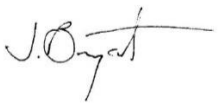
REVIEW OF ENVIRONMENTAL FACTORS (REF)
JETTY REPAIR (THROUGH RENEWAL)
ST GEORGES BASIN
ISLAND POINT ROAD, ST GEORGES BASIN

Contents

Document control

Item	Details
Project	Repair of jetty through renewal – St Georges Basin estuary - Island Point Road, St Georges Basin
Client/Proponent	City Services, Shoalhaven City Council
Prepared By	City Services, Shoalhaven City Council

Document status

Version	Author / Reviewer*	Name	Signed	Date
V1.0	Author	Geoff Young		20/09/2023
	Reviewer	Jeff Bryant		21/09/2023

*Review and endorsement statement:

"I certify that I have reviewed and endorsed the contents of this REF document and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading".

Assessment and approvals overview

Item	Details
Assessment type	Division 5.1 (EP&A Act) - Review of Environmental Factors (REF)
Proponent	Shoalhaven City Council
Determining authority / authorities	Shoalhaven City Council
Required approvals (consents, licences and permits)	"Fisheries Permit" - Section 200 and 205 of the NSW *Fisheries Management Act 1994*.
Required publication	Yes – as per Section 171(4)(b)(i) of the NSW *Environmental Planning and Assessment Regulation 2021*

1. PROPOSAL AND LOCATION

1.1 Overview and Background

The proposed activity is the repair, through renewal, of an existing jetty within St Georges Basin (the estuary) off Island Point Road, St Georges Basin (Figure 1). This jetty was severely damaged during numerous storm events in 2022.

The proposed activity would comprise (refer to Figure 2 below and Appendix A for design plans and report):

- site preparation works including the establishment of a temporary construction zone within cleared areas, sediment fencing, barge installation, and container and temporary toilet installation
- demolition and removal of the existing timber jetty
- replacement with a jetty comprising:
    - 32 metres long by 4 metre wide composite fibre (FRP) jetty
    - gangway – 8.5 metres long by 1.5 metre wide attached to a floating pontoon structure – 6 metres long by 4 metres wide for closer access to the water
    - associated piles / piers (25) for the jetty and another 2 piles for the floating pontoon that extend above the 2050 1% AEP flood level
- formation of a temporary rock platform to allow piling machine to install the piles close to the shore. Approximate dimensions would be 10 metres (from the shore) by maximum 2 metres deep and 8 metres wide. This would be removed once piles are installed. The remaining piles would be installed from a barge.
- installation of seating and fishing-rod holders
- provision of solar light adjacent to the existing fish cleaning table
- repair of any landscaped areas and features disturbed during demolition and construction works.

Works would also involve the implementation of safeguards and mitigation measures prescribed in Section 7 of this Review of Environmental Factors (REF).

Shoalhaven City Council (SCC) is the proponent and the determining authority under Part 5 of the EP&A Act. The environmental assessment of the proposed activity and associated environmental impacts has been undertaken in the context of Clause 171 of the *Environmental Planning and Assessment Regulation 2021*. In doing so, this REF helps to fulfil the requirements of Section 5.5 of the Act that SCC examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

1.2 Location

The proposed activity would be undertaken in and on the shore of St Georges Basin Estuary off Island Point Road, St George Basin (Figure 1 below).

The existing jetty is owned and managed by SCC under Crown Licence 494193.

The shore comprises the Island Point Road casement and Lot 118 DP17832. Island Point Road is a public road to which SCC is the road authority. Lot 118 is SCC owned operational land managed as “Island Point Reserve”.

There is a SCC managed public park (Kingfisher Park, Lot 6 DP225886) adjacent to Island Point Reserve, however this would not be affected by the proposed activity.

1.3 Design and Construction

Design Plans and Report are provided in Appendix A. However, in summary:

- To reduce disturbance to the bed of the waterway and keep within existing Crown Land licence, the proposed height, width and length of the jetty matches the existing structure (prior to being damaged).
- The jetty floating pontoons would be 6 metres long to cater as a temporary mooring associated with use of the nearby boat ramp, for one, 4-metre long vessel (1.5 x design length) in accordance with the NSW *Boat Ramp Facility Guidelines* (TfNSW 2015).
- The entrance to the jetty would be supported on a strip footing and concrete piles that bear onto the sandstone rather than embed.
- Piles would be concrete piles embedded 3 metres into the sandstone bedrock utilising sleeved continuous flight auger operated from barge and shore. The embedment to this extent provides resistance to the wind, wave and floodwater actions that are anticipated during storm events.
- Composite Fibre Technology (CFT), particularly fibre reinforced polymer (FRP) would be used for structural framing members for the jetty bearers, joists, handrails and mini-mesh decking. The gangway and pontoon would be a proprietary product that uses aluminium, plastics and rubber suitable for the marine environment.

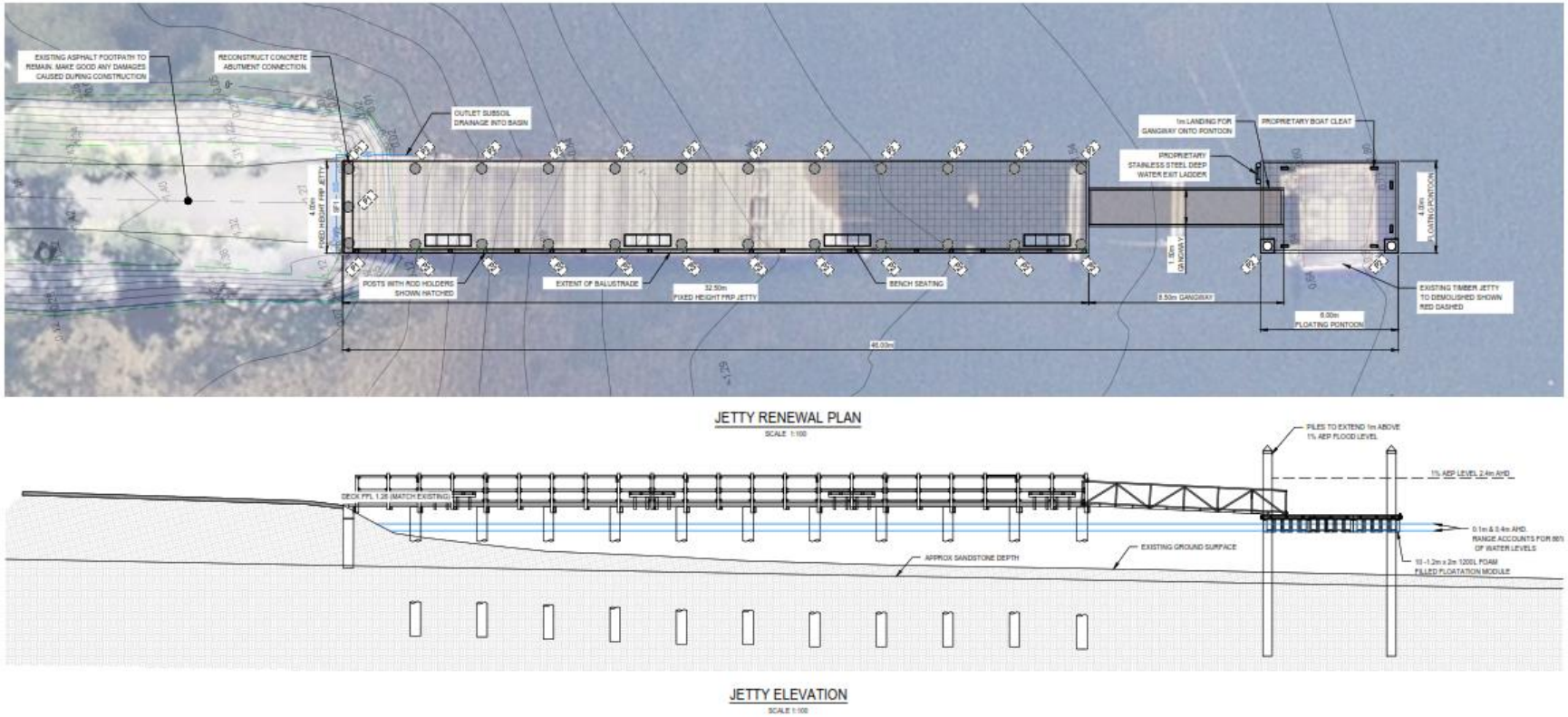
After a consideration of alternatives (MIE 2023, Appendix A) the proposed activity was considered to be the most optimal solution in terms of constructability, durability, costs, maintenance and aesthetics.

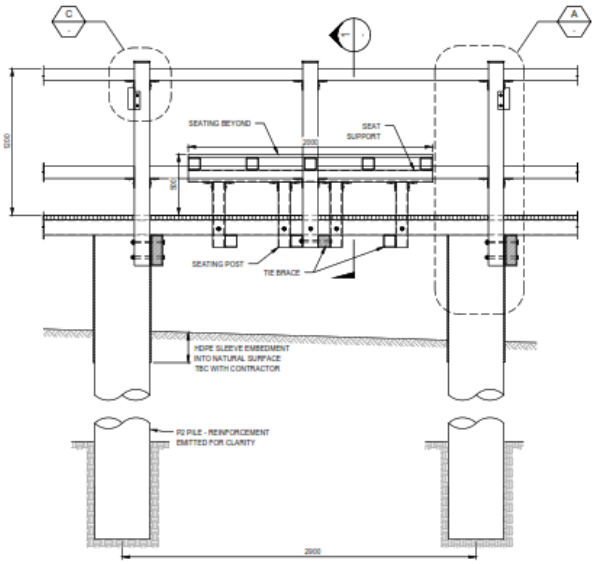
Because of the 3 metre pile embedment into sandstone, a large piling rig would be utilised. Such piling rig and forces applied during construction, would be too large for a top-down construction method (*i.e.* piling from the existing or new jetty deck). A barge would accompany the piling rig so that the foundation would be constructed from the water (MIE 2023). The draft required for a barge is sufficient until approximately 10 metres from the shore. This where a temporary rock platform of gabion rock or similar will be installed to allow the piling rig to drive out and install the piles in the more shallow areas (~10 metres from shore).

The design and construction methodology may change slightly based on recommendations from the construction contractor when engaged. Any significant changes will require a review of this REF.

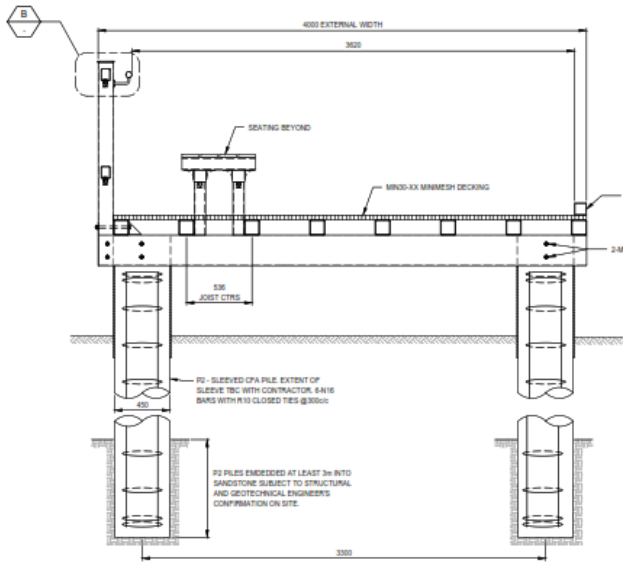
Figure 1 Location of the proposed activity

Figure 2: Proposed activity (refer to Appendix A for details)

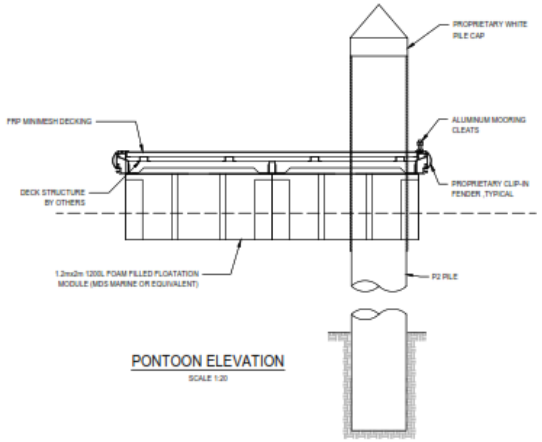




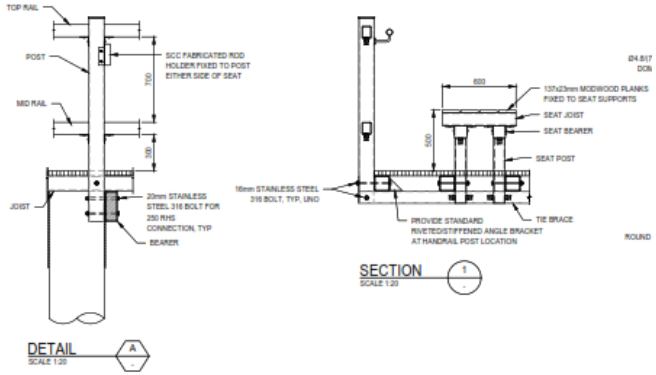
TYPICAL ELEVATION
SCALE 1:20



TYPICAL SECTION
SCALE 1:20

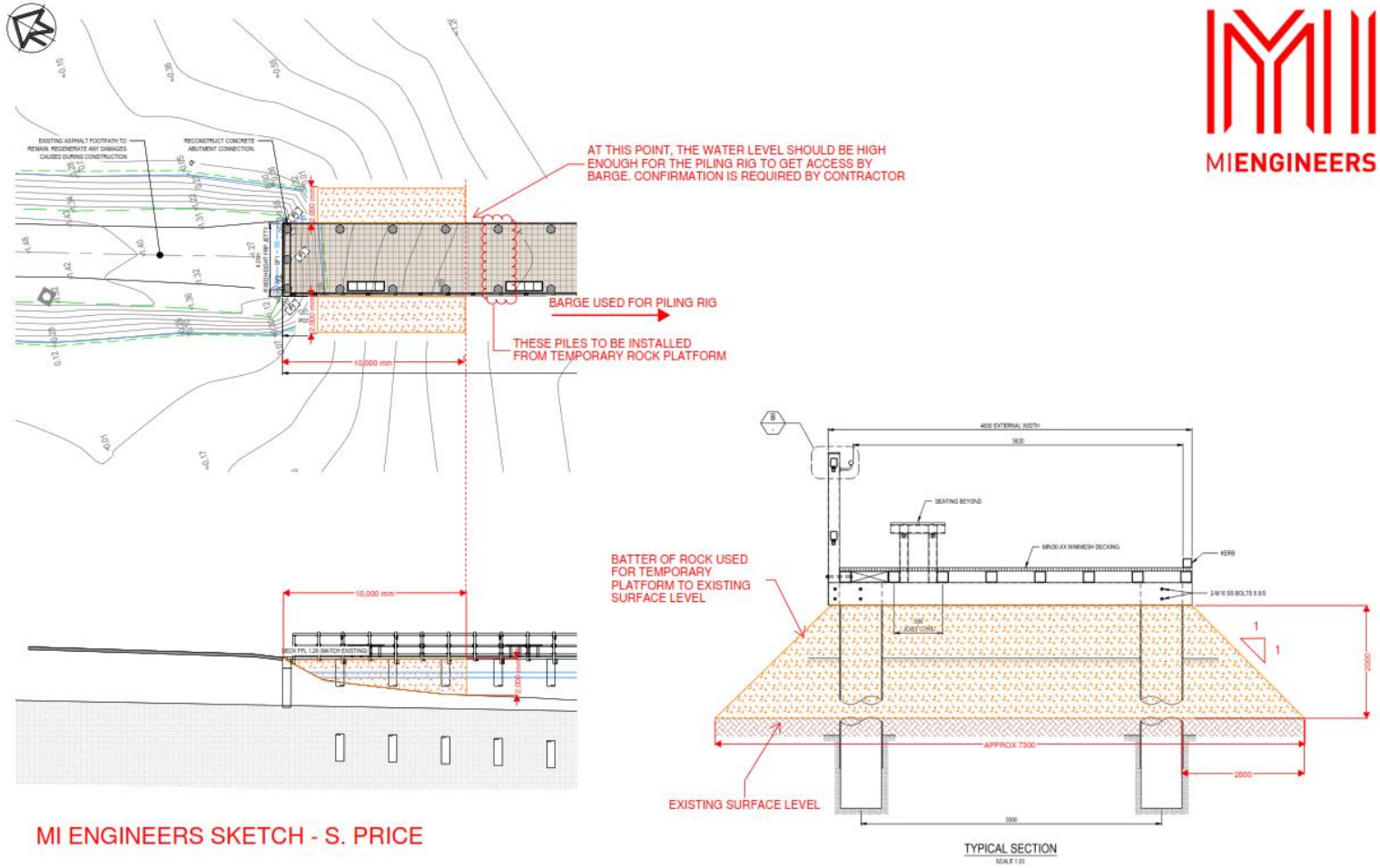


PONTOON ELEVATION
SCALE 1:20



DETAIL
SCALE 1:20

SECTION
SCALE 1:20



MI ENGINEERS SKETCH - S. PRICE

15/09/2023

APPROXIMATE LOCATION AND DIMENSIONS OF TEMPORARY ROCK PLATFORM

2. EXISTING ENVIRONMENT

Photos of the site are provided in Section 2.5 below.

The site of the proposed activity was assessed by a SCC Biodiversity Officer on the 15 March 2023 and again by a SCC Environmental Operation Officer on 9 August 2023.

Investigations involved vegetation and habitat assessment, recording flora species within and immediately adjacent to the proposed activity, looking for Aboriginal heritage objects, determination of vegetation communities including assessing the presence of threatened ecological communities, seagrass and saltmarsh, and investigation of habitat availability for threatened flora and fauna species.

2.1 Geology and Geomorphology

The jetty would be constructed within estuarine basin and bay deposits of Holocene age (Figure 3 p.12). This material comprises mixture of clay, silt shell, very fine to fine grained lithic-quarts sand fluvially and/or marine deposited. Being Holocene and estuarine in origin, the lake bottom sediments at the site have a higher risk of containing iron sulfides which when exposed to oxygen generate sulfuric acid *i.e.* acid sulfate soils. This is reflected in the acid sulfate soil risk map where the site is mapped as “class 5” risk along the shore and “class 1” risk for the lake bottom sediments (Figure 4 below). Below the marine/fluvial deposits lies the Wandrawandian Formation of sandstone, mudstones and siltstones.

Boulders of this formation lie adjacent and underneath the jetty deck and on the shallow areas of the estuary adjacent to the jetty (refer photos in Section 2.5 below). It is not known whether this is naturally occurring rock or was deposited for the purposes of the existing jetty.

Bedrock was encountered 2 to 3.35 metres from the top of the jetty deck (Geofirst 2022). Based on geotechnical and flood impact investigations, Geofirst (2022) recommended that all piles be embedded at least three metres into the sandstone and the exposure classification of severe to very severe should be adopted for concrete and steel footings.

