Sand Plovers mostly eat molluscs, worms, crustaceans (especially small crabs and sometimes shrimps) and insects.	Vulnerable	Vulnerable, Marine, Migratory	Unlikely	No
Lesser Sand Plover, Mongolian Plover	<i>Charadrius mongolus</i>	Shorebird	Usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops. Roosts during high tide on sandy beaches, spits and rocky shores; forage individually or in scattered flocks on wet ground at low tide, usually away from the water's edge. Breeds in the northern hemisphere and heads south for the boreal winter. It also sometime occurs in short saltmarsh or among mangroves. It eats invertebrates, such as molluscs (especially bivalves), worms, crustaceans (especially crabs) and insects.	Vulnerable	Endangered, Marine, Migratory	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Oriental Plover, Oriental Dotterel	<i>Charadrius veredus</i>	Shorebird	Breeds in the northern hemisphere before migrating to Australia for the southern summer. Mostly occurs on the north-west coast and at a few scattered sites elsewhere, seldom recorded in southern Australia. Usually forage among short grass or on hard stony bar ground but also on mudflats or beaches.	-	Marine, Migratory	Unlikely	No
Latham's Snipe, Japanese Snipe	<i>Gallinago hardwickii</i>	Shorebird	They usually inhabit open, freshwater wetlands with low, dense vegetation but can also occur in habitats that have saline or brackish water, such as saltmarsh, mangrove creeks, around bays and beaches, and at tidal rivers. Omnivorous species forages mudflats and shallow water feeding on seeds and plant material as well as invertebrates including insects, earthworms and spiders.	-	Marine, Migratory	Unlikely	No
Grey-tailed Tattler	<i>Heteroscelus brevipes</i>	Shorebird	Forages on mudflats, sandflats, beaches and also rock ledges and reefs. Often perches on branches, seawalls, jetties and pontoons. In Moreton Bay, Queensland, it is most abundant in areas with dense beds of seagrass.	-	Marine, Migratory	Unlikely	No
Wandering tattler	<i>Heteroscelus incanus</i>	Shorebird	Almost entirely confined to rocky shorelines, wave-washed tidal platforms and exposed reefs around headlands or high islands.	-	Migratory Species (J)	Unlikely	No
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	Shorebird	Breeds in northern Siberia before migrating south of the southern summer. In NSW the main site for species is the Hunter River estuary with birds occasionally reaching the Shoalhaven estuary. Favour sheltered parts of the coast such as estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat. Roost on sheltered sand, shell or shingle beaches.	Vulnerable	-	Unlikely	No
Bar-tailed Godwit	<i>Limosa lapponica</i>	Shorebird	Migrates from northern hemisphere. Inhabits coastal mudflats, sandbars and shorelines. Prefer exposed sandy substrates on intertidal flats, banks and beaches. Also prefer soft mud, often with beds of <i>Zostera</i> or other seagrasses. Roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh.	-	Marine, Migratory	Unlikely	No
