Cattle Bay Marina

Construction Environmental Management Plan

Eden Cattle Bay Marina Pty Ltd

February 2020
Final
PA1042

Royal HaskoningDHV
Enhancing Society Together

HASKONING AUSTRALIA
MARITIME & WATERWAYS
RIVERS, DELTAS & COASTS

Level 14
56 Berry Street
NORTH SYDNEY NSW 2060
T: +61 (0) 2 8854 5000
F: +61 (0) 2 9929 0960
www.royalhaskoningdhv.com
ABN 66 153 656 252

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CONTENTS

1 INTRODUCTION

1.1 General

Royal Haskoning DHV (RHDHV) has been engaged by Eden Cattle Bay Marina Pty Ltd to prepare a Construction Environmental Management Plan (CEMP) for the proposed construction works associated with the Cattle Bay Marina development. The CEMP would be further refined based on the conditions of consent and prior to issue of a construction approval.

The CEMP describes the potential environmental issues associated with relocation of existing swing moorings, installation of the floating marina and wave attenuator structure, and refurbishment of the existing jetty and the associated mitigation measures.

This CEMP is to be read in conjunction with the following documents that contain management measures that form part of the CEMP:

Ocean Environmental Consulting (December 2018), *Cattle Bay Marina Water Quality Management Plan* prepared on behalf of Eden Cattle Bay Marina Pty Ltd.

Ocean Environmental Consulting (February 2019), *Cattle Bay Marina Marine Ecology Report* prepared on behalf of Eden Cattle Bay Marina Pty Ltd.

Ocean Environmental Consulting (20 September 2019), Responses to agency submission regarding Development Application 2019.208, Cattle Bay Marina Lot 2 DP1138056 and Lot 4 DP 1138056, Cattle Bay Road Eden

West and Associates (2015), *Cattle Bay Marina Development Application Acoustic Report*, prepared for Eden Cattle Bay Marine Pty Ltd, April 2015.

1.2 Site Location

The site of the proposed Cattle Bay Marina is located approximately 1 kilometre west of the Eden town centre on the NSW south coast, in the Bega Valley Shire local government area. The site adjoins Cattle Bay Road to the east and encompasses part of Cattle Bay to the south.

The site proposed to be occupied by the marina comprises the part of Cattle Bay within Twofold Bay surrounding and encompassing the existing jetty and the landside area where the jetty joins the land as shown in Figure 1.

The land component comprises Lot 2 and part of Lot 4 in DP 1138056. Lot 2 is owned by Eden Resort Hotel Pty Ltd (ERH) and has an area of 1.67 hectares. It contains the majority of the remains of the former Heinz cannery. Lot 4 comprises a strip of foreshore land commencing northwards from the seawall to where it adjoins Lot 2. It is owned by Bega Valley Shire Council.

The overwater area proposed to be occupied by the marina (pontoons, berths and access ways) is approximately 7.5 hectares and is located on Crown Land.

Figure 1: Site location plan (Source: Google Maps)

1.3 Proposed Development

A plan of the proposed marina development is shown on Figure 2. The development proposal comprises the following main elements:

- A total of approximately 154 berths in three floating pontoon arms restrained by piles;
- Relocation of 25 swing moorings to locations to be confirmed with NSW Roads and Maritime Services (RMS) and the Eden Port Authority;
- A fixed wave attenuator with an alignment consistent with the modelled design in the report prepared by Cardno 'Cattle Bay Marina, Eden – Wave Modelling' dated 28 July 2014 and subsequent correspondence by Royal Haskoning DHV entitled "Cattle Bay Marina – Response to Submissions on EIS Supplementary Statement on Wave Attenuator and Potential Impacts" dated 8 April 15;
- Refurbishment of the existing jetty;
- A mix of berth sizes from 12m to 28m to cater for a range of watercraft from small local recreational craft to larger international super yachts;
- Provision of power, lighting, water, fire fighting equipment, mobile 'muck truck' (for sewage pump out) and security access controls to the pontoons and berths;

- Connection to existing potable water, sewer and power supplies to serve the temporary building and fire fighting;
- Refurbishment and temporary use of the existing stormwater drainage system (until redevelopment as part of mixed use development) incorporating provision of new Gross Pollutant Trap where existing drainage pipe exits Lot 2 (before passing through Lot 4);
- Temporary car park comprising 97 spaces plus 3 loading/unloading spaces. The car parking spaces will be located on, and use, the existing concrete apron and stormwater drainage that remain following the demolition of the cannery buildings. This will involve minor rectification of the apron to make it suitable for use as a car park until the land side of the development is undertaken in accordance with the Concept Plan approval (when the car parking and servicing for the marina will be incorporated into the development of the site);
- The car park will utilise the existing site access gate off Cattle Bay Road; and,
- Temporary (portable) building to house marina administration and toilets. Access will meet disability standards.
- the renovation and landscaping of the carpark area and site generally as required by the development consent.