Figure 3 Geology

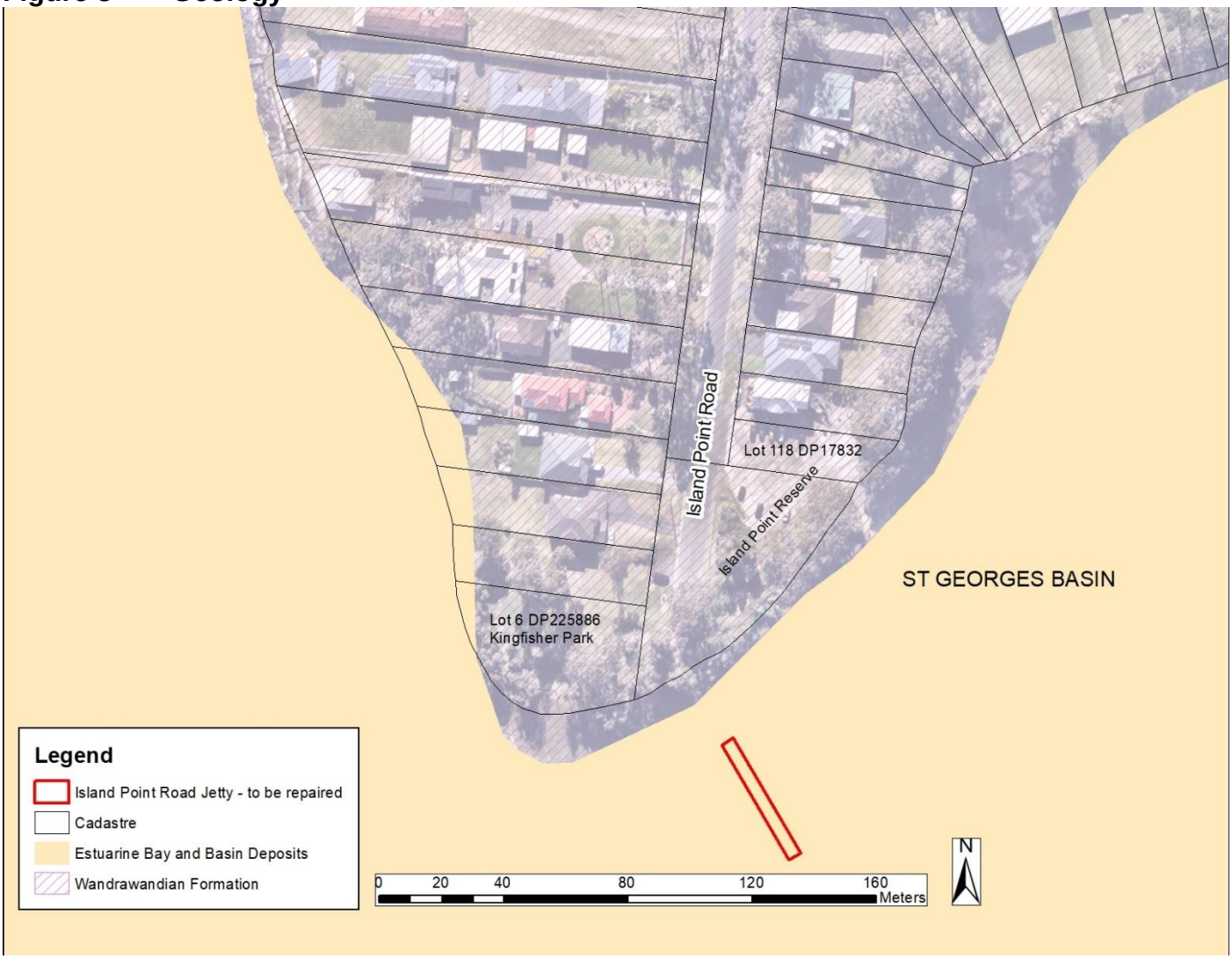
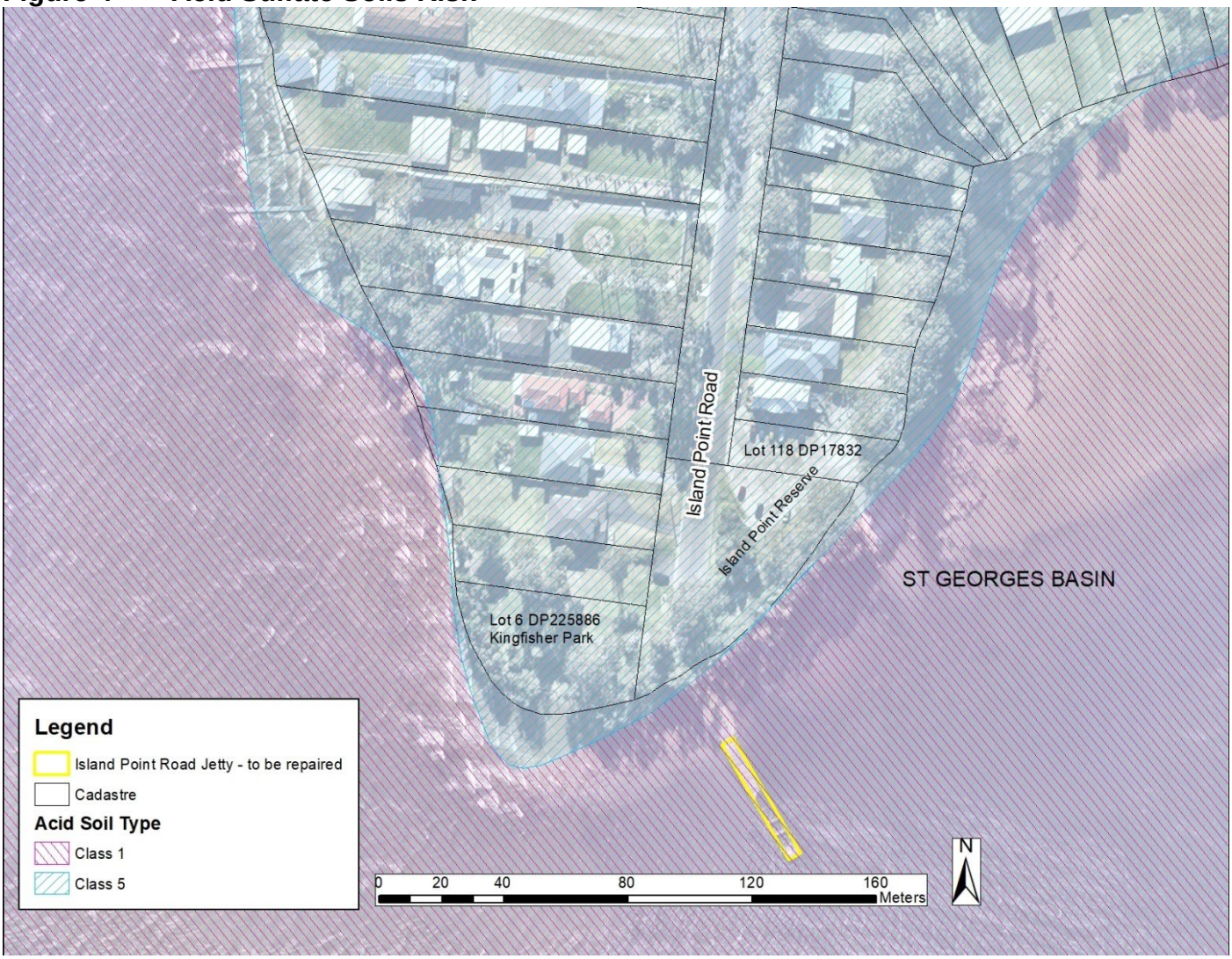


Figure 4 Acid Sulfate Soils Risk



2.2 The Waterway

Like nearby Jervis Bay, the St Georges Basin lies in a syncline in the Wandrawandian Formation. It was almost completely sealed off by the mass of sand that was swept up from the ocean building the Bherwerre sand spit and dunes.

The substrate of the estuary comprises deposits of silt and sand of (mainly) fluvial origin. Benthos and signs of benthic life were not observed but are likely. Similarly, fish such as Bream, Dusky Flathead, Whiting and Mullet would also be expected to occur at the site of the proposed activity site from time to time.

Sparse patches of live Eelgrass *Zostera sp.* occur adjacent to the jetty with Eelgrass wrack present both on the shore and in the water. NSW Department of Industries has also previously mapped, Paddleweed *Halophila sp.* as extensive in the vicinity of the jetty (Figure 5 p.16). For the purpose of this assessment, Halophila to the extent shown in Figure 5 is assumed to be still present.

The estuary is mapped by NSW Department of Primary Industries as 'key fish habitat' for the purposes of the NSW *Fisheries Management Act 1994.*

St Georges Basin has a small tidal range (5 centimetres) dependent on entrance conditions. Water at the site ranges between 0.1 metres and 0.4 metres 86% of the time (MIE 2023).

The site is entirely within flood liable land being mapped by SCC as existing Flood Planning Area for the purposes of the SCC Development Control Plan and Shoalhaven Local Environmental Plan (SLEP). The site has a 1% AEP flood level of 2.4 metres AHD with a floodwater velocity of 0.5 metres per second.

The repair of the jetty is required due to consecutive storm events in 2022. These storms damaged the footing system and led to the collapse of the structure. The large southerly wind pressures during the storms resulted in frequent waves impacting on the structure and ultimately caused the structural failure. These storm forces have been considered during the design of the new structure (MIE 2023).

Components of the old jetty lie on the bottom of the estuary. These components would be removed if they pose a hazard for future users of the jetty.

2.3 Terrestrial Habitat and Vegetation Assessment

The proposed activity site consists of a dilapidated and severely damaged timber jetty that extends from the southern end of Island Point Road into the St Georges Basin waterbody. The marine environment is very shallow and rocky with sparse seagrass (*Zostera* and *Halophila*). The foreshore is rocky and sparsely vegetated with native species such as Spiny-headed Mat-rush *Lomandra longifolia* and Swamp Oak *Casuarina glauca*. Exposed rock and mud at low tide may provide some foraging habitat for shorebirds but is this extremely limited due to the small tidal range.

There is some incursion of Kikuyu *Cenchrus clandestinus* along the foreshore from the adjacent park. The foreshore leading to the jetty are dominated by a canopy of mature Swamp Oak *Casuarina glauca*.

Mature Spotted Gum *Corymbia maculata* and Swamp Oak are present throughout the adjacent public park. These trees are the most significant habitat features on the site, with dense canopies and small hollows present, providing potential habitat for many arboreal and hollow-dependent species in the locality. No hollow-bearing trees would be removed.

To the east of the proposed activity site, the public reserve continues with more formal amenities, such as a picnic area, toilets, and a landscaped native garden of Coastal Rosemary *Westringia fruticosa*, Tea Tree *Leptospermum sp*., Spotted Gum, Weeping Bottlebrush *Callistemon viminalis*, Spiny-headed Mat-rush, and Cascade Lilly Pilly *Syzygium 'cascade'*.

No threatened flora nor suitable habitat for locally occurring threatened orchid species was identified on site during site environmental examinations.

No South-eastern Glossy Black-cockatoo *Calyptorhynchus lathami lathami* feed trees (e.g. *Allocasuarina littoralis* with characteristic chewed cones), nor Yellow-bellied Glider *Petaurus australis* feed trees (e.g. *Corymbia gummifera* or *Eucalyptus punctata* with v-shaped feeding scars) occur within or in close proximity to the site. No signs of potential threatened fauna use of the site (e.g. bandicoot diggings, owl white-wash or other threatened fauna scats) were noted.

2.4 Aquatic Ecology

Riparian and aquatic habitat types present at the site of the proposed activity were the water column, rock boulders at the shore, unvegetated soft substrates (sand/mud), seagrass, the existing jetty, submerged timber and metals (small tree branches and jetty remnants) and riparian vegetation.

No fish were observed but Yellow Bream *Acanthoparus australis* are anticipated to occur around the jetty and seagrass patch and Dusky Flathead *Platycephalus fuscus* on the unvegetated sediments.

No benthos or presence of benthos (e.g. invertebrate burrows) was observed at the site, but are anticipated to occur.

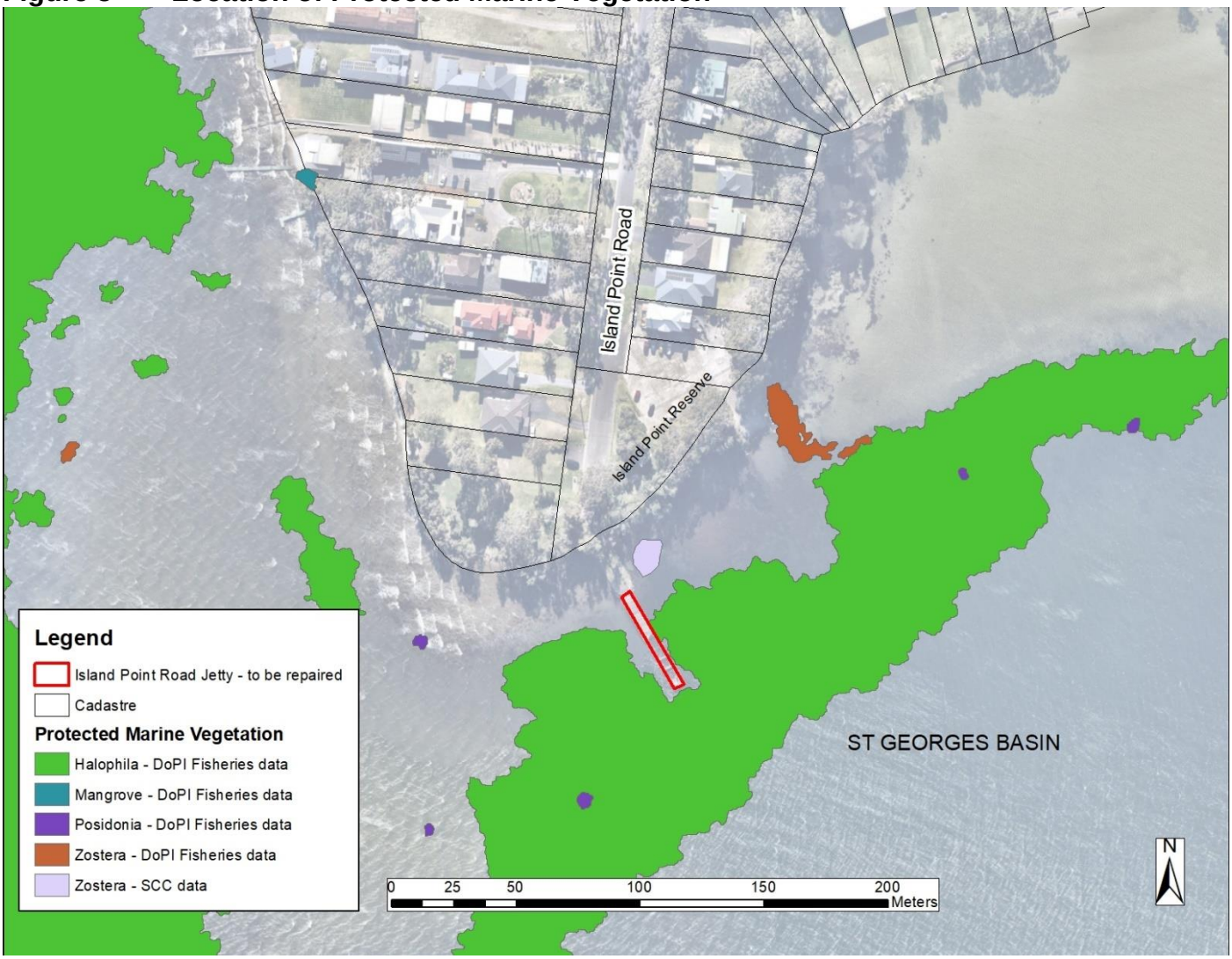
Seagrasses in the form of live Eelgrass *Zostera sp.* patches and wrack were present were observable at the site of the proposed jetty (Figure 5 below).

An extensive area of Paddleweed *Halophila sp.* (protected marine vegetation) has also been recorded previously at the end of the proposed kayak launching facility (Figure 5 below). For the purpose of this REF, it is assumed to be still present.

The mapped extent of seagrass shown in Figure 5 below does not include very sparse, unmapped, occurrences of Eelgrass and Paddleweed apparent around the site.

A few scattered macroalgae plants (red and brown) were present along the nearby foreshore. The aquatic weed *Caulerpa taxifolia* was not observed.

Figure 5 Location of Protected Marine Vegetation



2.5 Photos

Photo 1: End section of the existing damaged jetty

Photo 2: Swamp Oak and Spiny-headed Mat-rush lined path leading to the jetty to be repaired. These trees are likely to be removed to allow access for the piling rig.

Photo 3: Marine environment visible from the foreshore, showing the shallow, rocky environment.

Photo 4: Southern extent of Island Point Road leading to the jetty and the Council park.

3. ASSESSMENT OF LIKELY IMPACTS ON THE ENVIRONMENT

3.1 Impacts associated with the proposed activity

The proposal would involve the following disturbance and direct impacts:

- Removal of approximately 20 small Swamp Oaks *Casuarina glauca* and 15 Spiny-headed Matt-rush *Lomandra longifolia* plants currently lining the jetty approach (refer to Photo 4 in Section 2.5 of this REF). This is to allow access for plant and equipment including the piling rig and trucks depositing rock material (for the temporary rock platform).
- Installation of piles and rock into the bed of the estuary that may affect fish and seagrass habitat.
- Reclamation, albeit temporary, of the estuary with rock of approximately 160m^3.
- Possible pollution of the water during demolition and renewal works

Other impacts on the environment, including indirect impacts have been considered, including:

- threatened species
- indigenous and non-indigenous heritage
- water quality, the riparian zone and key fish habitat
- development of flood liable land
- acid sulfate soils.

Each is discussed below.

3.2 Pollution

Pollution of the waters could occur during the proposed activity including:

- hydrocarbons *e.g.* oil and fuel spills and leaks
- fines from the cutting of timber, bolts and brackets and FRP.
- fines from rock deposited to form the temporary rock platform.

Cutting of material shall, wherever possible, be conducted on land and all fines and off-cuts to be collected and disposed of off-site.

If cutting needs to occur over water, tarps, flat bottom boats, or other vessels shall be utilised to capture potential contaminants including oils, saw-dust and metal or FRP fines. Battery powered hand-tools are preferred over two-stroke.

Clean rock (without fines) shall be used to construct the temporary rock platform. This rock shall also be encased under a non-woven geotextile to separate the introduced material from the existing estuary bed and aid in the removal of the rock when works are completed.

3.3 Vegetation impact

The proposed activity would require the removal of approximately 20 small Swamp Oaks and 15 currently lining the jetty approach (refer to Photo 4 in Section 2.5 of this REF). This is to allow

access for plant and equipment including the piling rig and trucks depositing rock material (for the temporary rock platform).

The impact to vegetation as described above is not significant for the following reasons:

- The Swamp Oaks are small and have recolonised this previously landscaped area because of a lack of maintenance. Mature Swamp Oaks would be unwanted in this landscaped area.
- *Lomandra longifolia* are common and have been planted here as a landscaping feature. They will be replaced.
- There are no plants in this area listed in the threatened species schedules of the NSW *Biodiversity Conservation Act 2016* (NSW BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Fauna species listed in the threatened species schedules of the NSW BC Act and the EPBC Act are not likely to reside in this location or rely on this vegetation for food, refuge or breeding.
- The clearing would not have a significant impact on an endangered ecological community listed under the NSW BC Act and EPBC Act.
- The vegetation does not appear to provide important food sources for locally occurring threatened species and do not appear to contain nests or hollows.
- The vegetation is not mapped on the Biodiversity Values Map administered for the purposes of the NSW *Biodiversity Conservation Act 2016.*

An environmental impact statement (EIS) is therefore not warranted.

3.4 Seagrass

Seagrasses are specialised marine plants. They have evolved from terrestrial plants and are adapted to living and reproducing entirely within marine and estuarine waters. Seagrasses serve three functions (DoPI 2007):

1. They provide habitat for fish and other aquatic fauna.
2. They help to improve water quality by absorbing nutrients from runoff and stabilising sediments.
3. They are a source of primary food for fish and other aquatic fauna.