Black-tailed Godwit	<i>Limosa limosa</i>	Shorebird	The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. forages on wide intertidal mudflats or sandflats, in soft mud or shallow water and occasionally in shallow estuaries. Omnivorous feeding on eating annelids, crustaceans, arachnids, fish eggs and spawn and tadpoles of frogs, and occasionally seeds. Breeds in the northern hemisphere then migrates to Australia in August before leaving again in March. It is most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the coast, and inland. Frequently recorded in mixed flocks with Bar-tailed Godwits.	Vulnerable	Marine, Migratory	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Eastern Curlew	<i>Numenius madagascariensis</i>	Shorebird	The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons. The Eastern Curlew is a migratory species, moving south by day and night, usually along coastlines, leaving breeding areas from mid-July to late September. They arrive in north-western and eastern Australia mainly in August. Large numbers appear on the east coast from September to November. Most leave again from late February to March. They eat mainly small crabs and molluscs, foraging mudflats by day and night.	-	Critically Endangered, Migratory	Unlikely	No
Little Curlew, Little Whimbrel	<i>Numenius minutus</i>	Shorebird	Most often found feeding in short, dry grassland and sedgeland, including dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey, dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns, gardens, recreational areas, ovals, racecourses and verges of roads and airstrips are also used. The Little Curlew is omnivorous, mainly eating insects, but also seeds and berries	-	Migratory Species	Unlikely	No
Whimbrel	<i>Numenius phaeopus</i>	Shorebird	Regular migrant to Australia from breeding grounds in Alaska. Feeds on mudflats of estuaries and lagoons.	-	Marine, Migratory	Unlikely	No
Osprey	<i>Pandion haliaetus</i>	Marine Bird	Coastal waters and estuaries	-	Marine, Migratory	Unlikely	No
Ruff	<i>Philomachus pugnax</i>	Shorebird	The Ruff breeds in Europe from north Russia to north-west Kazakhstan before migrating south. It is a rare but common visitor to Australia. The Ruff forages on exposed mudflats, in shallow water and occasionally on dry mud, preferring to roost amongst shorter vegetation.	-	Marine, Migratory	Unlikely	No
Pacific Golden Plover	<i>Pluvialis fulva</i>	Shorebird	Inhabits coastal mudflats, sand flats, beaches and saltmarsh. Only rarely occurs inland.	-	Marine, Migratory	Unlikely	No
Grey Plover	<i>Pluvialis squatarola</i>	Shorebird	In non-breeding ground in Australia they occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. Usually roost in sandy areas on sheltered beaches or estuaries. Forage exposed mudflats and beaches of coastal estuaries and lagoons.	-	Migratory Species	Unlikely	No
Wood Sandpiper	<i>Tringa glareola</i>	Shorebird	Breeds in the northern hemisphere before migrating to Australia for the southern summer. Generally found inland around freshwater swamps and wetlands, lakes, flooded pasture- usually well vegetated. Infrequent around brackish water and typically do not frequent coastal flats, occasionally mangroves.	-	Marine, Migratory	Unlikely	No
Common Greenshank	<i>Tringa nebularia</i>	Waterbird	Recorded in most NSW coastal regions and is widely distributed west of the Great Dividing Range. On the coast it inhabits sheltered estuaries with extensive mudflats, mangrove swamps and muddy shallows. Inland it inhabits billabongs, swamps and the like.	-	Marine, Migratory	Unlikely	No