No dredging or reclamation activities are proposed as part of the marina development.

No fuelling or repair and maintenance facilities are proposed as these are provided elsewhere in Twofold Bay.

Furthermore, no demolition of any existing structures within the site is proposed. The proposed works to the vegetation are limited to weed removal on the concrete slabs. The existing vegetation to the west and north within the site is not impacted by the proposed development.

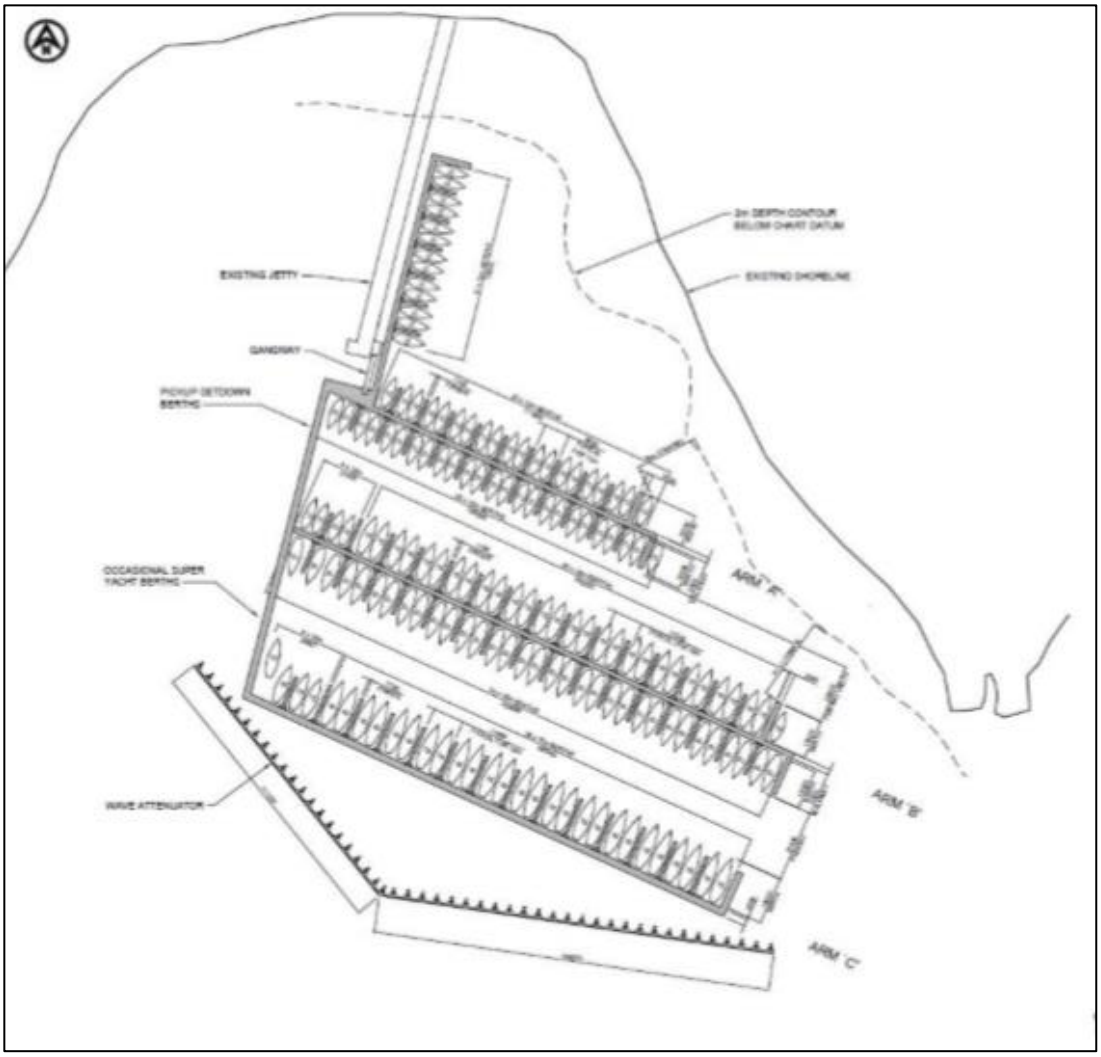

Figure 2: Proposed development

1.4 Construction Works

The construction works would comprise the following main activities:

- **Site Set Up and Establishment of Environmental Controls**.
- **Refurbishment of Existing Jetty** – The extent of work required to refurbish the jetty is subject to a detailed condition assessment and may involve rehabilitation of existing timber piles, headstocks, girders and decking in a controlled manner. The type of plant involved in the works would include barge mounted cranes, transport barges, work boats and hand held power tools.
- **Relocation of Swing Moorings** – The removal and relocation of swing moorings would be undertaken by a commercial mooring contractor licensed by RMS.
- **Lowering of Rock Pinnacle** – Lowering of the rock pinnacle to -4 m CD would be undertaken in the first instance with a barge-mounted excavator fitted with a hydraulic hammer. Should the rock prove too hard for this method, it is proposed to

use a non-explosive rock splitting expansive agent to pre-split the pinnacle prior to removal by excavator. Disposal of the broken rock would either be to land or onto the surrounding seabed (below -4 m CD) for habitat creation, subject to consultation with relevant authorities.

- **Pile Installation** – Piles for the marina would be delivered to site by barge (from the port area within Snug Cove) and installed from the water using a piling barge. Piling will be carried out in compliance with the South Australian Government Department of Planning Transport and Infrastructure Underwater Piling Noise Guidelines 2012.
- **Installation of Pontoon Units** – Pontoon units would be manufactured off site and launched into the water by crane from the port area within Snug Cove and towed across to Cattle Bay into their correct locations, guided by GPS, for interconnection.
- **Installation of Services and Access Ramp** – Access ramps would be delivered to the site as one unit by barge and installed by barge-mounted crane. Installation of services pedestals, fire fighting equipment and power and water, including service cables and pipework, would be undertaken on site by licensed contractor.
- **Construction of Wave Attenuator** – The construction of the wave attenuator would require a series of vertical and raked piles to be driven by a piling barge. The precast concrete panels that comprise the vertical wave baffle would be manufactured off site and delivered to the site by barge (from the port area within Snug Cove) for lifting into place by a barge-mounted crane. Alternatively, the concrete panels may be cast on site.
- **Temporary Building Installation** – The temporary (portable) building would be delivered to the site by road and connected to existing potable water, sewerage and power services.
- **Weed Removal** – Weeds would be removed from in between the existing concrete slabs covering the land portion of the site.

A preliminary construction program has been prepared that envisages an overall construction period of approximately 16 weeks, including 8 weeks of piling activity.

2 OBJECTIVES

The purpose of the CEMP is to provide guidance on environmental control measures for the construction of the proposed marina development. It provides a manual for use by management, the construction team and an advisory document for agencies and stakeholders.

The aims and objectives of the CEMP are to:

- describe the nature and scope of anticipated environmental impacts, address relevant legislation and approval conditions, and outline actions to be taken to ensure compliance and to mitigate the environmental impacts identified before and through the execution of the construction contract;
- establish the environmental management process involving cooperation between all parties involved in the construction process to ensure understanding of the key environmental issues for this project so that objectives and targets are met. Standard and site specific procedures and equipment for mitigation of environmental damage will be implemented;
- satisfactorily manage water quality any sediment disturbance during the construction phase of the marina;
- realise optimum performance in the areas of demolition, piling (noise, disturbance of seabed, water quality etc.) and waste minimisation and to complete the project with no environmental incidents. To achieve these objectives all site workers will be instructed in their responsibilities of care and reporting, and familiarised with environmental safeguards;
- identify statutory and non-statutory responsibilities; and,
- document the environmental management process.

The CEMP ensures the aims and objectives are met through the following:

- documenting of all measures to be taken to manage identified impacts;
- providing a clear indication of the respective environmental responsibilities;
- setting standards and/or performance measures for the relevant environmental issues associated with the construction work;
- describing what actions and measures will be implemented to mitigate the potential impacts of these construction works, and ensure that these works will comply with the relevant standards and/or performance measures; and,
- describing what procedures will be implemented to register, report, and respond to any complaints or non-compliances during the construction works.