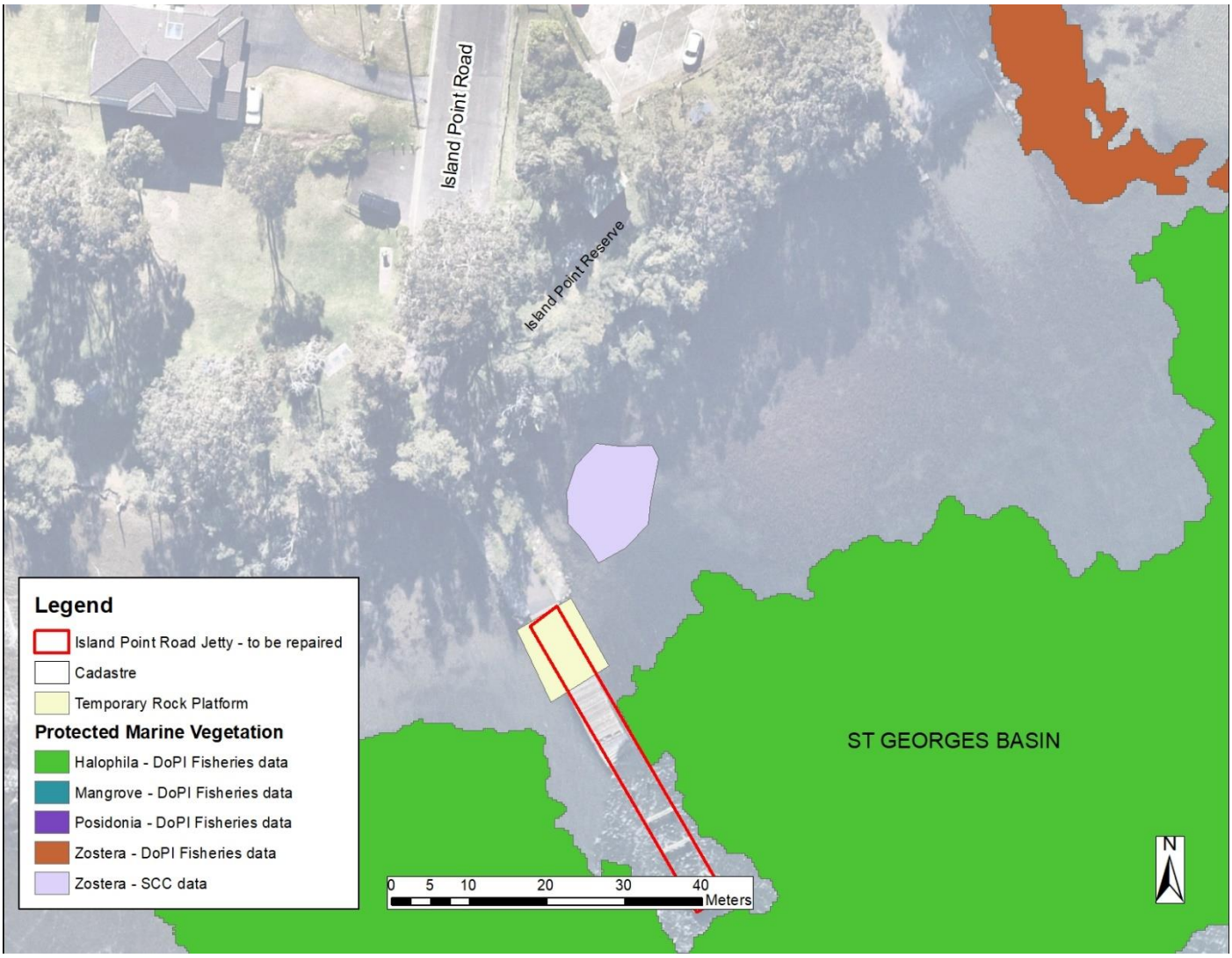
The rock platform would be installed on the bottom of the estuary which has sparse densities of seagrasses Paddleweed and Eelgrass. Foreshore structures such as jetties can shade seagrass, causing indirect damage (DoPI 2007).

The proposed activity, in comparison to the existing jetty, would benefit seagrass habitat at the site for the following reasons:

- The installation of the new 1.5 metre wide by 8.5 metre long gangway to the pontoon, instead of the 4 metre wide timber jetty section it is replacing, would reduce impact of shading on seagrass habitat at that location
- The existing timber decking would be replaced with mesh that would allow additional sunlight to penetrate to bed of the estuary below.

The only area where direct and indirect impacts would be new is the temporary rock platform particularly the two metres it would extend either side of the existing jetty. This equates to approximately 40m^2 of additional seagrass habitat that would be directly and indirectly harmed. At this location, seagrass is very sparse and the more dense area of mapped Eelgrass and Paddleweed as shown in Figure 6 below, is avoided. Regardless, a Permit to Harm Marine Vegetation (s.205 of the NSW *Fisheries Management Act 1994*) must be obtained prior to the commencement of the proposed activity.

Figure 6 Location of temporary rock platform in relation to mapped seagrass areas



3.5 Threatened species impact assessment (NSW)

Section 1.7 of the EP&A Act 1979 applies the provisions of Part 7 of the NSW *Biodiversity Conservation Act 2016* and Part 7A of the *NSW Fisheries Management Act 1994* that relate to the operation of the Act in connection with the terrestrial and aquatic environment. Each are addressed below.

3.5.1 Part 7A *Fisheries Management Act 1994*

Part 7A relates to threatened species conservation. Section 220ZZ provides a "7-Part test of significance" to determine whether a proposed action is likely to significantly affect threatened species, populations or ecological communities and thereby require a species impact statement (SIS). The assessment is provided below:

Part 1 In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction.

Several saltwater species listed in the schedules of the Act are known to occur or have occurred on the south coast of NSW:

- Grey Nurse Shark *Carcharias taurus* and Blind Slug *Smeagol hilaris* are listed as Critically Endangered.
- Southern Bluefin Tuna *Thunnus maccoyii* and Scalloped Hammerhead Shark *Sphyrna lewini* are listed as Endangered.
- Great White Shark *Carcharodon carcharia* and Black Rockcod *Epinephalus daemelii* are listed as Vulnerable.
- Green Sawfish *Pristis zijsron* is listed as Presumed Extinct.

Populations of these species have primarily been reduced by over-harvesting, habitat degradation and human interference or hazards (*e.g.* nets) in habitat.

Grey Nurse Shark

Grey Nurse Sharks have the potential to enter Sussex Inlet waterway and then into St Georges Basin. Grey Nurse Sharks are, however, found predominantly in inshore coastal waters. They have been recorded at various depths, but mainly found in waters between 15 and 40 metres deep. It is unlikely that the species would occur at the site of the proposed activity due to the long, shallow entrance and distance from the entrance to the proposed activity site. In the unlikely event that the species was present it would swim away from any potential impact.

Blind Slug

This is a pulmonate (with lung) slug. It has only been collected from a small, isolated location at Merry Beach, south of Ulladulla. The species lives in gravel and cobble filled rocky crevices and beaches at Merry Beach. The proposal would therefore have no effect on the lifecycle of this species.

Southern Bluefin Tuna

The Southern Bluefin Tuna are pelagic fish occurring in the oceanic waters normally on the seaward side of the continental shelf. The proposal would therefore have no effect on the lifecycle of this species.

Scalloped Hammerhead Shark

The Scalloped Hammerhead Shark is a coastal pelagic species with a circum-global distribution in warm temperate and tropical coastal areas. They are known to form large migratory schools and in

Australia tend to move as far south as Sydney during the warmer months. The proposal would therefore have no effect on the lifecycle of this species.

Great White Sharks

Great White Sharks are normally found in inshore waters around rocky reefs and islands and often near seal colonies. They have been recorded at varying depths down to 1,200 metres. The proposal would therefore have no effect on the lifecycle of this species.

Black Rockcod

Black Rockcod live in relatively shallow rocky reefs where they are usually found in caves, ledges, gutters and beneath bommies. Small juveniles are often found in coastal rocky pools, and larger juveniles around rocky shores in estuaries.

The site of the proposed activity, being a rocky shore, could provide suitable habitat for larger juveniles. The proposed activity is not removing or impacting the rocky foreshore and in the unlikely event that the species is present during construction works, individuals are likely to swim away and not be directly impacted.

The numbers of Black Rockcod have been depleted in the past by line- and spear-fishers (DoPI 2012). Two key threatening processes of relevance to Black Rockcod are '*Hook and line fishing in areas important for the survival of threatened species'* and the '*Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW'.* The proposed activity site is not listed as an important site in the recovery plan for the species (DoPI 2012) and the proposed activity does not constitute the identified key threatening processes.

The proposed activity is therefore unlikely to have an adverse effect on the life cycle of the species such that a viable local population of the species is to be placed at risk of extinction

Green Sawfish

Green Sawfish (presumed extinct in NSW) are bottom dwelling rays commonly found in near-coastal environments including estuaries, river mouths, embankments and along sandy and muddy beaches. It has been recorded in Jervis Bay, but the last confirmed sighting of the species in NSW was in 1972 from the Clarence River at Yamba. The proposal would not directly impact the species and is unlikely to negatively affect suitable habitat for the Green Sawfish, such that the species (if not already extinct) would be impacted.

Part 2 In the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the lifecycle 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.

The endangered populations listed under the Act are:

- *Ambassis agassizii* Steindachner Agassiz's glassfish, olive perchlet, western New South Wales population
- *Craterocephalus amniculus* Darling River Hardyhead, Hunter River population

- *Gadopsis marmoratus* river blackfish, Snowy River population
- *Tandanus tandanus* freshwater catfish, eel tailed catfish, Murray-Darling Basin population
- *Posidonia australis* seagrass, Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie populations

These areas would be unaffected by the proposed activity.

Part 3 In the case of an endangered ecological community or critically endangered ecological community whether the proposed development or activity:

I. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

II. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

The endangered ecological communities listed under the Act are:

- Aquatic ecological community in the natural drainage system of the lower Murray River catchment
- Aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River
- Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River
- Aquatic ecological community in the catchment of the Snowy River in NSW

These areas would be unaffected by the proposed activity.

Part 4 In relation to the habitat of a threatened species or ecological community:

I. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

II. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

III. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

N/A – The area affected by the activity does not provide habitat for threatened species, populations or ecological communities (refer responses to Part 1 through Part 3 above)

Part 5 Whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly),

The only critical habitat currently on the register is "*Critical Habitat of Grey Nurse Shark"* with listed and mapped areas of:

- Bass Point (Shellharbour)

- Big and Little Seal Rocks
- Fish Rock and Green Island (South West Rocks)
- Julian Rocks (Byron Bay)
- Little Broughton Island (Port Stephens)
- Magic Point (Maroubra)
- Montague Island (Narooma)
- The Pinnacle (Forster)
- Tollgate Islands (Batemans Bay)

These areas would be unaffected by the proposed activity.

Part 6 Whether the proposed development or activity is consistent with a Priorities Action Statement

As demonstrated in Part 1 above, the proposed activity would have no effect on threatened species.

Part 7 Whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process

Key Threatening Process	Assessment
Degradation of native riparian vegetation along NSW water courses	Not applicable – The subject waterway is estuarine. Estuarine and marine waters are excluded from this KTP as the degradation of riparian vegetation in these areas does not adversely affect two or more listed threatened species, populations or ecological communities (Fisheries Scientific Committee 2007).
Hook and line fishing in areas important for the survival on threatened fish species	Not applicable – proposal does not comprise or facilitate hook and line fishing.
Human-caused climate change	Not applicable – the proposal does not contribute to human-caused climate change.
Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams	Not applicable – the proposal does not involve the installation or operation of instream structures that would alter the natural flow regime.
Introduction of fish to waters within a river catchment outside their range	Not applicable – the proposal does not involve releasing fish.
Introduction of non-indigenous fish and marine vegetation to the coastal waters of NSW	Not applicable – the proposal does not involve the introduction of non-indigenous fish.

Key Threatening Process	Assessment
Removal of large woody debris from NSW rivers and streams	Not applicable – the proposal does not involve the removal of woody debris.
The current shark meshing program in NSW waters	Not applicable – the proposal does not involve shark meshing.

3.5.2 Part 7 *Biodiversity Conservation Act 2016*

Section 7.3 of the Act provides a 'five-part' test to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats.

Each Part is addressed below:

Part A - In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be place at risk of extinction.

An assessment of the potential for NSW threatened flora and fauna species occurring on-site or otherwise being impacted by the proposal was undertaken (refer to Appendix B). The following species were assessed to require further assessment:

- Sooty Oystercatcher *Haematopus fuliginosus*
- Pied Oystercatcher *Haematopus longirostris*

Sooty Oystercatchers are found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations. The species favours rock headlands, rocky shelves, exposed reefs with rook pools, beaches and muddy estuaries. Forages on exposed rock or coral at low tide for food such as limpet and mussels. Breeds in spring and summer, almost exclusively on offshore islands, an occasionally on isolated promontories (OEH 2023).

The Pied Oystercatcher 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. Two to three eggs are laid between August and January. The female is the primary incubator and the young leave the nest within several days (OEH 2017).

The intertidal zone near the jetty could comprise suitable (albeit low-quality) foraging habitat for both species. The proposed activity however is unlikely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be place at risk of extinction for the following reasons:

- The proposed activity would not impact breeding habitat.
- A local population is not known for the location with the species being recorded only in the vicinity (five kilometre radius) of the proposed activity.
- The proposed activity would not remove foraging habitat.

- Both species are highly mobile and would leave the site if they were present during the construction of the facility.
- The proposed activity would have no impact on the tidal regimes of the estuary.

A species impact statement (SIS) and/or entry into the Biodiversity Offset Scheme (BOS) is therefore not required for these species.

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

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction

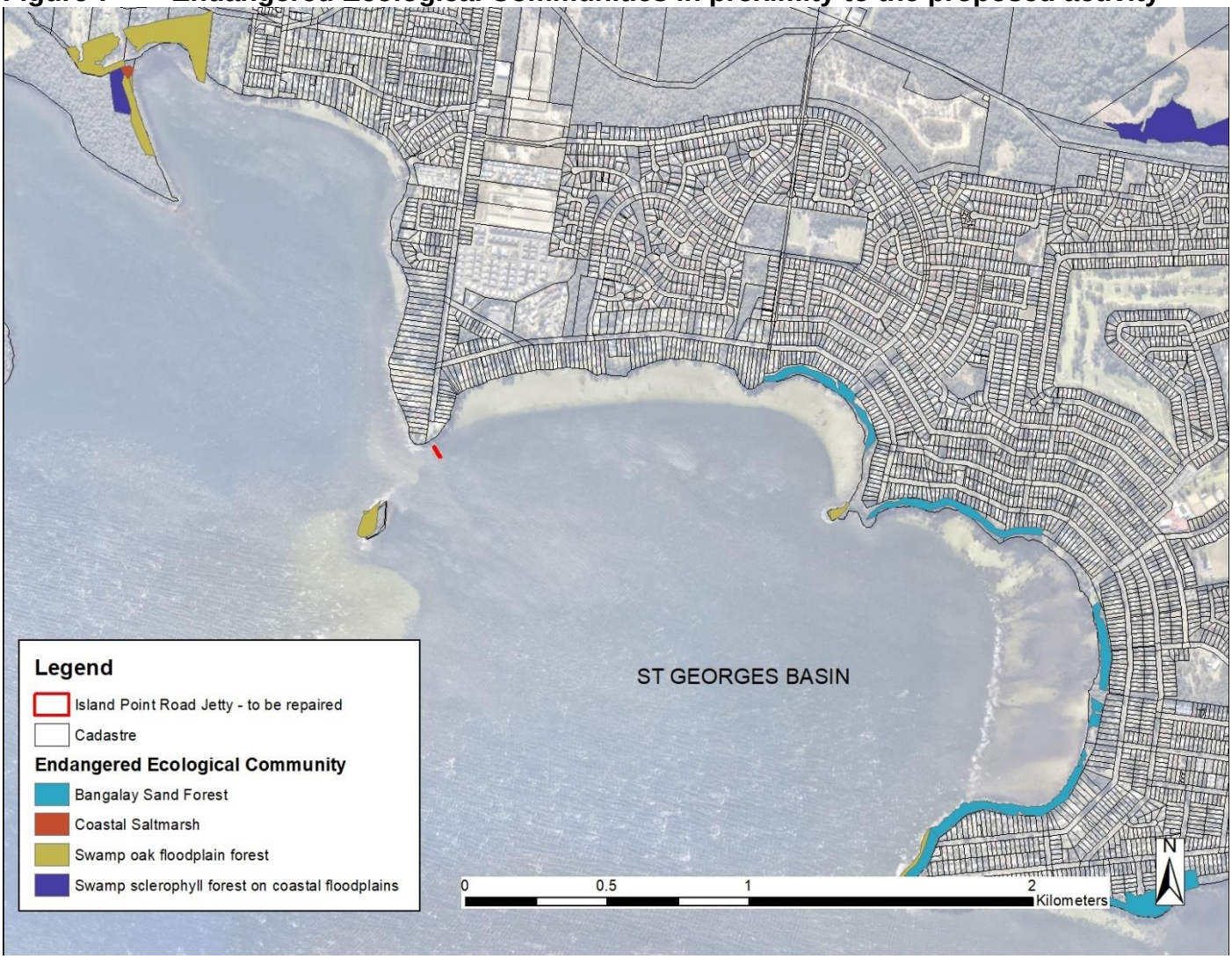
Four endangered ecological communities (EECs) are mapped as occurring in the landscape in the vicinity of the proposed activity (Figure 7 below). Although not mapped as such in Figure 7 below, the vegetation fringing the estuary and near to the proposed activity could comprise the endangered ecological community *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (hereafter referred to as 'Swamp Oak Floodplain Forest') due to the dominating presence of Swamp Oak *Casuarina glauca* and presence of other species listed in the Scientific Committees Determination for the EEC https://www.environment.nsw.gov.au/Topics/Animals-and-plants/Threatened-species/NSW-Threatened-Species-Scientific-Committee/Determinations/Final-determinations/2011-2012/Swamp-Oak-Floodplain-Forest-of-the-NSW-North-Coast-minor-amendment-Determination .

Swamp Oak Floodplain Forest is found on the coastal floodplains of NSW. It has a dense to sparse tree layer in which Swamp Oak is the dominant species. The community is associated with grey-black clay-loams and sandy loams where the groundwater is saline or subsaline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains (OEH 2022).

The Swamp Oak Forest at the site is highly disturbed and fragmented being cleared for residential and park development and maintained by regular mowing as foreshore parkland (refer to photos in Section 2.5 of this REF).

The proposal would not result in or exacerbate the fragmentation or isolation of areas of the community and is unlikely to adversely affect the extent or composition of the community such that the local occurrence of the EEC (fringes of the estuary) would be placed at risk of extinction. A species impact statement (SIS) or entry into the BOS is therefore not required.

Figure 7 Endangered Ecological Communities in proximity to the proposed activity



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

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.

No important habitat for threatened species would be removed or otherwise significantly impacted (see Part A).

No EEC would not be further fragmented or isolated, nor removed or modified to an extent that would affect the long-term survival of the EEC occurring in the locality (refer to Part B).

The proposal will therefore not affect the long-term survival of any threatened species or endangered ecological community in the locality.

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

No "*areas of outstanding biodiversity values"* have been declared in the City of Shoalhaven.

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

There are no key threatening process listed in the NSW *Biodiversity Conservation Act 2016* considered relevant to the proposed activity.

3.6 Indigenous heritage

Under Section 86 of the NSW *National Parks and Wildlife Act 1974* (NPW Act) it is an offence to disturb, damage, or destroy any Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). The Act, however, provides that if a person who exercises 'due diligence' in determining that their actions will not harm Aboriginal objects has a defence against prosecution if they later unknowingly harm an object without an AHIP (Section 87(2) of the Act). To effect this, the NSW Department of Environment, Climate Change and Water have prepared the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wale*s (hereafter referred to as the 'Due Diligence Code') (DECCW 2010) to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for an AHIP.