Common Name	Species	Type	Habitat & Ecology	TSC Act	EPBC Act	Potential to be affected	Assessment of significance required?
Marsh Sandpiper, Little Greenshank	<i>Tringa stagnatilis</i>	Shorebird	Lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, salt pans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. The Marsh Sandpiper usually forages in shallow water at the edge of wetlands. They probe wet mud of mudflats or feed among marshy vegetation on insects, molluscs and crustaceans.	-	Migratory Species	Unlikely	No
Osprey	<i>Pandion haliaetus</i>	Marine Bird	Coastal waters and estuaries	-	Marine, Migratory	Unlikely	No
Ruff	<i>Philomachus pugnax</i>	Shorebird	The Ruff breeds in Europe from north Russia to north-west Kazakhstan before migrating south. It is a rare but common visitor to Australia. The Ruff forages on exposed mudflats, in shallow water and occasionally on dry mud, preferring to roost amongst shorter vegetation.	-	Marine, Migratory	Unlikely	No

APPENDIX 7: HERITAGE SEARCH RESULTS



Figure 1: Ballina LEP 2012 heritage items

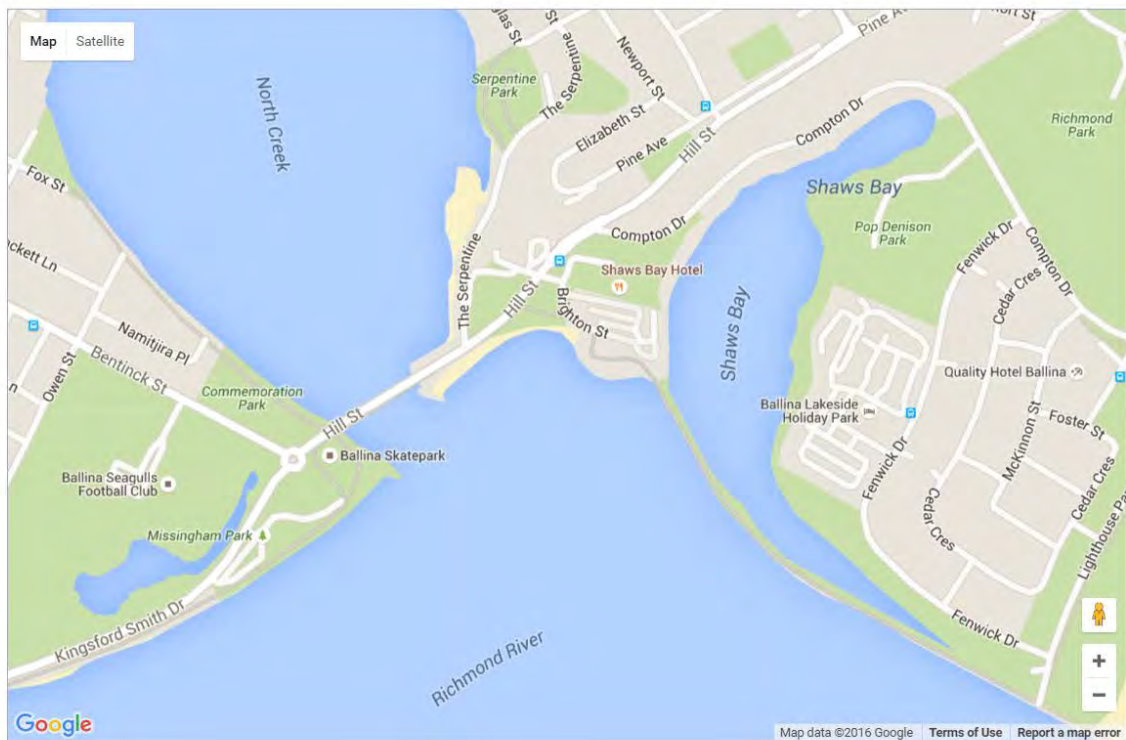


Figure 2: State heritage register search results (no results within search area)



AHIMS Web Services (AWS) Search Result

Purchase Order/Reference : Shaws REF

Client Service ID : 224314

Hydrosphere Consulting

Date: 09 May 2016

P O Box 7059

Ballina New South Wales 2478

Attention: Uriah Makings

Email: uriah.makings@hydrosphere.com.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat. Long From : -28.8744, 153.5755 - Lat. Long To : -28.8627, 153.5941 with a Buffer of 50 meters, conducted by Uriah Makings on 09 May 2016.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

2	Aboriginal sites are recorded in or near the above location.
----------	---

1	Aboriginal places have been declared in or near the above location. *
----------	--

ID	Aboriginal Place Name
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83	East Ballina (Angels Beach) Aboriginal Place
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If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the [NSW Government Gazette](http://www.nsw.gov.au/gazette) (<http://www.nsw.gov.au/gazette>) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

APPENDIX 8: COASTAL CYPRESS PINE FOREST ENDANGERED ECOLOGICAL COMMUNITY SPECIES LIST AND ASSESSMENT OF SIGNIFICANCE

The following species list is extracted from NSW Scientific Committee (2011).