3 STATUTORY AND LICENCE REQUIREMENTS

The marina development is local development and subject to assessment and determination under Part 4 of the EP&A Act. The proposed development is also 'Designated Development' under Schedule 3 of the EP&A Regulation and 'Integrated Development' as, in addition to development consent, it requires permits or approvals under the *Protection of the Environment Operations Act 1997, Fisheries Management Act 1994 and Water Management Act 2000.* The operation of the development as a marina is also a 'scheduled activity' within the meaning of Schedule 1 of the Protection of the Environment Operations Act.

Prior to commencement of works, all relevant conditions of the development consent for the marina issued by Bega Valley Council need to be satisfied.

Prior to commencement of construction works, a Part 7 permit for 'dredging and reclamation' (in relation to piling activities) and to 'harm marine vegetation' under the *Fisheries Management Act 1994* is required from Fisheries NSW.

Prior to commencement of construction works, a licence under the *Protection of the Environment Operations Act 1997* is required from the NSW Environment Protection Authority.

Prior to commencement of waterside construction works, Harbour Master approval for the proposal is required to be obtained under clause 67 of the *Management of Waters and Waterside Lands Regulations – N.S.W.* in relation to the proposed disturbance of the bed of a 'special port'.

The Proponent (Eden Cattle Bay Marina Pty Ltd) shall be responsible for ensuring that all necessary approvals and licences are obtained prior to commencement of any works. Contractors and sub-contractors must comply with the terms and conditions of all approvals and licences obtained. This includes, but is not be limited to, the conditions of Development Approval.

During construction of the works all personnel shall also comply with the applicable environmental regulatory requirements.

4 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 General

The following sections outline the environmental aspects and potential impacts associated with the construction activities for development of Cattle Bay Marina and the adopted mitigation measures, including specific undertakings arising from the environmental impact assessment and specialist studies.

4.2 Soil and Water Management

Due to the water-based nature of the construction works it is not envisaged that the construction period would involve any significant disturbance of the land portion of the site. The existing concrete slabs would be utilised as a hardstand area for establishment of site offices and amenities, storage of construction equipment and materials, car parking, delivery of supplies and land-based access to the site by construction personnel. However, it is noted that the eastern part of the site may be subjected to flooding due to insufficient culvert capacity beneath Cattle Bay Road leading to overtopping of the road.

To mitigate potential impacts on water management from temporary occupation of the land portion of the site by the Contractor, the following measures shall be adopted:

- a Flooding Emergency Response Plan should be prepared to establish protocols for monitoring of flood levels, evacuation of construction personnel from the site compound (e.g. to the existing jetty or elevated land) and securing of construction equipment and materials;
- all demolition and waste products generated during construction period should be contained and removed from the site and disposed of appropriately to prevent them from being washed on to the beach or into the waterway;
- diversion of stormwater from hard surfaces through a coarse filter (gross pollutant trap) should occur to prevent any construction rubbish or debris from being washed on to the beach or into the waterway;
- bunding of chemical storage areas on site to prevent any leakages from being carried away by site runoff; and,
- all land-based equipment used during construction should be well maintained and serviced to reduce the likelihood of oil / fuel leaks and spills.
- Environmental safeguards and mitigation methods including appropriate soil and water management controls are to be implemented for the marina construction works consistent with “Managing Urban Stormwater: Soils and Construction” (4th Edition Landcom, 2004, aka the Blue Book).
- Any stockpiles should be located 20 metres away from adjacent water land. Stockpiles should be appropriately controlled by sediment fencing or other materials as prescribed in “Managing Urban Stormwater: Soils and Construction” (4th Edition Landcom, 2004).

4.3 Sediment Quality

Sediment sampling and analysis for a range of organic and inorganic substances was undertaken as part of EIS investigations. This concluded that the concentrations of substances were below the ANZECC sediment quality guidelines (Interim Sediment Quality Guideline – Low [ISQG Low]). As such, any minor disturbance of sediments that may occur during construction activities, such as pile driving, would not release contaminants into the water column that would adversely impact on the environment.