A search on the Aboriginal Heritage Information Management System (AHIMS) on 9 August 2023 indicated that there are no recorded Aboriginal sites or places in the vicinity of the proposal (refer to AHIMS report below in Figure 8 below).

The site of the proposed activity is within a landscape feature listed in the Due Diligence Code that has a higher propensity for Aboriginal objects *i.e.* within 200 metres of waters. As such a targeted site survey was undertaken on 15 March 2023 and 9 August 2023. No objects were found.

The Study Area could also be described as 'disturbed land' as defined by the Due Diligence Code), i.e.:

> *Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as stormwater drainage and other similar infrastructure) and construction of earthworks."*

The proposed activity is within disturbed land as the lands have been subjected to the continued disturbance of human activity and development being cleared, reclaimed for jetty, and managed as a public park. The proposed activity would also be predominantly undertaken within a waterway.

An AHIP is not required, and the activity can proceed with caution.

Figure 8 Results of AHIMS Aboriginal heritage search

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Island Point Jetty
Client Service ID : 808138

Shoalhaven City Council - Nowra
PO Box 42 Bridge Rd
Nowra New South Wales 2541
Attention: Geoffrey Young

Date: 09 August 2023

Email: geoff.young@shoalhaven.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 280695.0 - 281025.0, Northings : 6113003.0 - 6113230.0 with a Buffer of 0 meters, conducted by Geoffrey Young on 09 August 2023.

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 Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

3.7 Non-indigenous Heritage

The following heritage item listed under Schedule 5 of the *Shoalhaven Local Environmental Plan 2014* is located within proximity of the Subject Site:

- World War II Flying Boat Base (Item 454)

This heritage item is listed as of local significance in the Shoalhaven. Heritage item 454 is located on the northern foreshore of the St Georges Basin waterbody, within the Island Point Road lot adjacent to the Subject Site. The proposal will not have an adverse impact on this heritage item.

3.8 Acid Sulfate Soils

The concrete piles would be installed into the bottom sediments of St Georges Basin which have been mapped as Class 1 risk for acid sulfate soils (Figure 4 p.13).

The *Shoalhaven Local Environmental Plan 2014* (SLEP) indicates that a risk of exposure of acid sulfate soils exist on land mapped as Class 1 where any works occur that expose soil to air.

The concrete piles would be installed in Class 1 risk bottom sediment through sleeved continuous flight auger (CFA) which according to MI Engineers (2023) could extract and contain extracted spoil within the system whilst piling.

Consequently, the bottom sediment material above the sandstone bedrock that would be excavated shall be tested for the presence of potential acid sulfate soils. A full Acid Base Account assessment utilising the SPOCAS[1] analysis shall confirm the presence of acidity, potential acidity and liming rate to neutralise the acid prior to disposal. If confirmed as acidic or potentially acidic, an Acid Sulfate Soil Management Plan shall be prepared in accordance with the Acid Sulfate Soil Manual (ASSMAC 1998). This requirement is reflected in the safeguards and environmental impact mitigation measures prescribed in Section 7 of this REF.

3.9 Flooding

The proposed activity would be in flood liable land. The proposed activity is however, unlikely to result in adverse flood impacts as the dimensions of the renewed jetty is the same as the old jetty.

Based on the recently completed St Georges Basin Flood Study (Stantec 2022), the location of the jetty at 1% Annual Exceedance Probability (AEP) would experience corresponding water height of 2.4 m AHD and velocity of 0.5m/s. At a flood event of this type, the jetty would be inundated by a significant depth of water (jetty deck level would 1.26m AHD) and for extended durations.

The jetty has been designed with consideration of the flooding regime, including:

- The use of materials suitable for long periods of inundations (FRP with stainless steel connections).
- Pontoon piles are 1 metre higher than the 1% AEP level of 2.4 metres AHD.
- The floating pontoons are purpose-built modules made from high impact and stress resistant UV stabilised polyethylene and are designed to be bolted to a structural frame. The pontoon contain polyurethane foam filling for additional security.
- Electrical installation are not proposed.
- The structure would be supported by piles taken to the recommended embedment into sandstone of 3 metres(Geofirst 2023). This embedment provides sufficient resistance to the wind, wave and floodwater actions during storm events (MIE 2023).

The proposed activity was forwarded to SCC's Lead – Floodplain Management for comment. Details are provided in Section 5 of this REF.

[1] Suspension Peroxide Oxidisation Combined Acidity and Sulfur.

3.10 EP&A Regulation – Clause 171 matters of consideration

Clause 171(2) of the *Environmental Planning and Assessment Regulation 2021* lists the factors to be taken into account when consideration is being given to the likely impact of an activity on the environment under Part 5 of the EP&A Act. The following assessment in Table 1 below deals with each of the factors in relation to the proposed activity.

Table 1: Clause 171(2) Factors

Does the proposal:	Assessment	Reason
a) Have any environmental impact on a community?	Positive	Although some community members, particularly nearby residents, may be affected by slight increase in noise during construction, the proposed activity would benefit the community and visitors to the area through improved recreational facilities. The proposed activity would not have any impact on other community services and infrastructure such as power, water, waste water, waste management, educational, medical or social services.
b) Cause any transformation of a locality?	Positive	The locality is situated on the shore of St Georges Basin at within a residential area. The locality will remain the same. The locality is currently used as a community recreation area with existing jetty, boat ramp, and public park. The proposed activity would complement the locality.
c) Have any environmental impact on the ecosystem of the locality?	Low adverse	An assessment provided in Section 3.4 of this REF concludes that the proposed activity would not have a significant impact upon threatened species or endangered ecological communities. No significant habitat features would be removed or otherwise impacted. No food resources critical to the survival of a particular species would be removed. Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
d) Cause a diminution of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Low adverse / positive	In the context of the locality, with consideration of residential nearby, the visual impact of the activity would be minimal and complementary. The proposed activity introduces a structure adjacent to a substantially altered environment, *i.e.* residential areas and cleared foreshore with existing watercraft facilities. The proposed activity would improve recreational values of and opportunities at the locality.

Does the proposal:	Assessment	Reason
		Removal of vegetation and habitat will be minimal, occurring on existing edges and not resulting in significant fragmentation of habitat. The area that would be affected by the proposed activity has no significant value in terms of science or other environmental qualities. The proposed activity would have no impact on these values.
e) Have any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific, or social significance or other special value for present or future generations?	Negligible	The site of the proposed activity has no significant aesthetic, architectural, cultural, historical, scientific or social values. As such, the proposed activity would have no impact on these items. No items in the vicinity of the work site which are listed on the State Heritage Register and the Shoalhaven Local Environmental Plan would be impacted by the proposal. The site is not within an Aboriginal Place declared under the *National Parks and Wildlife Act 1974.* In accordance with the NSW Department of Environment, Climate Change and Water's Due Diligence Code of Practice, the proposed activity does not require an Aboriginal Heritage Impact Permit as the activity is unlikely to harm an Aboriginal artefact (refer to Section 3.6).
f) Have any impact on the habitat of protected fauna (within the meaning of the Biodiversity Conservation Act 2016)?	Low adverse	A small area of marginal fauna habitat will be removed by the activity. No important habitat will be removed or otherwise impacted. The potential impact is therefore considered to be insignificant or inconsequential. The proposed activity would not have a significant impact upon threatened fauna (refer to Section 3.4 of this REF). The specified environmental mitigation measures (Section 7) would mitigate indirect impacts to fauna and habitat.
g) Cause any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Negligible	There are no species likely to rely on the site of the proposed works to the extent that modification would put them further in danger. The prescribed environmental safeguards and mitigation measures (Section 7 of this REF) would minimise the risk of impact on resident fauna, fish, and flora.
h) Have any long-term effects on the environment?	Negligible	Works would be relatively short term and the noise generated will occur during normal working hours. There are no sensitive receivers in the vicinity of the proposed works.

Does the proposal:	Assessment	Reason
		The proposed activity would not use hazardous substances or use or generate chemicals which may build up residues in the environment. The possible impacts have been discussed in detail under Section 3. Refer also to the conclusions and recommendations in Section 7.
i) Cause any degradation of the quality of the environment?	Low-adverse	Aquatic ecosystems are not likely to be significantly affected by the proposed activity and there is not likely to be any long-term or long-lasting impact through the input of sediment and nutrient into the ecosystem. The proposal would not intentionally introduce noxious weeds, vermin, or feral animals into the area or contaminate the soil. Environmental safeguards and mitigation measures (Section 7) would be employed to minimise risk of impacts.
j) Cause any risk to the safety of the environment?	Negligible	The proposed activity would not involve hazardous wastes and would not lead to increased bushfire or landslip risks. The activity is not anticipated to adversely affect flood behaviour or exacerbate flooding risks.
k) Cause any reduction in the range of beneficial uses of the environment?	Positive	The site and local environment will remain relatively unchanged. The area is currently being used as a recreational and watercraft area in a significantly modified environment. The proposed activity would improve this use.
l) Cause any pollution of the environment?	Low adverse	The proposal would involve a temporary and local increase in noise during the construction phase due to the use of machinery. However this will not affect any sensitive receivers such as residential areas, schools, childcare centres and hospitals. Nearby residents would be notified of noise-generating works. Turbidity, sediment and erosion control in accordance with the Blue Book will be implemented to minimise movement of sediment into the Lake. It is unlikely that the activity (including the environmental impact mitigation measures) would result in water or air pollution, spillages, dust, odours, vibration or radiation. The proposal does not involve the use, storage or transportation of hazardous substances or the generation of chemicals which may build up residues in the environment. The material that would be excavated shall be tested for the presence of potential acid sulfate soils. A full Acid Base Account assessment utilising the SPOCAS analysis shall confirm the presence of acidity, potential acidity and liming

Does the proposal:	Assessment	Reason
		rate to neutralise the acid prior to disposal. If necessary, an acid sulfate soil management plan would be prepared to facilitate treatment.
m) Have any environmental problems associated with the disposal of waste?	Negligible	The waste that would be disposed off-site can be recycled or re-used in accordance with resource recovery exemptions or taken to a licensed waste facility. The material that would be excavated shall be tested for the presence of potential acid sulfate soils. A full Acid Base Account assessment utilising the SPOCAS analysis shall confirm the presence of acidity, potential acidity and liming rate to neutralise the acid prior to disposal. If necessary, an acid sulfate soil management plan would be prepared to facilitate treatment. There would be no trackable waste, hazardous waste, liquid waste, or restricted solid waste as described in the NSW *Protection of the Environment Operations Act 1997*.
n) Cause any increased demands on resources (natural or otherwise) which are, or are likely to become, in short supply?	Negligible	The amount of resources that would be used are not considered significant and would not increase demands on current resources such that they would become in short supply.
o) Have any cumulative environmental effect with other existing or likely future activities?	Negligible	The assessed low adverse or negligible impacts of the proposal are not likely to interact. Mitigation measures (Section 7) shall be implemented to minimise the risk of cumulative environmental effects. The current proposal would not significantly affect habitat connectivity or reduce any significant vegetation. No further construction activities are planned for this location.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions	Negligible	The proposed activity would have no effect on coastal processes including those projected under climate change conditions. The jetty would be built to withstand inundation over long durations of time during flood events.
q) applicable local strategic planning statements, regional strategic plans or district plans made under	Positive	The proposed activity is consistent with the *Shoalhaven 2040* Strategic Land-use Planning Statement, including Planning Priority 2 *Delivering infrastructure* and Planning Priority 7 *Promoting a responsible visitor economy*

Does the proposal:	Assessment	Reason
the Act, Division 3.1		https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D20/437277. The activity is not inconsistent with the Illawarra Shoalhaven Regional Plan 2041 https://www.planning.nsw.gov.au/-/media/Files/DPE/Plans-and-policies/Plans-for-your-area/Regional-plans/Illawarra-Shoalhaven-Regional-Plan-05-21.pdf and does not impact any areas mapped in the Planning Statement as “high environmental value” or “habitat corridor”.
r) other relevant environmental factors	n/a	Environmental factors have been addressed in Section 3 of this REF.

4. PERMISSIBILITY AND APPROVALS

4.1 Environmental Planning & Assessment Act 1979

Section 4.1 (Development that does not need consent) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that:

> *"If an environmental planning instrument provides that specified development may be carried out without the need for development consent, a person may carry the development out, in accordance with the instrument, on land to which the provision applies."*

In this regard, Section 2.80(4) of the NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) states "*development for the purpose of wharf or boating facilities may be carried out by or on behalf of a public authority without consent on any land*." "Wharf or boating facilities includes the facilities for launching any vessel, not just boats (refer to Dictionary in the Standard Instrument https://legislation.nsw.gov.au/view/html/inforce/current/epi-2006-155a#dict). Clause 2.80(4) of the Transport and Infrastructure SEPP therefore applies, and the proposed activity does not require development consent.

As the proposed activity does not require development consent, and as it constitutes an 'activity' for the purposes of Part 5 of the EP&A Act, being carried out by (or on behalf of) a public authority, environmental assessment under Part 5 of the EP&A Act is required. This REF provides this assessment.

4.2 Fisheries Management Act 1994

The entire St Georges Basin is mapped as Key Fish Habitat for the purposes of the NSW. The proposed activity will involve reclamation and dredging and harm to Marine vegetation as defined in the Act.

Reclamation and dredging is regulated under Part 7 Division 3 of the Act https://legislation.nsw.gov.au/view/html/inforce/current/act-1994-038#pt.7-div.3 and will require a Section 200 Permit to be issued by the NSW Department of Primary Industries – Fisheries prior to any works within the estuary.

The proposed activity would harm seagrass habitat with sparse Paddleweed and Eelgrass present. This will require a Section 205 Permit to be issued by the NSW Department of Primary Industries – Fisheries prior to the works commencing.

Regarding the other provisions and controls in the Act the proposed activity:

- would not affect declared aquatic reserves (Part 7, Division 2 of the Act);
- would not involve blocking the passage of fish (s.219);
- would not impact mangroves (Part 7, Division 4);
- would not involve disturbance to gravel beds where salmon or trout spawn (s.208 of the Act);
- does not involve the release of live fish (Part 7, Division 7);
- does not involve the construction of dams and weirs (s.218);

- would not result in the blocking of the passage of fish;
- would not use explosives in a watercourse (Clauses 70 and 71 of the *Fisheries Management (General) Regulation 2019).*

The seven-part test of significance, provided in Section 3.5.1 of this REF, determined that the proposed activity is unlikely to significantly affect threatened species, populations or ecological communities. A species impact statement is therefore not required.

4.3 Crown Land Management Act 2016

The proposed activity would be undertaken on the bed and foreshore of St. Georges Basin which is Crown Land.

Under Section 9.2 of the *Crown Land Management Act 2016,* a person must not erect a structure on Crown Land without authority (https://legislation.nsw.gov.au/view/html/inforce/current/act-2016-058#sec.9.2). SCC has this authority in the form of a Crown Land Licence (LI 494193, refer to SCC document D14/113018) which authorises the proposed use, structure and occupation.

4.4 Other

A summary of other relevant legislation and permissibility is provided in Table 2 below.

Table 2: Summary of other relevant legislation and permissibility

NSW STATE LEGISLATION
***Environmental Planning and Assessment Act 1979* (EP&A Act)**
Permissible √ Not permissible ☐
Justification: The Transport and Infrastructure SEPP provides for the proposed works to be undertaken without development consent (refer above). In circumstances where development consent is not required, the environmental assessment provisions outlined in Part 5 of the Act are required to be complied with. This REF fulfils this requirement.
State Environmental Planning Policy (Hazards and Resilience) 2021
Permissible √ Not permissible ☐
Justification: The proposed activity is not mapped as comprising coastal wetlands or littoral rainforest for the purpose of this SEPP. Other considerations of the SEPP are not applicable to the proposed activity.
Protection of the Environment Operations Act 1997
Permissible √ Not permissible ☐
Justification: The proposed activity does not constitute scheduled development work or scheduled activities as listed in Schedule 1 of the Act. The proposed activity therefore does not require an environmental protection licence.

Local Land Services Act 2013
Permissible √ Not permissible ☐
Justification: Any clearing of vegetation would be of a kind authorised under Section 60O(b)(ii) of the Local Land Services Act 2016 ("an activity carried out by a determining authority within the meaning of Part 5 of the Act after compliance with that Part."). No separate authorisation under the Act is required.
Coastal Management Act 2016
Permissible √ Not permissible ☐
Justification: SCC is currently in the process of developing Coastal Management Plans (CMPs) for coastal areas of the Shoalhaven in accordance with the Act. The St Georges Basin and Sussex Inlet CMP has not yet been finalised. However, the issues of biodiversity, water quality, Aboriginal community values, access, recreation and tourism, boat navigation, flooding, and climate change have been identified as key issues (displaydoc.aspx (nsw.gov.au). The proposal will not have any adverse impacts on any of the above factors.
Aboriginal Land Rights Act 1993
Permissible √ Not permissible ☐
Justification: The proposed activity would not affect or use land subject to Aboriginal Land Claims.
***National Parks and Wildlife Act 1974* (NP&W Act)**
Permissible √ Not permissible ☐
Justification: • The proposed activity would not encroach into National Park estate. • The Act provides the basis for the legal protection and management of Aboriginal sites in NSW. Under Sections 86 and 90 of the Act it is an offence to disturb an Aboriginal object or knowlingly destroy or damage, or cause the destruction or damage to, an Aboriginal object or place, except in accordance with a permit of consent under section 87 and 90 of the Act. • As there are no recorded sites or visible objects and as the site is on 'disturbed land' and in a waterway, the Due Diligence Guidelines (DECCW 2010) requires no further assessment as it is reasonable to conclude that there is a low probability of objects occurring in the area of the proposed activity and an AHIP is not required. Refer to Section 3.6 of this REF for more information.

Biodiversity Conservation Act 2016
Permissible √ Not permissible ☐
Justification: • The proposed activity is unlikely to have a significant impact on species and communities listed in the schedules of the Act (refer to Section 3.2 of this REF). • The proposed development is not within an area declared to be of "outstanding biodiversity value" as defined in the Act. • The design and mitigation measures (Section 7) would ensure that no *serious and irreversible impacts on biodiversity values* (as defined by the BC Act) occur at the site of the proposed activity. The proposed activity therefore is not deemed to be *likely to significantly affect threatened species* and an environmental impact statement (EIS) or a Biodiversity Development Assessment Report (BDAR) is not required. It is also a defence to a prosecution for an offence under Part 2 of the Act (harming animals, picking plants, damaging the habitat of threatened species or ecological communities *etc*) if the work was essential for the carrying out of an activity by a determining authority within the meaning of Part 5 of the *Environmental Planning and Assessment Act 1979* after compliance with that Part. The activity will not remove vegetation that is listed under Schedule 1 Threatened Species, Schedule 2 Threatened ecological communities and Schedule 6 Protected Plants. Therefore the activity is considered permissible as this REF has been prepared and determined in accordance with the EP&A Act.
Water Management Act 2000
Permissible √ Not permissible ☐
Justification: • Local councils are exempt from s.91E(1) of the Act in relation to all controlled activities that they carry out in, on or under waterfront land by virtue of clause 41 of the *Water Management (General) Regulation 2018.* • The proposal would not interfere with the aquifer and therefore an interference licence is not required (s.91F).
Heritage Act 1977
Permissible √ Not permissible ☐
Justification: The proposed activity would not disturb an item of state heritage significance. The proposal would constitute 'minor works' under 'Relics of local heritage significance: a guide for minor works with limited impact'. The proposal would not result in any direct impacts on heritage items or values. Works can be undertaken with caution under an applicable exception under s139(1) and (2) of the Act.