Coastal Cypress Pine Forest is characterised by the assemblage of species below. The total list of species is larger than that below. The species composition varies between sites with many species only present at one or two sites or in low abundance:

<i>Abildgaardia vaginata</i>	<i>Eucalyptus pilularis</i>
<i>Acacia aulacocarpa</i>	<i>Eucalyptus resinifera</i> subsp. <i>hemilampra</i>
<i>Acacia disparrima</i> subsp. <i>disparrima</i>	<i>Eucalyptus signata</i>
<i>Acacia ulicifolia</i>	<i>Euroschinus falcata</i>
<i>Acianthus caudatus</i>	<i>Halfordia kendack</i>
<i>Acianthus exsertus</i>	<i>Hoya australis</i> subsp. <i>australis</i>
<i>Acrornychia imperforata</i>	<i>Imperata cylindrica</i> var. <i>major</i>
<i>Acrotriche aggregata</i>	<i>Leptospermum polygalifolium</i>
<i>Allocasuarina littoralis</i>	<i>Leucopogon ericoides</i>
<i>Alyxia ruscifolia</i>	<i>Leucopogon leptospermoides</i>
<i>Araucaria cunninghamii</i>	<i>Leucopogon margarodes</i>
<i>Aristida</i> spp.	<i>Lomandra longifolia</i>
<i>Astroloma humifusum</i>	<i>Monotoca elliptica</i>
<i>Austromyrtus dulcis</i>	<i>Notelaea longifolia</i>
<i>Baloskion tetrphyllum</i> subsp. <i>meiostachyum</i>	<i>Oxylobium robustum</i>
<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	<i>Paspalidium distans</i>
<i>Banksia serrata</i>	<i>Persoonia stradbokensis</i>
<i>Bulboschoenus barbata</i>	<i>Platycerium bifurcatum</i>
<i>Callitris columellaris</i>	<i>Pomax umbellata</i>
<i>Chiloglottis</i> sp.	<i>Pteridium esculentum</i>
<i>Commelina cyanea</i>	<i>Pterostylis nutans</i>
<i>Corymbia intermedia</i>	<i>Pterostylis pedunculata</i>
<i>Cyclophyllum longipetalum</i>	<i>Zieria smithii</i>
<i>Cymbopogon refractus</i> var. <i>refractus</i>	
<i>Cyperus stradbokensis</i>	
<i>Dianella caerulea</i>	
<i>Eragrostis brownii</i>	

Assessment of Significance (7-Part Test):**Coastal Cypress Pine Forest Endangered Ecological Community**

a.	<p>In the case of a threatened species, is the action proposed likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction?</p> <p><input checked="" type="checkbox"/> Not applicable – no threatened species recorded at the site</p> <p><input type="checkbox"/> The action is not likely to have an adverse effect</p> <p><input type="checkbox"/> The action is likely to have an adverse effect</p> <p>Comments:</p>
b.	<p>In the case of an endangered population, is the action proposed likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction?</p> <p><input checked="" type="checkbox"/> Not applicable – no endangered populations recorded at the site</p> <p><input type="checkbox"/> The action is not likely to have an adverse effect</p> <p><input type="checkbox"/> The action is likely to have an adverse effect</p> <p>Comments:</p>
c.	<p>In the case of an endangered ecological community or critically endangered ecological community, is the action proposed:</p> <p>(i) likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or</p> <p>(ii) likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction?</p> <p><input type="checkbox"/> Not applicable – no endangered ecological community or critically endangered ecological community recorded at the site</p> <p><input checked="" type="checkbox"/> The action is not likely to have an adverse effect</p> <p><input type="checkbox"/> The action is likely to have an adverse effect</p> <p>Comments:</p> <p>i. The actions proposed will have minor initial negative impact and will facilitate long-term benefit and enhance protection of this EEC. See comments later under factor 'f'.</p> <p>ii. The EEC currently contains a number non-endemic and weed species. The planned activities will aim to reduce the occurrence of species that are not consistent with this EEC, whilst promoting growth and protection of species known to be associated with it.</p>