Sediments in the area of the proposed marina generally comprise fine to medium grained sand with less than 10% to 15% by weight mud (silts and clays). This fines fraction could exhibit acid sulfate soil potential, however the proposed construction works do not require the physical removal of any sediment or exposure of sediments above water to allow oxidisation to occur.

As such, the management of sediment quality is limited to issues associated with the potential for generation of turbidity from minor disturbance of bed sediments (refer Section 4.4).

4.4 Water Quality

The potential impacts of the construction works on water quality include turbidity caused by disturbance of the seabed and release of contaminants into the water as a result of fuel and oil spills, and leakages and release of sewage and bilge water, from floating plant. These potential adverse effects on water quality may impact on the surrounding aquatic ecology (refer Section 4.5) and the existing aquaculture industry.

The water quality mitigation measures and recommendations made in the Water Quality Management Plan prepared by Ocean Environmental Consulting December 2018 are to be implemented in the construction of the marina development which include the following.

To mitigate potential impacts on water quality from disturbance of bed sediments, the following measures shall be adopted:

- Contractors shall minimise propeller wash in shallow water (i.e. during refurbishment of the jetty) by avoiding weather and tide conditions that could heighten the risk of bed disturbance, this could be achieved by planning shallow water work for calmer early morning periods, high or rising tide conditions and avoiding shallow water work during periods of swell exposure;
- towing or pushing of vessels shall not involve the use of excessive engine power in shallow water areas and in the vicinity of seagrass beds and patches;
- undertaking works that may cause seabed disturbance during periods of calm weather where possible so that the potential for any suspended sediments to settle on inshore seagrass beds is minimised;
- turbidity control barriers (i.e. silt curtains) shall be used to enclose the areas of construction activities that have the potential to disturb the seabed (i.e. piling, jetty refurbishment);

- the use of sinking lines to secure or anchor floating plant shall be limited where possible;
- a Water Quality Management Plan (Ocean Environmental, 2019) shall be implemented by the Proponent, which includes a Water Quality Monitoring Program comprising the following elements:
    - baseline monitoring of physico-chemical parameters (i.e. temperature, salinity, pH, electrical conductivity, dissolved oxygen) and turbidity at two 'impact' sites within Cattle Bay and two 'control' sites on either side of Cocora Point;
    - collection of water samples and laboratory analysis of Total Suspended Solids (TSS) and turbidity to derive a relationship between TSS and turbidity for the site;
    - daily monitoring of turbidity during construction at 'impact' and 'control' sites;
    - the water quality trigger limit during construction shall be the exceedance of the background TSS (defined by measurement at 'control' sites) by more than 50 mg/L;
    - NTU and corresponding TSS values shall be reported in a logbook that would be made available on request;
    - 'stop work' procedures shall be put in place when turbidity values exceed the above trigger limit and be maintained until the turbidity levels return to less than 50 mg/L above background levels;
    - post-construction monitoring and comparison with baseline monitoring results and relevant ANZECC water quality guidelines to assess any impacts;
    - visual monitoring of the worksite during construction is to conducted to ensure that no visible turbid plumes are entering the environment.

To mitigate potential impacts on water quality from release of contaminants from operation of floating plant, the following measures shall be adopted:

- all floating plant and equipment used during construction should be well maintained and serviced to reduce the likelihood of oil / fuel leaks and spills;
- spill response kits suitable for the containment of fuel and oil spills shall be kept on construction vessels;
- any metal hardware which would leave marks on pontoon decks are to be kept in containers, any unnecessary cleaning of pontoon decks shall be avoided;
- work barges shall be kept clean and clear of unnecessary waste materials, operational oil and fuel cans shall be stored appropriately and securely fastened, and all pile barges equipped with oil absorbent pads and bunding as appropriate;
- work vessels shall be refuelled off site and bilge water or sewage shall not be discharged into the water at the construction site;
- anchors, cables, barge spuds etc, are not to be located within areas of seagrass or rocky reef.

- hydraulic lines on plant operating on or adjacent to the water are to be sleeved to contain leaks or bursts.