COMMONWEALTH LEGISLATION
Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act)
Permissible √ Not permissible ☐
Justification: The proposed activity would not be undertaken on Commonwealth land and no matters of National Environmental Significance are likely to be significantly impacted by the proposed activity. The proposed activity is therefore not a controlled action and does not require Commonwealth referral.
Commonwealth *Native Title Act 1993*
Permissible √ Not permissible ☐
Justification: Native Title has previously been extinguished by the construction of the existing jetty in 1984 as a “Past Act” and associated licencing (Section 229). Notification to NTSCORP is not required.

5. CONSULTATION WITH GOVERNMENT AGENCIES

5.1 Transport and Infrastructure SEPP 2021 requirements

Section 2.10 – Consultation with councils - development with impacts on council-related infrastructure or services

The proposed activity would:

(a) not have an impact on stormwater management

(b) unlikely generate traffic to an extent that it would strain the capacity of the road system

(c) not involve connection to, or have a substantial impact on the capacity of the sewerage system

(d) not involve connection to, and use of a substantial volume of water from the water supply system

(e) unlikely to cause a disruption to pedestrian or vehicular traffic

(f) not involve excavation of a footpath or road.

Consultation under Section 2.10 is therefore not required.

Section 2.11 – Consultation with councils - development with impacts on local heritage

No impacts to any local heritage item would occur. Consultation under Section 2.11 is therefore not required.

Section 2.12 – Consultation with councils - development with impacts on flood liable land

The proposed activity would be on flood liable land. As a consequence, a notice of intention was sent to SCC Floodplain Engineers on 11 January 2023. A response was received on 20 February 2023 (D23/22383). The response states:

> *"The Basin Rd and Island Pt Rd jetty renewals are in areas with a 1%AEP velocity of 1m/s and 0.5m/s based on the recently completed St Georges Basin Flood Study. Both jetties would be inundated by a significant depth of floodwater and for extended durations during a flood event in St Georges Basin. Hence any works should comprise flood compatible materials, should be able to withstand floodwater and buoyancy forces in a 1% AEP event, and any electrical installations should be constructed at or above the flood planning level or be able to be isolated prior to a flood event"*

In response:

- All materials comply with *Supporting Document 1 – Chapter G9 – Guidelines for Development on Flood Prone Land.*
    - The structure would be constructed of FRP material with stainless steel connections
    - The floating pontoons are purpose-built modules made from high impact and stress resistant UV stabilised polyethylene and are designed to be bolted to a structural frame. Modules contain polyurethane foam filling for additional security.
- Pontoon piles are 1 metre higher than the 1% AEP level of 2.4 metres AHD.
- Electrical installations are not proposed.

- The structure would be supported by piles taken to the recommended (Geofirst 2023) embedment into sandstone of 3 metres. This embedment provides sufficient resistance to the wind, wave and floodwater actions during storm events (MIE 2023)
- The proposed structure has been designed to withstand southerly wind pressures, frequent waves and velocity and loading of floodwaters (MIE 2023).

No further consultation is required.

Section 2.13 – Consultation with State Emergency Service (SES) - development with impacts on flood liable land

Although the proposed activity would be on flood liable land, the proposed activity does not constitute a "relevant provision" prescribed in the SEPP (Section 2.13(2) https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732#sec.2.13) . Notification to SES is therefore not required.

Section 2.14 – Consultation with councils - development with impacts on certain land within the coastal zone

The proposal would not occur within a coastal vulnerability area. Consultation is therefore not required.

Section 2.15 – Consultation with public authorities other than councils

In consideration of the other consultation requirements specified under Section 2.15 of the Transport and Infrastructure SEPP, the proposed activity:

- would not be undertaken adjacent to land reserved under the *National Parks and Wildlife Act 1974* or land acquired under that Act
- would not be undertaken on land in Zone E1 National Parks and Nature Reserves on in a equivalent land use zone.
- would not increase the amount of artificial light in the night sky and located on land within the dark sky region as identified on the dark sky region map
- would not be undertaken within Defence communications facility buffer (only relevant to the defence communications facility near Morundah)
- would not be undertaken on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*
- would not have an impact on the Willandra Lakes Region World Heritage Property
- would not occur in a Western City operational area specified in the *Western Parkland City Authority Act 2018.*

These prescribed consultation requirements therefore do not apply.

The proposed activity does comprise a fixed or floating structure in or over navigable waters. So, in accordance with Section 2.15(2)(c) a Notice of Intention was forwarded onto Transport for NSW on the 4 August 2023 (SCC reference D23/314302). A response was received on 11 August 2023

(SCC reference D23/323139). The response confirmed that Transport for NSW have no objection to the proposed activity, provided that:

> "*1. Each side of the jetty structure oriented in the direction of the navigable channel must be painted white and have reflective material (e.g. discs or strips) placed so that they can be seen by any passing vessel.*
>
> *2. The proprietary clip in fender system for the pontoon is to be white.*
>
> *3. Piles to have white caps fitted.*
>
> …
>
> *It is important to note that the proponent, or other entity or contractor acting on their behalf, are not exempt from the provisions of the Marine Safety Act 1998, or any other relevant legislation, an all parties must comply with any direction given by NSW Maritime Authorised officers with regard to safe navigation or the prevention of pollution".*

Proprietary white pile caps have been incorporated into the design (Appendix A). All other items are included in the environmental impact mitigation measures and safeguards prescribed in Section 7 of this REF.

Section 2.16 – Consideration of Planning for Bush Fire Protection (PBP)

The proposed activity is not a development prescribed in this section (health services facilities, correctional centres, residential accommodation). Consideration of PBP is therefore not required.

6. COMMUNITY ENGAGEMENT

The proposed activity is like-for-lake replacement of the damaged jetty in the same location. The community is advocating for its replacement. No formal engagement with the community was undertaken.

The level of engagement undertaken for the proposed activity is consistent with Council's Community Engagement Policy (POL12-28). Apart from notifying the relevant community consultative bodies and residents about the commencement date and noise-generating activities, no further engagement is required prior to works commencing.

7. ENVIRONMENTAL SAFEGUARDS AND MEASURES TO MINIMISE IMPACTS

Safeguard / Measure	Responsibility
Works planning, approvals, consultation & notification	
1. A Fisheries Permit shall be obtained for the dredging, reclamation and harm to marine vegetation prior to commencement of works.	SCC Project Manager (PM), SCC Environmental Operations Officer (EOO), and Construction Contractor
2. This REF shall be published on the NSW Planning Portal	SCC EOO
3. The material that would be excavated shall be tested for the presence of potential acid sulfate soils. A full Acid Base Account assessment utilising the SPOCAS analysis shall confirm the presence of acidity, potential acidity and liming rate to neutralise the acid prior to disposal. If necessary, an acid sulfate soil management plan shall be prepared to facilitate treatment.	Construction Contractor
4. This REF shall be reviewed when Construction Contractor is engaged, and methodology is agreed and finalised.	SCC EOO
5. Relevant community consultative bodies shall be notified of the commencement date.	SCC Project Manager
6. Owners and residents of nearby house shall be notified of the commencement date and dates of noise-generating activity particularly demolition works and piling operations. Recommended residences are 2, 5, 6, 7, 9 and 11 Island Point Road.	SCC Project Manager and Construction Contractor
Site Establishment	
7. A waterway traffic management plan shall be prepared to safely manage public use of the waterway in the vicinity of the proposed activity.	Construction Contractor
8. Erosion and sediment controls in accordance with the 'Blue Book' (Landcom 2004) shall be installed and maintained to prevent the entry of sediment into waterways i.e. water diversion, minimising disturbance, erosion control, sediment capture and rapid re-establishment.	Site Manager; Construction Contractor

Safeguard / Measure	Responsibility
9. A hydrocarbon floating boom with turbidity curtain shall be installed in the Lake around the work site and: a. the curtain shall be installed prior to the commencement of the activity. b. a minimum of one curtain shall be installed to form a perimeter around the works site . c. the turbidity curtain shall be affixed so that there are no breaches or gaps between the curtain, hydrocarbon boom, and shoreline interface. d. the curtain shall be appropriately managed throughout the duration of the works. The primary curtain shall continually be monitored for visible signs of fuel spills or turbidity plumes, the perimeter of the curtain shall be inspected prior to undertaking the works each day and following a major rainfall or stormwater event. e. If the turbidity curtain is damaged and/or breached and pollution of the surrounding waters is imminent, all work shall immediately cease. Works shall not recommence until turbidity in the vicinity of the works area has returned to baseline conditions, the curtain repaired or replaced and the cause of the damage/breach is established and preventative measures implemented. f. Prior to the removal of the turbidity curtain and hydrocarbon floating boom, any sediment / turbidity shall be allowed to settle to further minimise the dispersion of suspended sediments.	Construction Contractor
10. A Construction Environmental Management Plan (CEMP) for the proposed activity shall be prepared to address the prescribed safeguards and measures within this REF and any conditions specified in the Fisheries Permit.	Construction Contractor
Construction works	
11. Works shall be compliant with the conditions of the Fisheries Permit.	SCC PM and Construction Contractor
12. The Waterway Traffic Management Plan shall be implemented.	

Safeguard / Measure	Responsibility
13. The contractor shall maintain public access to the nearby boat ramp.	Construction Contractor
14. During demolition of the existing jetty, the lower parts of the existing piles shall be left in place by cutting off existing piles at estuary floor level or as agreed with NSW Department of Primary Industries – Fisheries.	Construction Contractor
15. All parties must comply with any direction given by authorised officers of the Transport for NSW Maritime, NSW Department of Primary Industries, and NSW Environment Protection Authority with regard to safe navigation and the prevention of pollution.	SCC PM and Construction Contractor
16. Erosion and sediment controls and the hydrocarbon boom and silt curtain shall be maintained in good working order for the duration of the works and subsequently until the site has been stabilised and the risk of erosion, sediment dispersal or hydrocarbon pollution (fuels and oils) is minimal.	Construction Contractor
17. Clean rock (without fines) shall be used to construct the temporary rock platform. This rock shall also be encased under a non-woven geotextile to separate the introduced material from the existing estuary bed and aid in the removal of the rock when works are completed.	Construction Contractor
18. Cutting of material shall, wherever possible, be conducted on land and all fines and off-cuts to be collected and disposed of off-site. If cutting needs to occur over water, tarps, flat bottom boats, or other vessels shall be utilised to capture potential contaminants including oils, saw-dust and metal or FRP fines. Battery powered hand-tools are preferred over two-stroke.	Construction Contractor
19. Vegetation removal shall be undertaken only to the extent required to carry out the works.	Construction Contractor
20. Eelgrass wrack shall be left on site (can be moved).	Construction Contractor
21. An emergency spill kit shall be always kept on-site with procedures to contain and collect any leakage or spillage of fuels, oils, greases, etc from plant and equipment.	Construction Contractor
22. Staff working at the site will be instructed to stop work immediately on identification of any suspected Aboriginal heritage artefact. If any objects are found, NSW Department	Construction Contractor

Safeguard / Measure	Responsibility
of Planning, Industry and Environment (ph:131 555) shall be contacted.	
23. Noise-generating construction activities shall be limited to the following hours to limit noise and traffic impacts to adjacent residents: 7:00 am to 6:00 pm Monday to Friday and 8:00 am to 5:00 pm Saturdays.	Construction Contractor
24. Any stockpiles of soil shall be located at least 10 metres away from the estuary and any stormwater flow-paths with erosion and sediment controls in place in accordance with the 'Blue Book' (Landcom 2004).	Construction Contractor
25. Each side of the structures oriented in the direction of the navigable channel must be painted white and have reflective material (e.g. discs or strips) placed so that they can be seen by any passing vessel.	Construction Contractor
26. The proprietary clip in the fender system for the pontoon shall be white.	Construction Contractor
27. Any waste shall be managed, transported, stored, collected and disposed of in an environmentally satisfactory manner pursuant to NSW Protection of the Environment Operations Act 1997, and that all reasonable measures regarding the control and prevention of pollution and waste from being introduced into the estuary are implemented.	Construction Contractor
Post construction	
28. An asset form must be trimmed to file 44574E on commissioning of the assets in Accordance with POL15/8 Asset Accounting Policy section 3.1.4 and POL16/79 Asset Management Policy section 3.3.	SCC PM
29. Any post-construction conditions of the Fisheries Permit shall be accomplished.	SCC PM or EOO

8. SIGNIFICANCE EVALUATION & DECISION STATEMENT

This Review of Environmental Factors has assessed the likely environmental impacts, in the context of Part 5 of the *Environmental Planning and Assessment Act 1979*, of a proposal by Shoalhaven City Council to the repair, through renewal, of the public jetty at Island Point Road, St Georges Basin.

In consideration of the proposal as described in Section 1, in accordance with any design plans referred to in this report, and assuming the implementation of all proposed safeguards and mitigation measures (Section 7), it is determined that:

1. It is unlikely that there will be any significant environmental impact as a result of the proposed work and an Environmental Impact Statement is not required for the proposed works.
2. The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats and a Species Impact Statement / BDAR is not required.
3. A Fisheries Permit is required. No additional statutory approvals, licences, permits and external government consultations are required.
4. The proposed activity may proceed.

In accepting and adopting this REF, Shoalhaven City Council commits to ensuring the implementation of the proposed safeguards and mitigation measures identified in this report (Section 7) to minimise and/or prevent detrimental environmental impacts.

Determined by:

William Lynch
(Acting) District Engineer
City Services – Works and Services
Shoalhaven City Council Date: 03/10/2023

9. REFERENCES

ASSMAC (Acid Sulfate Soils Management Advisory Committee) 1998 *Acid Sulfate Soils Manual.* ISBN 0 7347 0000 8

DECCW (Department of Environment, Climate Change and Water, NSW) 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. Available at: https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/634694/Policy-and-guidelines-for-fish-habitat.pdf

DoPI (Department of Primary Industries, NSW) 2012 *Black Rockcod (Epinephelus daemelii) Recovery Plan.* Aquaculture, conservation and Marine Parks Unit, Port Stephens Fisheries Institute. ISBN 978 0 7347 1997 3. https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0006/636351/Black-Rockcod-recovery-plan.pdf

DoPI (Department of Primary Industries, NSW) 2013 *Policy and Guidelines for Fish Habitat Conservation and Management.* ISBN 978 1 74256 283 https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/634694/Policy-and-guidelines-for-fish-habitat.pdf

DoPI (Department of Primary Industries, NSW) 2013b *Factsheet: Greynurse Shark (Sarcharias taurus). https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0004/635053/Primefact-582-Greynurse-shark.pdf*

Fisheries Scientific Committee 2006 *Determination: Installation and Operation of Instream Structures and Other Mechanisms That Alter Natural Flow Regimes of Rivers and Streams. https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0010/636517/FR21-instream-structures.pdf*

Fisheries Scientific Committee 2007 *Determination: Degradation of Native Riparian Vegetation along New South Wales Water Courses. https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0009/636534/FR19-riparian-vegetation.pdf*

Geofirst Pty Ltd 2022 *Geotechnical Report: Geotechnical Assessment for Proposed Jetty Renewal, Island Point Road, St. Georges Basin, NSW 2540.* Unpublished report for MI Engineers (SCC reference D23/211217)

Landcom 2004 *Managing Urban Stormwater: Soils and Construction – Volume 1.* Published by Landcom ISBN 0-97520-3037 https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-editon

MI Engineers (2023) *Design Report – Proposed Jetty Renewal – Island Point Road, St Georges Basin, NSW 2540.* Unpublished report for Shoalhaven City Council (MI Engineers reference DN220321.R01 dated 26 May 2023, SCC reference D23/211211).

OEH (NSW Office of Environment and Heritage). 2017. Pied Oystercatcher – profile. Available at: https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10386

OEH (NSW Office of Environment and Heritage). 2023. Sooty Oystercatcher – profile. Available at: https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10385

OEH (NSW Office of Environment and Heritage). 2022. Swamp Oak Floodplain forest of the New South Wales North Coast, Sydney Basin and Seouth East Corner Bioregions. https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10945

Stantec 2022 *Final Report: St Georges Basin Flood Study.* Report prepared for Shoalhaven City Council https://doc.shoalhaven.nsw.gov.au/displaydoc.aspx?record=D22/425410

TfNSW (Transport for NSW) 2015 *NSW Boat Ramp Facility Guidelines.* Roads and Maritime Services

APPENDIX A – The Activity

DO NOT SCALE

MIENGINEERS

SYDNEY OFFICE
Level 1, 83 - 89 Renwick Street, Redfern 2016
Tel (02) 8396 6565

SOUTH COAST OFFICE
49 Berry Street, Nowra NSW 2541
Tel (02) 4423 0566

WOLLONGONG OFFICE
Suite 3, 128/134 Crown Street, Wollongong NSW 2500
Tel (02) 4423 0566

www.miengineers.com

PROPOSED JETTY RENEWAL

ISLAND POINT RD, ST GEORGES BASIN, NSW 2540
STRUCTURAL DESIGN

LOCALITY PLAN
N.T.S.