- d. In relation to the habitat of a threatened species, population or ecological community:**
- (i) what is the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**
 - (ii) is an area of habitat likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**
 - (iii) what is the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality?**
- ☐ Not applicable – no habitat of a threatened species, population or ecological community recorded at the site
- ☒ The action is not likely to have an adverse impact
- ☐ The action is likely to have an adverse impact
- Comments:
- (i) Very little existing habitat is to be modified as the main path alignment follows an existing track and traverses areas which have been either severely burnt, have weed infestations or do not exhibit ground cover. There are however, some areas where seedling (~0.25m) *Callitris columellaris* are evident, as well as under-storey species such as *Lomandra longifolia* which is part of the species assemblage associated with this EEC. In these cases, some removal and replanting of these trees may be necessary in order to achieve the aims of the project. The total number of *L. longifolia* to be replanted is ~20, whereas the number of seedling pines is estimated to be <20. All species listed in the EEC listing will be replanted to suitable locations within the confines of the EEC.
 - (ii) The area will become more contiguous through closure of ad hoc tracks and planting to reduce edge effects, trampling. Weed management will assist in maximising the value of the EEC.
 - (iii) Coastal Cypress Pine Forest occurs in numerous locations in the vicinity of Shaws Bay. The Shaws Bay stand is important locally, however the area to be affected negatively is negligible. There will be significant long-term benefit.
 - (iv)

- e. Is the action proposed likely to have an adverse effect on critical habitat (either directly or indirectly)?**
- ☒ Not applicable – no critical habitat recorded at the site
- ☐ The action is not likely to have an adverse impact
- ☐ The action is likely to have an adverse impact
- Comments:

f. Is the action proposed consistent with the objectives or actions of a recovery plan or threat abatement plan?

- ☐ Not applicable – no recovery plan or threat abatement plan relevant
- ☒ The action is consistent with the applicable recovery or threat abatement plan
- ☐ The action is not consistent with the applicable recovery or threat abatement plan

Comments:

Although a recovery plan or threat abatement plan has not been prepared for this EEC, a number of threats have been identified by OEH:

- isolation of individual stands;
- edge encroachment;
- trampling;
- rubbish dumping;
- invasion of weeds
- inappropriate fire regimes

All of these threats are in evidence at Shaws Bay and the Shaws Bay foreshores enhancement project aims to reduce many of these threats as follows:

A specific vegetation management plan is to be produced which will seek to maximise the opportunity for protection of this EEC whilst allowing for continued low-key public use of the area occupied by the EEC. Specific measures to be included are:

- closure of several existing tracks traversing the forest. These tracks impact on understorey species as well as seedling pines and generally lead to the segregation of the forest into isolated stands. The new path system will not necessarily reduce the total area of existing pathway within the EEC, but the reduced number of paths will ensure that greater areas of contiguous forest are able to be maintained.
- The reduction in number of paths will reduce edge effects and a replanting strategy will be employed that ensures that edge vegetation is representative of the EEC or compatible with continued protection of the EEC. Edge planting will be dense enough to ensure that the depth of edge effects is reduced. This strategy along, with a dedicated weed management component to the strategy will assist in reducing weed infestation as well as the continued propagation of non-endemic species;
- Trampling will be reduced by formalisation of the main paths and closure of ad hoc tracks. The new path system will logically connect new points of interest within Shaws Bay and the desire for ad hoc tracks will be reduced; and
- Trackside planting, weed management and more constrained access to the main areas of EEC regeneration whilst improved public access and more frequent visitation along the main Eastern Pathway will assist in keeping anti-social behaviours such as littering, dumping and arson to a minimum.

9. Does the action proposed constitute, or is part of, a key threatening process or is it likely to result in the operation of, or increase the impact of, a key threatening process?

- ☒ The proposed action is not a key threatening process
- ☐ The action is not likely to cause or increase the impact of a key threatening process
- ☐ The action is likely to cause or increase the impact of a key threatening process

Comments:

The actions will reduce documented threats to this EEC.