DEFENDER-55 GREEN FROG SYSTEM SOLAR LIGHT, SIDE MOUNTED TO EXISTING ENDEAVOUR ENERGY LIGHT POLE TO MANUFACTURERS' SPECIFICATION OR APPROVED EQUIVALENT

APPROXIMATE AREA OF WORKS

SCC REF

1739-10
1739-11
1739-12

DRAWING INDEX

DIAL BEFORE YOU DIG www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
1	ISSUED FOR CONSTRUCTION	26.05.23	TS	TS
C	ISSUE FOR 80% DESIGN	31.03.23	TS	TS
B	CONCEPT PLAN SET	19.12.22	TS	TS
A	DRAFT ISSUE FOR RFQ	07.12.22	TS	GS

CLIENT: Shoalhaven City Council
PLAN REFERENCE 1739-10

ARCHITECT:

MIENGINEERS
SYDNEY OFFICE
83 - 89 Renwick Street,
Redfern NSW 2016
Tel (02) 8396 6565
SOUTH COAST OFFICE
49 Berry Street, Nowra NSW 2541
Tel (02) 4423 0566
WOLLONGONG OFFICE
Suite 3a, 128-134 Crown Street,
Wollongong NSW 2500
Tel (02) 4423 0566
MIENGINEERS.COM

PROJECT :
PROPOSED JETTY RENEWAL
ISLAND POINT RD, ST GEORGES BASIN, NSW 2540
STRUCTURAL DESIGN

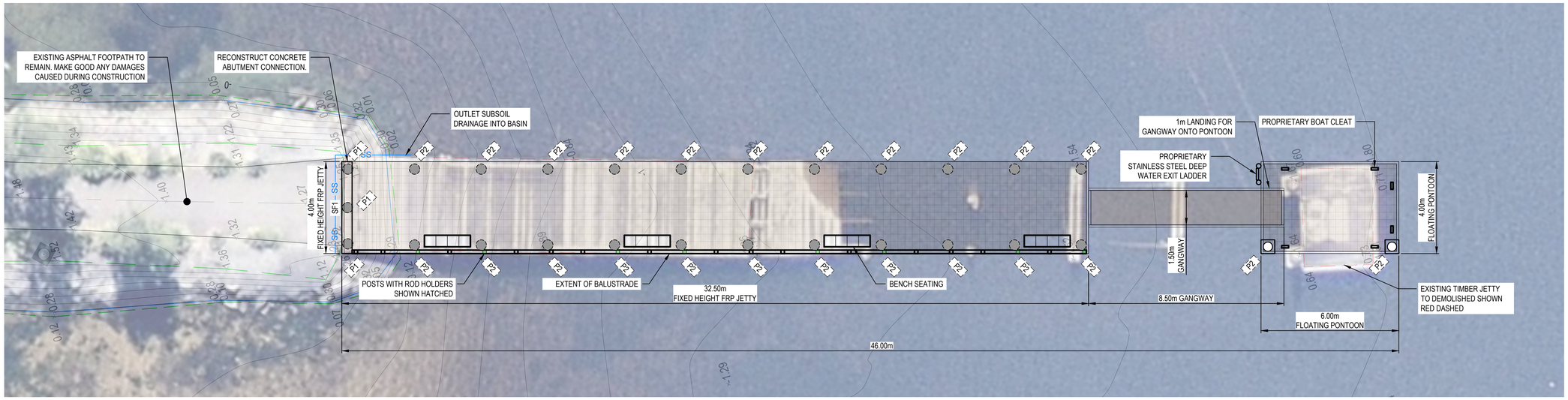
DRAWING NAME:
COVER SHEET

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	-	A1

DRAWING STATUS: CONSTRUCTION
DRAWING No.: S001
PROJECT No.: DN220321
REVISION: 1

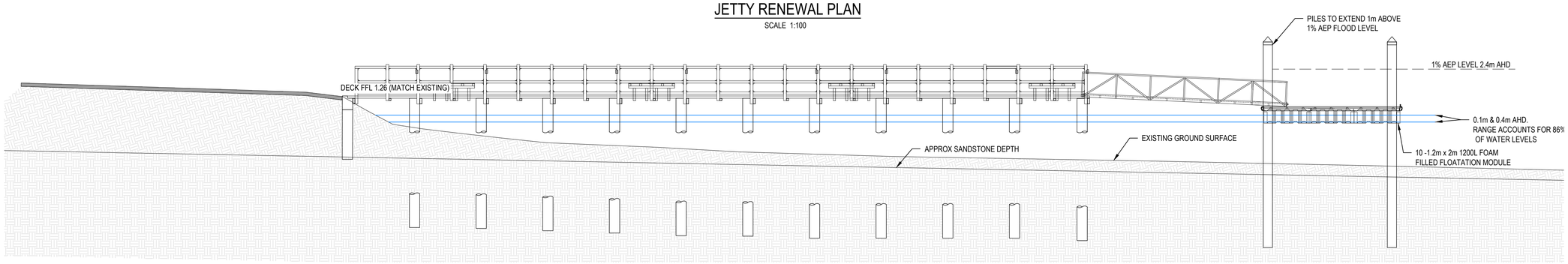
DO NOT SCALE

SCHEDULE		
MEMBER	SIZE	DESCRIPTION
BEARER	250x100x8.1 RHS	WGN-R5000
JOIST	125x6.4 SHS	WGN-S3000
HANDRAIL POST	125x6.4 SHS	WGN-S3000
TOP RAIL	100x75x5.2 RHS	WGN-R1000
MID RAIL	100x75x5.2 RHS	WGN-R1000
KERB	100x5.2 SHS	WGN-S1000
TIE BRACE	100x5.2 SHS	WGN-S1000
SEAT POST	100x5.2 SHS	WGN-S1000
SEAT BEARER	100x5.2 SHS	WGN-S1000
SEAT JOIST	100x5.2 SHS	WGN-S1000



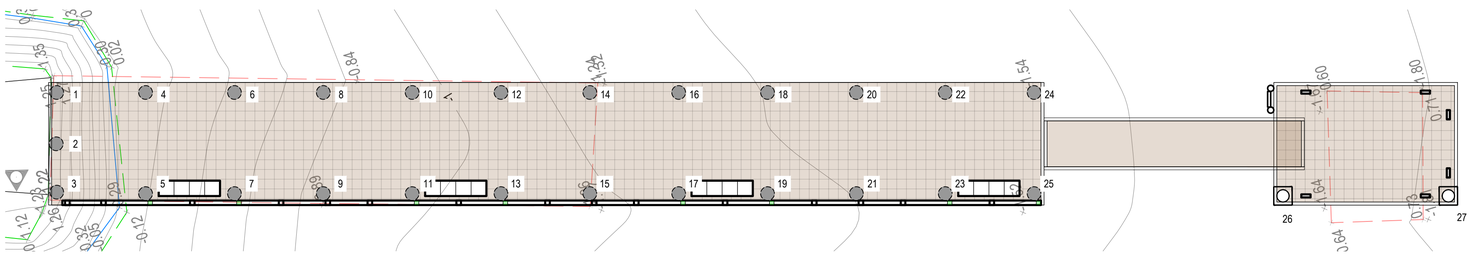
JETTY RENEWAL PLAN

SCALE 1:100



JETTY ELEVATION

SCALE 1:100



PILE SETOUT PLAN

SCALE 1:100

PILE SETOUT TABLE		
DATUM - GDA94		
ZONE - 56		
TAG	EASTING	NORTHING
1	2800881.939	6113054.9850
2	280880.463	6113054.193
3	280879.087	6113053.421
4	280883.334	6113052.441
5	280880.440	6113050.855
6	280884.729	6113049.898
7	280881.835	6113048.311
8	280886.123	6113047.354
9	280883.230	6113045.767
10	280887.518	6113044.810
11	280884.624	3116043.224
12	280888.913	6113042.267
13	280886.019	6113040.680
14	280890.307	6113039.723
15	280887.414	6113038.137
16	280891.702	6113037.180
17	280888.808	6113035.593
18	280893.097	3113034.636
19	280890.203	6113033.050
20	280894.491	6113032.093
21	280891.598	6113030.506
22	280895.886	6113029.549
23	280892.992	6113027.963
24	280897.281	6113027.006
25	280894.387	6113025.419
26	280901.954	6113005.070
27	280904.550	6113000.335

DIAL BEFORE YOU DIG www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
1	ISSUED FOR CONSTRUCTION	26.05.23	TS	TS
C	ISSUE FOR 80% DESIGN	31.03.23	TS	TS
B	CONCEPT PLAN SET	19.12.22	TS	TS
A	DRAFT ISSUE FOR RFQ	07.12.22	TS	GS

CLIENT: Shoalhaven City Council

PLAN REFERENCE 1739-11

ARCHITECT:

MIENGINEERS

SYDNEY OFFICE
83 - 89 Renwick Street,
Redfern NSW 2016
Tel (02) 8396 6565

SOUTH COAST OFFICE
49 Berry Street, Nowra NSW 2541
Tel (02) 4423 0566

WOLLONGONG OFFICE
Suite 3a, 128-134 Crown Street,
Wollongong NSW 2500
Tel (02) 4423 0566

MIENGINEERS.COM

PROJECT:
PROPOSED JETTY RENEWAL
ISLAND POINT RD, ST GEORGES BASIN, NSW 2540
STRUCTURAL DESIGN

DRAWING NAME: JETTY RENEWAL PLAN

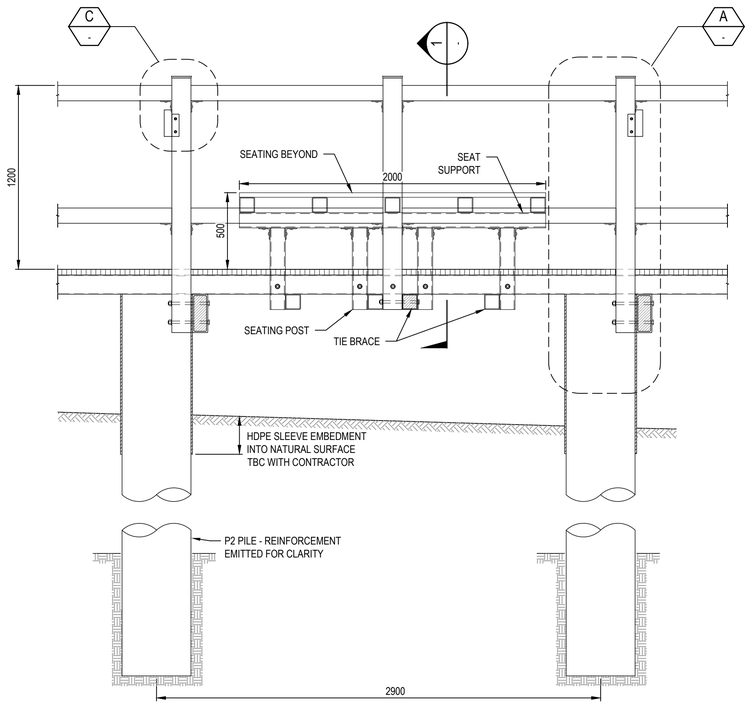
DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S010

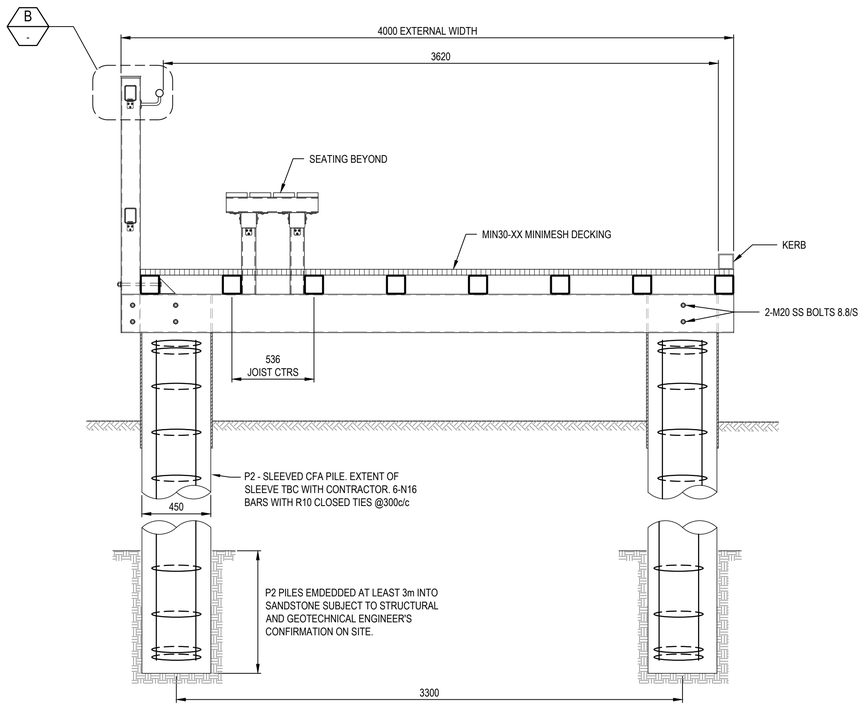
PROJECT No.	REVISION:
DN220321	1

DO NOT SCALE

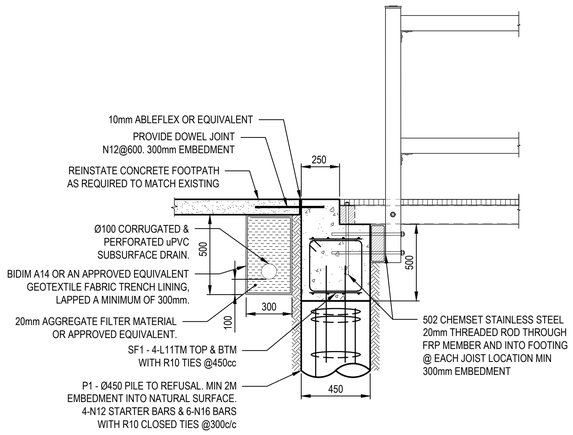
SCHEDULE		
MEMBER	SIZE	DESCRIPTION
BEARER	250x100x8.1 RHS	WGN-R5000
JOIST	125x6.4 SHS	WGN-S3000
HANDRAIL POST	125x6.4 SHS	WGN-S3000
TOP RAIL	100x75x5.2 RHS	WGN-R1000
MID RAIL	100x75x5.2 RHS	WGN-R1000
KERB	100x5.2 SHS	WGN-S1000
TIE BRACE	100x5.2 SHS	WGN-S1000
SEAT POST	100x5.2 SHS	WGN-S1000
SEAT BEARER	100x5.2 SHS	WGN-S1000
SEAT JOIST	100x5.2 SHS	WGN-S1000



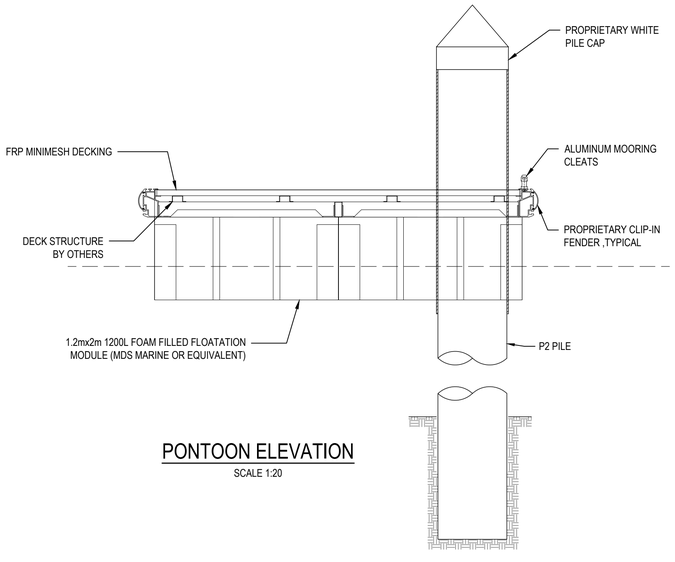
TYPICAL ELEVATION
SCALE 1:20



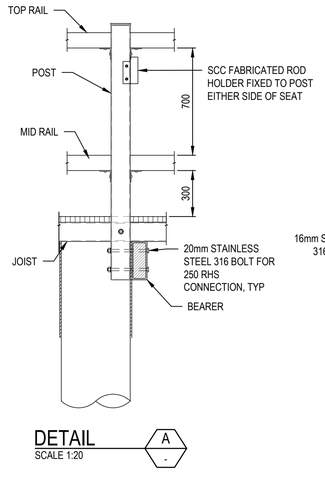
TYPICAL SECTION
SCALE 1:20



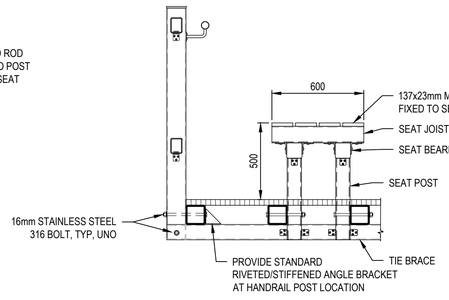
SF1 - FACILITY ENTRANCE SECTION
SCALE 1:20



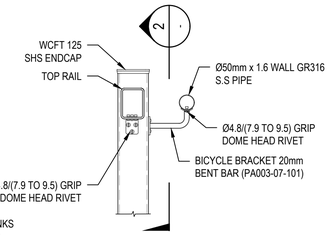
PONTOON ELEVATION
SCALE 1:20



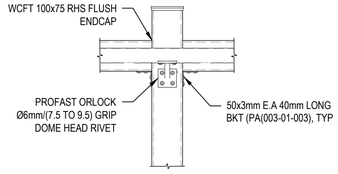
DETAIL A
SCALE 1:20



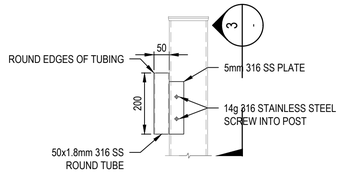
SECTION 1
SCALE 1:20



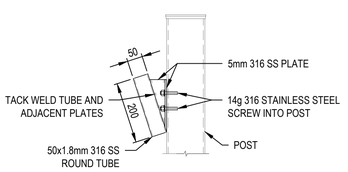
DETAIL B
SCALE 1:10



SECTION 2
SCALE 1:10



DETAIL C
SCALE 1:10



SECTION 3
SCALE 1:10

DIAL BEFORE YOU DIG www.1100.com.au

REVISION	AMENDMENTS	DATE	CKD	APP
1	ISSUED FOR CONSTRUCTION	26.05.23	TS	TS
C	ISSUE FOR 80% DESIGN	31.03.23	TS	TS
B	CONCEPT PLAN SET	19.12.22	TS	TS
A	DRAFT ISSUE FOR RFQ	07.12.22	TS	GS

CLIENT: Shoalhaven City Council
PLAN REFERENCE: 1739-12

ARCHITECT:

MIENGINEERS
SYDNEY OFFICE
83 - 89 Renwick Street, Redfern NSW 2016
Tel (02) 8396 6565
SOUTH COAST OFFICE
49 Berry Street, Nowra NSW 2541
Tel (02) 4423 0566
WOLLONGONG OFFICE
Suite 3a, 128-134 Crown Street, Wollongong NSW 2500
Tel (02) 4423 0566
MIENGINEERS.COM

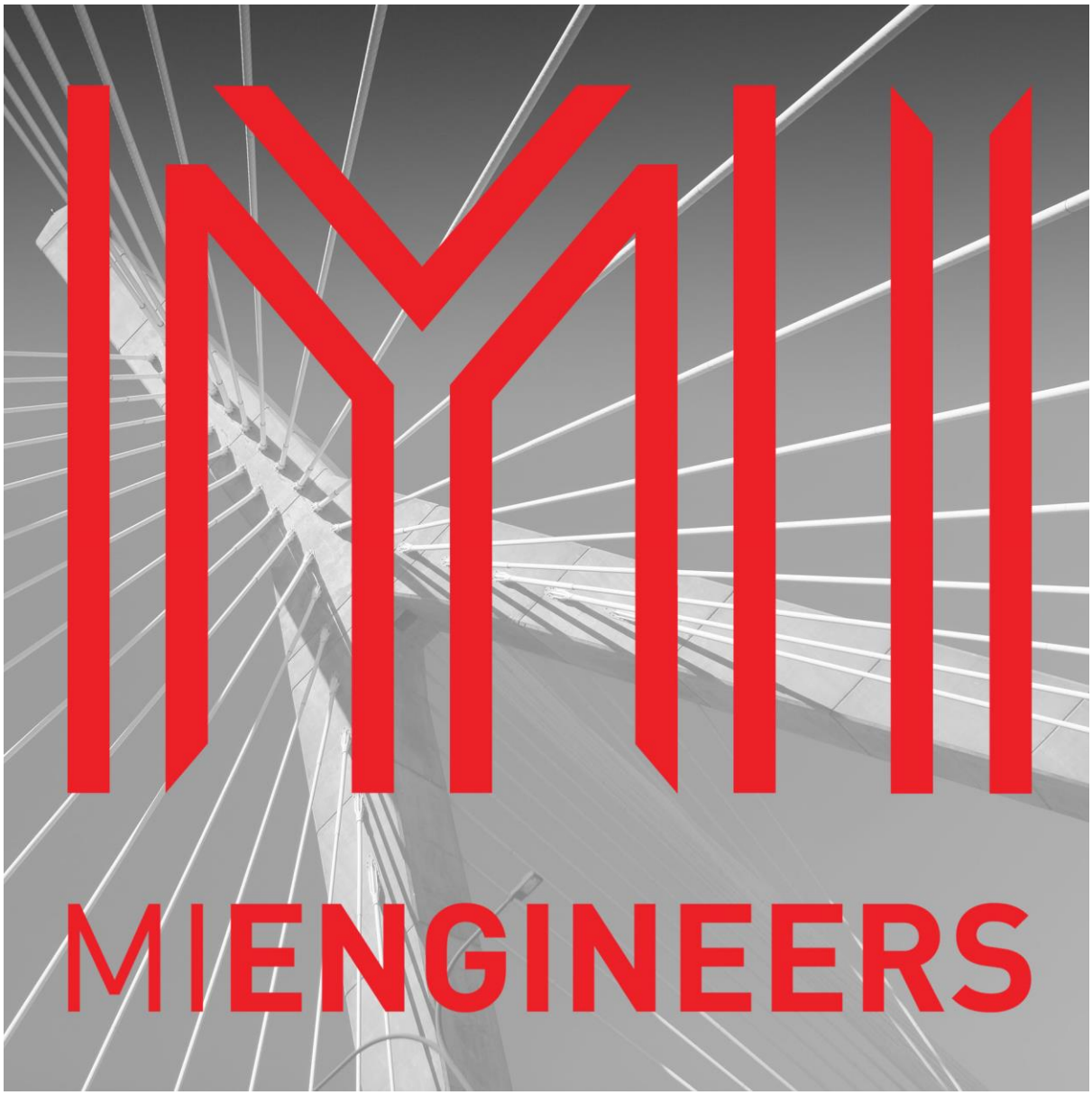
PROJECT:
PROPOSED JETTY RENEWAL
ISLAND POINT RD, ST GEORGES BASIN, NSW 2540
STRUCTURAL DESIGN

DRAWING NAME:
JETTY RENEWAL DETAILS

DESIGNED:	DRAWN:	SCALE:	SHEET SIZE:
TS	SP	1:100	A1

DRAWING STATUS	DRAWING No.
CONSTRUCTION	S020

PROJECT No.	REVISION:
DN220321	1



DESIGN REPORT

PROPOSED JETTY RENEWAL

Island Point Road, St Georges Basin, NSW 2540

Prepared for: Shoalhaven City Council

Report Number: DN220321.R01

Date: 26th May 2023

Company Details

Leckring Pty Ltd T/as MIEngineers
ABN 64 003 012 324

REDFERN
Level 1, 83-89 Renwick Street
Redfern, NSW 2016
Phone: 02 8396 6565
E: enquiries@miengineers.com

NOWRA
3/49 Berry Street
PO Box 992
Nowra, NSW 2541
Phone: 02 4423 0566

WOLLONGONG
3A/128-134 Crown Street
Wollongong, NSW 10
Phone: 02 4423 0566

Document Control

Issue No.	Date	Prepared by	Checked by	Final Approval
2	31/03/23	S. Price	T.Showan	
3	26/05/23	S. Price	T. Showan	T. Showan

Limitations Statement

The sole purpose of this report and the associated services performed by MIEngineers is in accordance with the scope of services set out in the contract between MIEngineers and the Client. That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

MIEngineers derived the data in this report primarily from site visits, discussions with the Client, information provided by the client and/or Government Authority and current methodologies. The passage of time, manifestation of latent conditions or impacts of future events may require further exploration at the site, subsequent data analysis, and re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, MIEngineers has relied upon and presumed accurate information (or absence thereof) provided by the Client and others identified herein. Except as otherwise stated in the report, MIEngineers has not attempted to verify the accuracy or completeness of any such information.

The findings, observations and conclusions expressed by MIEngineers in this report are not, and should not be considered, an opinion concerning anything other than as outlined in the scope of works. No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings, observations and conclusions are based solely upon site conditions and information in existence at the time of the investigation.

Table of Contents

Appendices

Introduction

Background

Situated on the northern shores of St Georges Basin, the existing jetty at Kingfisher Reserve serves as the area's primary jetty and is regularly utilised by land-based fishers, boaters, and remote-control boat users. Shoalhaven City Council's (SCC) success in receiving a grant under the Recreational Fishing Trust Fund has led to engagement with MIEngineers (MIE) to design and document the proposed jetty renewal to improve the fishing experience for the local community.

The key features of the proposed jetty renewal include:

- Replacing the existing timber jetty with a composite fibre (FRP) jetty,
- 1.5m wide, 8.5m long FRP gangway.
- A 4m wide, 6m long floating pontoon structure for closer access to the water.
- Seating and rod holders on the jetty
- Additionally, a solar light provided adjacent to the existing fish cleaning table

Site Description and Locality

Site Locality

As shown in Figure 1 below, the existing jetty is situated to the west of the adjacent boat ramp and forms part of the boating precinct at Kingfisher Reserve.

Figure 1 – Site Locality (NearMap)

MIEngineers Scope of Work

MIEngineers scope of work includes:

- Engineering Survey
- Hydrographic Survey
- Survey Mark Audit
- Geotechnical Investigation & Structural Design
- Underground Utility Service Locating
- Construction Drawings & Cost Estimates
- AUS-SPEC Construction Documentation
- Safety-in-Design Assessment & Report

Existing Information

The following information was viewed to inform the design.

Dial Before You Dig Documentation

To supplement the survey information, Dial Before You Dig (DBYD) documentation was used to inform the approximate location of existing underground services.

Four asset owners were flagged as having assets in the area surrounding the proposed construction site location. Endeavour Energy, Telstra, NBN and Shoalhaven Water advised that no assets would be disrupted by the proposed works and therefore, no further investigations are deemed necessary.

SCC Environmental Due Diligence Report

Council supplied an Environmental Due Diligence Checklist, completed by the responsible project manager. The checklist noted the following items:

- SCC has lawful authority to carry out the activity without development consent through Section 2.80(4) of the Transport and Infrastructure SEPP. SCC has crown land licence over the site (Licence 494193).
- Access to businesses and local traffic will not be affected by the proposed works.
- The land is not reserved or a Marine Park, nor will it impact a state or local listed heritage item or conservation area.
- There is a low likelihood of the occurrence of an Aboriginal artefact being present and/or harmed.
- SEPP Coastal Management 2018 Coastal Wetlands, Littoral Rainforest and Coastal Vulnerability Area layers do not apply to the land.
- The subject area has been mapped as key Fish Habitant area. A fisheries permit may be required. The proposal may also harm protected marine vegetation.
- Class 1 acid sulphate soils are found on the site and therefore any minor dredging/disturbance as part of the works will require the preparation of an acid sulfate soil management plan.

Concluding remarks note that:

- *The proposed activity can be undertaken without development consent. A Review of Environmental Factors is required.*
- *A Fisheries Permit is required for dredging/reclamation and harm to protected marine vegetation.*

The following actions are also recommended to minimise potential impacts:

- *Seek a permit from NSW Fisheries for the potential harm to seagrass and saltmarsh.*
- *Prepare an Acid Sulphate Soil Management Plan for the potential disturbed Class 1 soils along the shoreline and seabed.*
- *Seek Crown Lands permission to construct on their property and licence for the installation of structure in the waterway.*
- *Seek comment from Transport for NSW (TfNSW) for the proposed fixed/floating structure in a waterway.*
- *Seek comment from SCC Floodplain Engineers with respect to flood liable land.*

- *The activity shall be carried out in accordance with relevant requirements of Managing Urban Stormwater: Soils & Construction (4th edition, Landcom, 2004), commonly referred to as the "Blue Book" to prevent erosion and movement of sediment into the waterway.*

SCC Flood Information

While the Environmental Due Diligence report indicates that the site is not flood liable, the 1% AEP flood level is a significant design factor and is required to determine the height of the floating pontoon piers.

Tidal Planes

The tidal information relied upon in the design of the proposed jetty renewal was obtained from Manly Hydraulics Laboratory's gauge (Island Point gauge Ref. No. 216415D).

The station details reveal that St Georges Basin has "very small tidal range (5cm), dependent on entrance conditions". A summary of the key values are shown below.

Table 1 – Summary of Tidal Data

MHL Tidal Data: Island Point (216415)	
Station Characteristic	**Value**
Peak Flood of Record	1.853m (26 August 2015)
1% AEP Flood Level	2.4m AHD
Hydraulic Characteristic	Very small tidal range (5cm), dependent on entrance conditions
Water Level 0.1m	Cumulative frequency = 0.91663
Water Level 0.4m	Cumulative frequency = 0.05174

Summarising this data, the water level at the station ranges between 0.1m & 0.4m, 86% of the time. Given that there are no tidal plane values provided for the mean high water and mean low water levels by MHL, the frequency of different water levels will be used as a basis for design.

Council's AUS-SPEC

Council has provided a list of AUS-SPEC Worksections and correlated Annexures that are linked with the proposed works of this project. Council has requested that *"The Consultant shall also provide recommended specification for 0136 General Requirements and 0173 Environmental management".* The AUS-SPEC Worksection and Annexures provide by council can be seen in Table 2. Any additional worksections found to be included in this project, can be found in the provided 'Shoalhaven Construction Code – Annexures' document and cost estimate.

Table 2: Council's Provided AUS-SPEC Worksections and Annexures

AUS-SPEC Worksection	Annexure(s)
0257 Landscape – Road reserve and street trees	4.1 Annexure – Selections
0257 Landscape – Open space and playground landscape	4.1 Annexure – Selections
0319 Auxiliary concrete works	4.1 Annexure – Selections
1101 Traffic management	5.1 Annexure – Project plan requirements 5.2 Annexure – Temporary roadways
1102 Control of erosion and sedimentation (Construction)	4.1 Annexure – Selections
1112 Earthworks (Road reserve)	5.1 Annexure – Earthworks information
1113 Stabilisation	4.1 Annexure – Stabilisation schedules
1141 Flexible pavement base and subbase	4.1 Annexure – Schedules
1143 Sprayed bituminous surfacing	6.1 Annexure – Project requirements 6.2 Annexure – Schedule of job details
1144 Asphalt (Roadways)	5.1 Annexure – Schedule of job details 5.2 Annexures – Asphalt work record
1145 Segmental paving	4.1 Annexure – Paver schedule
1146 Microsurfacing	5.1 Annexure – Selections
1171 Subsurface drainage (Construction)	4.1 Annexure – Subsurface drainage schedule
1192 Signposting	4.1 Annexure – Proprietary sign requirements schedule
1354 Drainage structures	4.1 Annexure – Selections
1859 CCTV inspection of drainage conduits	6 Annexure – Scope of CCTV inspection

Subcontractor Site Findings

Survey Information

A detailed survey of the project area was supplied by Axiom Spatial Surveyors. The survey identified public and private assets such as existing structures, stormwater infrastructure, communication pits, sewer manholes, sewer lamp holes, trees, signs, and bollards. etc. These assets have been included on the drawings, where relevant.

The surveyor completed a Survey Mark Audit, whereby all marks have been determined to be safe. No further investigation is required.

Geotechnical Investigation

MIEngineers engaged Geofirst to undertake a geotechnical investigation for the project. The scope of the geotechnical investigation was to:

- Assess the strength of the subsurface profile via Dynamic Cone Penetrometer (DCP) tests for the extent of the proposed jetty.
- Submit a report with recommendations and comments on the footing design.

The report found that shallow sandstone bedrock was encountered throughout the entire site. Recommendations made in the report by the geotechnical engineer have been summarised in the following Geotechnical Considerations.

Jetty Design Considerations

Existing Structure

As outlined in SCC's brief, the substructure and foundation system of the existing structure is found to be in extremely poor condition and needs replacing. Therefore, the proposed design does not consider utilising or restoring any of the existing structure. Demolition of the existing structure has been considered in the cost estimate.

Existing Geometry

The existing structure consists of three main parts. The fixed jetty is 32.5m long and 4m wide. Previous to the storm events which damaged the jetty beyond repair, a gangway, roughly 8m long, and a floating pontoon, roughly 4m x 4.8m, extended out further into the basin. These measurements were estimated using NearMaps' dimension tool because of the extensive damage and failure of the gangway and pontoon.

Figure 2 – Existing jetty to be replaced

Geotechnical Considerations

Pile Design

The geotechnical report recommends pile foundations are embedded 3m into the sandstone bedrock to support the new structures, requiring the ability to withstand the lateral forces induced by the tidal movements and flood loads.

Given the close proximity to the ocean, the exposure for concrete footings is classified as severe to very severe, in addition to the potential coastal erosion for high-level footings. Both of these factors have been taken into consideration throughout the design of the footing system.

Ancillary Structures

As outlined in the design brief, the proposed design is to include seats, solar lighting, rod holders, and boat cleats. The seats have been designed as part of the FRP structure. The rod holders are to be fabricated in house by SCC and screwed to the posts by the contractor. The proprietary solar light is to be mounted to the existing light pole adjacent to the fish cleaning facility. The proposed light is the Defender-55 Green Frog Systems solar light, which comes with a side mount so that it can be attached to the pole. The boat cleats will be provided with the floating pontoon as nominated.

Authority Approvals

The following authorities will need to be contacted seeking permission or comment for their respective elements of the project:

- NSW Fisheries to seek permit for the potential harm to seagrasses and saltmarsh.
- Crown Lands to seek permission to construct on their property & license for the installation of structures in the waterway.
- TfNSW to seek comment the structure along the waterway
- SCC Floodplain Engineers to seek comment regarding construction in flood prone land.
- Endeavour Energy for mounting solar light to existing light pole

SCC have taken on the duty of contacting the relevant authorities.

Storm Impact Considerations

The renewal of the jetty is required due to recent storm events which damaged the footing system and led to the collapsing of the structure. The large southerly wind pressures during the storm resulted in frequent waves impacting on the structure and ultimately caused the failure. These forces have been considered during the design of the new structure.

Similarly, the floodwater effects have been considered also. The velocity of the floodwater at the Island Point Rd jetty during a 1% AEP storm event is 0.5m/s. This value was provided by SCC following a flood study done in the area.

Detailed Design Option & Justification

The above considerations and restraints led to the development of one formal design option.

Geometry

A 4m wide fixed jetty, at RL 1.26 to match existing, is proposed to extend 32.5m, to an 8.5m x 1.5m aluminium gangway, which lands on a 4 x 6m floating pontoon.

The width and extent of the jetty was chosen to match the existing structure. This was done to reduce disturbance to the seabed. The extent of the jetty into the basin allows larger boats to use the floating pontoon as a temporary mooring location before or after use of the boat ramp to the north-east. It is noted that *the NSW Boat Ramp Facility Guidelines (2015)* recommend the usable berth length of a proposed floating pontoon is to be 1.5 times the length of the design vessel at design low water level. Given that most of the boats using the pontoon, likely aluminium tinnies, are less than 4m in length, the 6m proposed length for the pontoon achieves this recommendation.

The following recommendations were made to us by MDS marine following a review of the concept drawings for cost estimate purposes, *"The gangway will need to land onto the deck of the pontoon by at least 1m. This facility will be exposed to heavy short period waves, and we would recommend making the pontoon larger if possible. It might be an advantage to spin the pontoon at 90 degrees and make it longer if possible. Say 4m x 6m or more. 1 pile front and 1 rear"*. Given the criticalness of providing resistance against the heavy, short period waves, these recommendations have been reflected in the detailed design drawings as seen in Appendix 1.

Material

MIE propose to use Composite Fibre Technology (CFT), particularly fibre reinforced polymer (FRP), structural framing members for the jetty bearers, joists, handrails, and mini mesh decking. The gangway and pontoon are a proprietary product that uses aluminium, plastics, and rubber suitable for the marine environment.

FRP and CFT provides ease of construction and durability in harsh marine. CFT decking also allows light to penetrate through the mesh and onto the seabed. The handrails are to be used for the rod holders to be fastened to as well as customary application.

Substructure

This structure will be supported by sleeved Continuous Flight Augured (CFA) piles taken to the recommended embedment into sandstone of 3m by the geotechnical engineer. These piles will be taken to the underside of the fixed jetty component, while the floating pontoon piles will extend 1m above the 2050 1% AEP flood level. The entrance of the structure will be supported on a strip footing and concrete piles that bear onto the sandstone rather than embed.

The embedment of the piles into the sandstone provides sufficient resistance to the wind, wave, and floodwater actions applied to the structure during storm events. The piles at the entrance are laterally supported by the earth as opposed to the other piles which require the sandstone embedment for lateral stability.

316 stainless steel was chosen to be the material for the fixings of the structure. This stainless steel provides better resistance to corrosion and pitting in comparison to other metals due to its mechanical makeup. Despites its larger initial cost, 316 SS will last longer in this environment and extend the longevity of the overall structure. 316 SS is also recommended by Wagners who have designed many structures in a similar environment.

Ancillary Items

As per the RFQ the following items are to be included in the design. Justification has been provided for each item for its location and construction.

Seating

Following consultation with Wagners, the seating has been designed using SHS and RHS FRP members for the structural elements and Modwood planks for the slats. Four seats have been proposed along the Western extent of the fixed jetty to provide a seat for people fishing. The western side was chosen so that people fishing on the jetty won't be casting in the direction of the boat ramp and surrounding boats.

Rod Holders

After the 80% Design Issue, SCC provided comment that rod holders can be fabricated in house. MIEngineers have researched existing proprietary items and proposed 316 stainless steel rod holders to be fabricated by SCC. A rod holder has been proposed at the post nearest to both ends of the seats, totalling eight along the handrail. These locations have been chosen so that people can put their rods in the holders and keep fishing while sitting down.

Solar Light

A proprietary solar light has been proposed adjacent to the fish cleaning table. A Defender-55 Green Frog System Solar Light, side mounted to the existing light pole adjacent to the existing fish cleaning table has been noted on plan, with allowance for an approved equivalent. This solar light will be dimly lit throughout the night and operate at full brightness when it detects motion of people intending to use the table. A solar light that is on all night, discourages possible vandalism of the structure.

Boat Cleats

Two boat cleats have been proposed on each side of the floating pontoon, excluding the side with gangway landing. These are proprietary items that come with the pontoon and have been positioned so that boats can intermittently moor to them before or after using the boat ramp.

Ladder

A proprietary water ladder has been proposed on the floating pontoon to provide a safe method for deep water exit. The location has been provided so that it reduces the likelihood of being hit by boats and minimises traffic around the pontoon piles. Similarly, to the boat cleats, this item comes with the floating pontoon when nominated.

Alternate Options Considered

The proposed design strictly follows the design brief with regard to the jetty locations and extent. MIE investigated alternative approaches to the structure documented. The following documents the options considered, and the negatives associated.

- A 'like-for-like' timber jetty.
    - FRP and CFT far more durable than timber in the marine environment
- A jetty comprised entirely of floating pontoons.
    - Given the wind and wave actions encountered at the site, floating pontoons the whole extent would be unstable for users
    - The floating pontoons require a non-transparent substructure and would eliminate any light being transmitted to the seagrass below
- A shorter fixed height jetty, with a longer floating pontoon structure.

  - The pontoon structure is more expensive per m^2 than the FRP alternative, therefore reducing the cost for the same extent
  - Fishing rod holders are also difficult to install on floating pontoons as they required a stand-alone system to be fastened to
- A fixed height jetty with a step at the end to a platform at a lower level
  - Varying water height will mean the platform will be submerged and not visible to incoming boats
  - Ancillary items fixed to platform will also be submerged
  - Floating pontoon provides a constant difference in height between top of boat gunnel and pontoon floor level
  - Velocity of floodwater over platform may create safety hazards for users
  - Cofferdam may be required for construction of platform at water level

MIE believe the documented design was the most optimal solution holistic approach in terms of constructability, durability, cost, maintenance, and aesthetics.

Constructability

Given the 3m pile embedment into sandstone, a large piling rig will be required. Such piling rig and forces applied during construction, would be too large for a top-down construction method. A barge is proposed to accompany the piling rig so that the foundation construction will be done from the water.

From experience, the draft required for the barge is sufficient until approximately 10m from the bank. This is where a rock platform, of gabion rock or similar, will be employed for the piling rig to drive out and install the piles from the temporary platform. Once the piling is complete, an excavator will remove the rock and replace it with a layer of rock armouring for scour protection of the bank.

Expected Construction Sequence

The following steps outline the construction sequence that MIEngineers expect the contractor to undertake, however the contractor may see other methods more applicable based on experience and apply them where required.

1) Site establishment including clearing of work site
2) Fastening of solar light to existing power pole
3) Demolition of existing timber jetty
4) Placement of temporary rock platform
5) CFA piling from rock platform
6) Remove rock and pile back to shore as required
7) Place piling rig onto barge and construct remaining piles that couldn't be reached from platform
8) Construct piles, strip footing and drainage at entrance of structure
9) Fasten bearers to piles
10) Fasten joists and handrail system to bearer
11) Fasten seating system to joists
12) Fix minimesh decking to joists and Modwood planks to seating support
13) Lift pontoon into the water, push into position and connect pile guides
14) Lift gangway into place from crane on barge and secure to fixed jetty
15) Install rod holders, water ladder and boat cleats
16) Regenerate any disturbed areas

Quality Assurance and Design Verification

Quality Assurance and Design Verification will be implemented as per our RFQ submission and ongoing delivery of Council projects under Council's Technical Services Panel.

Quality Assurance and structural engineering review will be undertaken by Tom Showan, MIEngineers Structural Design Manager. Tom has worked extensively on several projects including Havilland Street Boat Ramps & Jetty, Conjola Park, Ulladulla Harbour Jetty, Woollamia Service Wharf, and bridge and culvert replacement projects for Shoalhaven City Council, including design, project management, construction inspections, and Level 3 asset inspections.

Work Health and Safety reviews will be conducted by Mal Windley.

Cost Estimation

A cost estimate has been prepared to accompany the Issue for Construction Package.

MIEngineers prepared a Schedule of Quantities based on the current design drawings and information available. The schedule of quantities was developed using AUS-SPEC pay items as per the RFQ where possible. Some anticipated construction costs are not covered in AUS-SPEC and have been either added to the relevant work section under a different pay item or covered in "Other Items" in the provided cost estimate.

Direct Cost Item Rates were generally developed using first principles, resource based estimating methods using Benchmark Estimating Software. This required the assessment of resource quantities, resource costs and production rates to determine a Direct Cost Item Rate. The Direct Cost Item Rates were then applied a mark up to account for the Contractor's overheads, profit, and risk.

The cost estimation is summarised below, rounded to the nearest $1,000:

Table 2 – Cost Estimation Summary

Item	Estimated Cost
Proposed Jetty Renewal	$521,000.00
Project Management (8%)	$42,000.00
Contingency (15%)	$78,000.00
Total, excl. GST	$641,000.00

Refer to Appendix 2 for details on the cost estimation, including actual (non-rounded) values.

Estimate Assumptions and Exclusions

The following assumptions and exclusions apply to the concept cost estimation:

- The estimate includes a contingency of 15% to suit the design stage of the project.
- The estimate is not based on a construction programme.
- Utilities:
  - The estimate does not allow for any relocation or protection of existing utilities.
- Property Acquisition:
  - No allowance has been made for property acquisition or the creation of easements.
- Project Management:
  - The estimate includes an allowance of 8% for project management, as directed by Council on recent project estimates.
- The cost for the FRP Fixed Jetty members has been provided by Wagners including design and delivery
- The cost of the aluminium gangway and floating pontoon has been provided by MDS Marine including design and delivery

Appendix 1 | Construction Drawings

Appendix 2 | Cost Estimate

Appendix 3 | Safety in Design Assessment

APPENDIX B - Likelihood of Occurrence Table (NSW Threatened Species)

NSW Threatened Species Likelihood of Occurrence Table

The table of likelihood of occurrence evaluates the likelihood of threatened species to occur on the subject site. This list is derived from previously recorded species within a 5 km radius (taken from NSW BioNet Atlas on 11/08/2023) around the subject site. Ecology information unless otherwise stated, has been obtained from the *Threatened Biodiversity Profile Search* on the NSW OEH (Office of Environment & Heritage) online database (https://www.environment.nsw.gov.au/threatenedspeciesapp/).

Likelihood of occurrence in study area

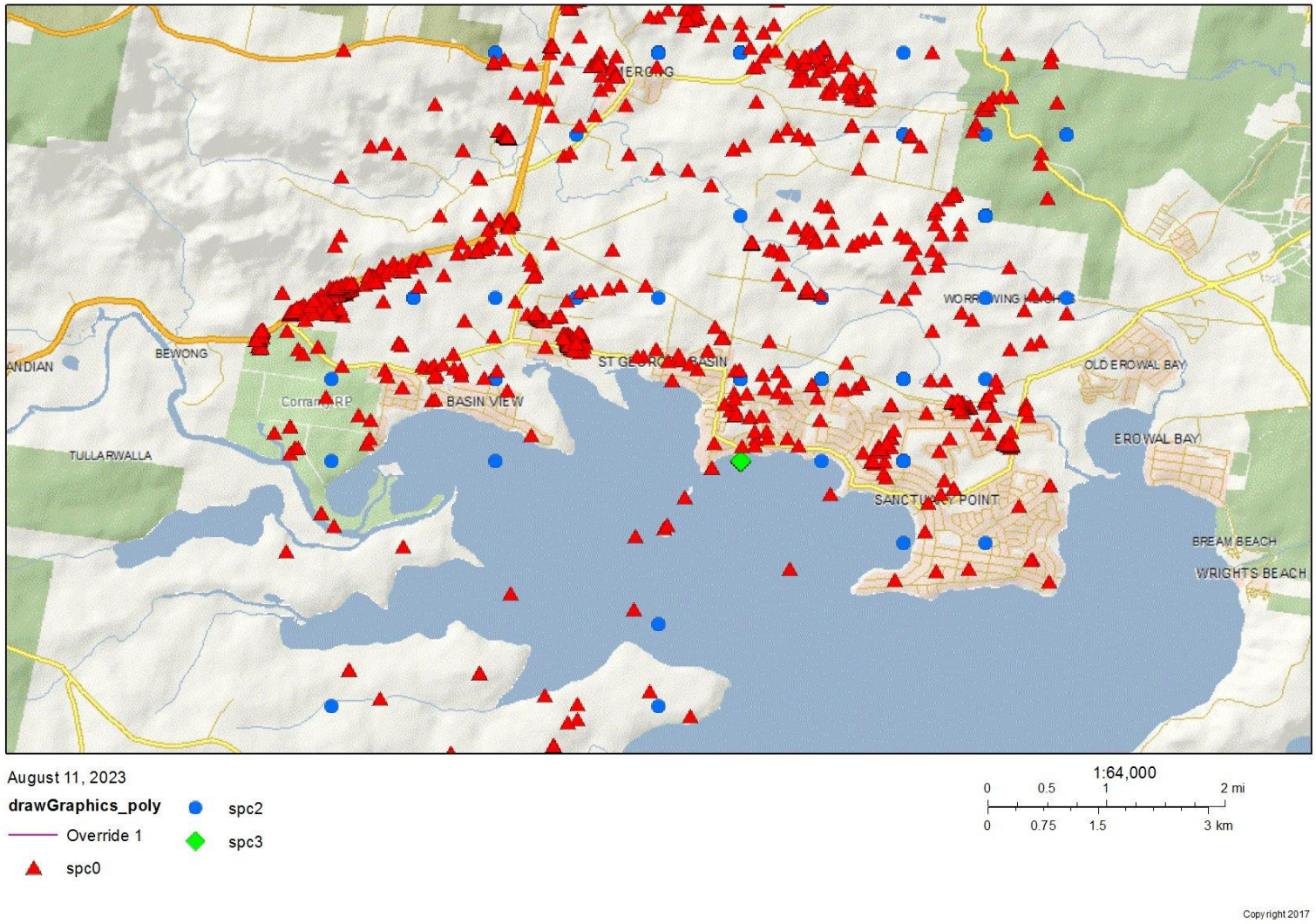
1. Unlikely – Species, population or ecological community is not likely to occur. Lack of previous recent (<25 years) records and suitable potential habitat limited or not available in the study area.
2. Likely – Species, population or ecological community could occur and study area is likely to provide suitable habitat. Previous records in the locality and/or suitable potential habitat in the study area.
3. Present – Species, population or ecological community was recorded during the field investigations.

Possibility of impact

1. Unlikely – The proposal would be unlikely to impact this species or its habitats. No NSW *Biodiversity Conservation Act 2016* "Test of Significance" or EPBC Act significance assessment is necessary for this species.
2. Likely – The proposal could impact this species, population or ecological community or its habitats. A NSW *Biodiversity Conservation Act 2016* "Test of Significance" and/or EPBC Act significance assessment is required for this species, population or ecological community.

Note that where further assessment is deemed required, this is undertaken within the REF as a Test of Significance (in the case of NSW listed species) or an EPBC Significant Impact Assessment (in the case of Commonwealth listed species).

Atlas Map


BEWONG
BASIN VIEW
TULLARWALLA
OLD EROWAL BAY
EROWAL BAY
SANCTUARY POINT
BREAM BEACH
WRIGHTS BEACH
August 11, 2023
drawGraphics_poly
Override 1
spc0
spc2
spc3
1:64,000
0 0.5 1 2 mi
0 0.75 1.5 3 km
Copyright 2017

Species name	***Status***	***Habitat requirements (www.environment.nsw.gov.au)***	***Likelihood of presence within areas impacted by the activity***
FLORA			
Narrow-leafed Wilsonia *Wilsonia backhousei*	Vulnerable *BC Act*	Occurs on the margins of salt marshes and lakes.	Targeted surveys for this species was undertaken on 11 August 2023 surveying along the foreshore from western side of Kingfisher Point to the boat ramp. The species was not located at the site.
Ettrema Mallee *Eucalyptus sturgissiana*	Vulnerable *BC Act*	The species is mostly restricted to the Northern Budawang Range in Morton National Park, with a few occurrences on the nearby coastal plain. Usually grows as an emergent in low shrub-heath.	Unlikely to occur. No suitable habitat present within the site. Not observed during site inspections.
Biconvex Paperbark *Melaleuca biconvexa*	Vulnerable BC Act and EPBC Act	The species generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Unlikely to occur. No suitable habitat present within the site. Not observed during site inspections.
Scrub Turpentine *Rhodamnia rubescens*	Endangered NSW BC Act and Critically Endangered EPBC Act	Species is found in littoral, warm temperate and subtropical and wet sclerophyll forest usually on volcanic and sedimentary soils.	Unlikely to occur. No suitable habitat present within the site. Not observed during site inspections.
Magenta Lilly Pilly *Syzygium paniculatum*	Endangered BC Act and Vulnerable EPBC Act	The species occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest.	Unlikely to occur. No suitable habitat present within the site. Not observed during site inspections.

Nowra Heath Myrtle *Triplarina nowraensis*	Endangered BC Act and EPBC Act	There are five known populations of Nowra Heath Myrtle. Three of these form a cluster to the immediate west of Nowra. A fourth, much smaller population is found 18km south-west of Nowra in the Boolijong Creek Valley. The Fifth population is located north of the Shoalhaven River on the plateau above Bundanon. The Species occurs on poorly drained, gently sloping sandstone shelves or along creek lines underlain by Nowra Sandstone. The sites are often treeless or have a very open tree canopy due to impeded drainage.	Unlikely to occur. No suitable habitat present within the site. Not observed during site inspections.
Pretty Beard Orchid *Calochilus pulchellus*	Endangered BC Act	At Vincentia the species grows in low Scribbly Gum dominated woodland with a low wet heath understorey. The soil is a sandy loam overlying sandstone. In Booderee National Park it grows in a tall heathy association. In Morton National Park on the Little Forest Plateau it occurs in low heath among scattered clumps of emergent eucalypts and Banksia in shallow coarse white sand over sandstone, in a near-escarpment area subject to strong orographic precipitation.	Unlikely to occur. No suitable habitat present within the site.
Leafless Tongue Orchid *Cryptostylis hunteriana*	Vulnerable BC Act and EPBC Act	The larger populations typically occur in woodland dominated by Scribbly Gum (Eucalyptus sclerophylla), Silvertop Ash (E. sieberi), Red Bloodwood (Corymbia gummifera) and Black Sheoak (Allocasuarina littoralis); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (C. subulata) and the Tartan Tongue Orchid (C. erecta).	Unlikely to occur. No suitable habitat present within the site.
Pterostylis ventricosa	Endangered BC Act	Predominantly in more open areas of tall coastal eucalypt forest often dominated by one or more of the following tree species:- Turpentine, Spotted Gum, Grey Ironbark, Blackbutt, White Stringybark, Scribbly Gum and Sydney Peppermint.	Unlikely to occur. Site is highly disturbed. Most of the proposed activity would be within the waterway or mown park with non-native grasses.
AMPHIBIANS			

Green and Golden Bell Frog *Litoria aurea*	Vulnerable *EPBC Act* Endangered *NSW* BC *Act*	Marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat for the species includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), with a grassy area nearby and diurnal sheltering sites available.	Unlikely to occur. No suitable habitat present within the site.
REPTILES			
Green Turtle *Chelonia mydas*	Vulnerable BC Act and EPBC Act	Ocean-dwelling species spending most of its life at sea.	Unlikely to occur. No suitable habitat present within the site.
BIRDS			
White-throated Needletail *Hirundapus caudacutus*	Vulnerable and Migratory *EPBC Act*	Almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Because they are aerial, it has been stated that conventional habitat descriptions are inapplicable, but there are, nevertheless, certain preferences exhibited by the species. Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea.	Possibly occurring over or in proximity to the site, but unlikely to utilise or rely on available habitat within the site.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	*NSW* BC *Act* Vulnerable Migratory	Found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterized by the	Possibly occurring over or in proximity to the site, but unlikely to rely on available habitat within the site. No breeding habitat.

	EPBC Act	presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. The species is mostly recorded in coastal lowlands, but can occupy habitats up to 1400 m above sea level on the Northern Tablelands of NSW and up to 800 m above sea level in Tasmania and South Australia. Birds have been recorded at or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs, saltmarsh and sewage ponds. They also occur at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves.	
Square-Tailed Kite *Lophoictinia isura*	*Vulnerable NSW* BC *Act*	Summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses large hunting ranges of more than 100km2. Breeding is from July to February, with nest sites generally located along or within 200m of riparian areas, near watercourses, in a fork or on large horizontal limbs.	Possibly occurring over or in proximity to the site, but unlikely to rely on available habitat within the site.
Eastern Osprey *Pandion cristatus*	Vulnerable NSW *BC Act*	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Possibly occurring over or in proximity to the site, but unlikely to rely on habitat within the site. No stick nests in proposed works site.
Sooty Oystercatcher *Haematopus fuliginosus*	Vulnerable NSW *BC Act*	Shore bird. Found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations. 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	Has potential to occur at the site. Assessment of impact provided in Section 3.5.2 of this REF.

		nest is a shallow scrape on the ground, or small mounds of pebbles, shells or seaweed when nesting among rocks.	
Pied Oystercatcher *Haematopus longirostris*	Endangered *NSW BC Act*	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. 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.	Has potential to occur at the site. Assessment of impact provided in Section 3.5.2 of this REF.
Gang-gang Cockatoo *Callocephalon fimbriatum*	Vulnerable NSW BC Act	Tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting	Possibly occurring over or in proximity to the site, but unlikely to rely on habitat within the site. No hollow-bearing trees would be affected.
South-eastern Glossy Black-cockatoo *Calyptorhynchus lathami lathami*	Vulnerable NSW BC Act	The species inhabits open forest and woodlands of the coast where stands of she-oak occur. In the locality the species feed almost exclusively on the seeds of the black she-oak *Allocasuarina littoralis* shredding the cones with their bill.	Unlikely to occur within the site. No suitable habitat present. No breeding or foraging habitat present.
Little Lorikeet *Glossopsitta discolor*	Vulnerable NSW BC Act	The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat. Forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other nectar and fruit bearing trees. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity.	Unlikely to occur within the site. No suitable habitat present. No breeding or foraging habitat present.
Powerful Owl *Ninox strenua*	Vulnerable NSW BC Act	Coastal Woodland, Dry Sclerophyll Forest, wet sclerophyll forest and rainforest- Can occur in fragmented landscapes Roosts in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina*	Unlikely to occur within the site. No suitable habitat present.

		littoralis, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda,* Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species. requires old growth elements-hollow bearing tree resources for nesting and prey resource. Nests in large tree hollows in large eucalypts that are at least 150yrs old. Often in riparian areas. Large home range	
Masked Owl *Tyto novaehollandiae*	Vulnerable NSW BC Act	Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl. The typical diet consists of tree-dwelling and ground mammals. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting.	Unlikely to occur within the site. No suitable habitat present. No breeding or foraging habitat present.
Sooty owl *Tyto tenebricosa*	Vulnerable NSW BC Act	Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forest.	Unlikely to occur within the site. No suitable habitat present.
Eastern Bristlebird *Dasyornis brachypterus*	Endangered NSW BC Act and EPBC Act	Habitat is characterised by dense, low vegetation including heath and open woodland with a heathy understorey.	Unlikely to occur within the site. No suitable habitat present.
Varied Sittella *Daphoenositta chrysoptera*	Vulnerable NSW BC Act	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland	Unlikely to occur within the site. No suitable habitat present.
Scarlet Robin *Petroica boodang*	Vulnerable NSW BC Act	The Scarlet Robin is primarily a resident in dry forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	Unlikely to occur within the site. No suitable habitat present.
MAMMALS			
Spotted-tailed Quoll *Dasyurus maculatus*	Vulnerable NSW BC Act and Endangered EPBC Act	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Quolls use hollow-bearing trees, fallen logs, other animal burrows, small caves and rock outcrops as den sites.	Unlikely to occur within the site. No suitable habitat present.

Koala *Phascolarctos cinereus*	Endangered NSW BC Act and EPBC Act	The koala inhabits eucalypt woodland and forests.	Unlikely to occur within the site. No suitable habitat present. Insufficient area of habitat disjunct from other areas of potential habitat.
Yellow-bellied Glider *Petaurus australis*	Vulnerable NSW BC Act and EPBC Act.	Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Feeds primarily on plant and insect exudates, including nectar, sap, honeydew and mana with pollen and insects providing protein	Unlikely to occur within the site. No suitable habitat present. No hollows suitable for the species is present in the activity area and no signs of feeding is apparent.
Southern Greater Glider *Petauroides Volans*	Endangered NSW BC Act and EPBC Act	The greater glider is an arboreal nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane eucalypt forests of fertile soils with relatively old trees and abundant hollows.	Unlikely to occur within the site. No suitable habitat present.
Long-nosed Potoroo *Potorous tridactylus*	Vulnerable NSW BC Act and EPBC Act	The species inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Unlikely to occur within the site. No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	Vulnerable NSW BC Act and EPBC Act	Occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 kilometres of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. The species feeds on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia,* and fruits of rainforest trees and vines	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site to a significant extent. No roosting habitat or food resources affected.
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	Vulnerable NSW BC Act	The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site to a significant extent. No roosting habitat or food resources affected.

Eastern Coastal Free-tailed Bat *Micronomus norfolkensis*	Vulnerable NSW BC Act	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will also roost under bark on in man-made structures.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site to a significant extent. No roosting habitat or food resources affected.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	Vulnerable NSW BC Act	Prefers moist habitats, with trees taller than 20m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site to a significant extent. No roosting habitat or food resources affected.
Southern Myotis *Myotis macropus*	Vulnerable NSW BC Act	Generally roost in groups of 10 to 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site. No roosting habitat or food resources affected.
Greater Broad-nosed Bat *Scoteanax rueppellii*	Vulnerable NSW BC Act	The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range. The species utilises a variety of habitats from woodland to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forests. Although this species usually roosts in tree hollows, it has been found in buildings.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site. No roosting habitat or food resources affected.
Large Bent-winged Bat *Miniopterus orianae oceanensis*	Vulnerable NSW BC Act	Caves are the primary roosting habitat, but also use derelict mines, stormwater tunnels, buildings and other man-made structures. The species form discrete populations centred on a maternity cave that is used annually. At other times of the year, populations disperse within about 300 km range of maternity caves.	Possibly occurring over or in proximity to the site, but unlikely to utilise available habitat within the site. No roosting habitat or food resources affected.