Mitigation measures associated with potential impacts to the aquaculture industry are outlined in the following:

- the Proponent shall notify the aquaculture permit holder(s) at least one week prior to commencement of any construction work (e.g. piling) that may result in the disturbance of any sediment.
- if any construction works cause water quality impacts that result in aquaculture lease area being closed to harvest by the NSW Food Authority, the Contractor must cease such works immediately and not recommence until the risk of adverse water quality impacts has been eliminated.
- if shellfish harvesting closure occurs as a result of water quality deterioration caused by construction works, the Proponent in cooperation with aquaculture permit holder(s) is to undertake testing, at the Proponent's cost, of the farmed shellfish to determine when shellfish is suitable for human consumption and the closure to harvest can be lifted; and,
- Fisheries NSW (1800 043 536) shall be immediately notified of any fish kills in the vicinity of the construction works. In such cases, all works other than emergency response procedures are to cease until the issue is rectified and written approval to proceed is provided by Fisheries NSW.

4.5 Aquatic Ecology

The potential impacts of the construction works on aquatic ecology include:

- disturbance of bed sediments during jetty refurbishment, piling, propulsion (propeller wash) of floating plant and anchoring of vessels has the potential to cause turbidity;
- impact or high frequency pulse noise from use of piling, hammering, cutting and drilling tools may cause disruptive behavioural responses (e.g. animals moving away from the construction area) for marine mammals;
- shading or damage of seagrass by mooring of floating plant;
- anchors and cables used to secure floating plant may damage seagrass;
- the use of anchor cables that stretch and slacken in the water column presents a risk of cable strike or entanglement for marine mammals; and,
- introduced marine species (IMS) that may be supported on existing swing moorings could be transported to other locations within Twofold Bay during removal and relocation activities.

The potential impacts on aquatic ecology from disturbance of bed sediments shall be mitigated by implementing the water quality management measures outlined in Section 4.4.

To mitigate potential impacts on aquatic ecology from generation of construction noise, the measures in the Cattle Bay Marina Marine Ecology Report prepared by Ocean Environmental Consulting (February 2019) including the following shall be adopted.

- avoid undertaking marine-based construction activities during October and November, which are the highest risk months for the presence of mother/calf whale pods in the region
- minimise construction activity in the remaining period of the core whale visitation season from mid-September to end September; and,
- undertaking works in the shoulder periods of the whale visitation season (i.e. August to September, and December) within the framework of a Marine Mammal Protection Plan, which incorporates:
    - establishment of safety zones around the construction area for 'observation' and 'shut-down' of construction activities subject to the proximity of marine mammals to the work area;
    - engagement of a suitability qualified marine mammal observer by the Contractor;
    - training of crew members in standard operational procedures for management of marine mammal monitoring and sightings; and,
    - preparation of piling activity reports, including records of marine mammal sightings and actions taken.

To mitigate potential impacts on aquatic ecology from mooring and the use of anchors and cables to secure floating plant, the following measures shall be adopted:

- floating plant shall not be moored directly over seagrass beds if there is a risk of there being less than 600 mm underkeel clearance at any time allowing for tide and wave action;
- floating plant shall not be moored over seagrass beds for longer than one complete 24 hour diurnal tidal cycle, in order to minimise shading impacts;
- avoid undertaking construction activities during the peak marine mammal visitation period and undertaking works in the shoulder periods within the framework of a Marine Mammal Protection Plan (as outlined above);
- placing floating plant on swing moorings overnight rather than a fixed mooring configuration to minimise cable oscillation;
- providing the Contractor with a geo-referenced map of seabed habitat limits with instructions that they cannot place anchors or other mooring apparatus into these habitats or allow cables to trail on the seabed ('cable scalping') and they are to target areas of bare sandy habitat for mooring and anchoring; and,
- the impacts of cable scalping shall be mitigated by the use of floating lines or buoying of sinking lines off the seabed.

4.5.1 Invasive Marine Species

The mitigation and / or management measures for invasive marine species which should be adopted during the construction phase of Cattle Bay Marina are provided below:

- An Introduced Marine Species Management Plan is to be prepared prior to construction of the marina.
- fouling organisms from swing moorings to be relocated shall be removed, collected and disposed of to an appropriate landfill facility, or an alternative measure would be to undertake IMS surveys of the moorings prior to relocation with any priority IMS removed, collected and disposed of appropriately by the IMS survey team; and,
- preparation of a Marine Debris Clearance Plan for removal, collection and disposal of accumulated hard substratum rubbish under the existing jetty to a suitable landfill facility to prevent re-introduction of attached IMS to Twofold Bay.
- All construction Contractors shall undertake a Vessel Risk Assessment (VRA) of their vessels, floating plant and other marine construction equipment prior to mobilisation to the site. The VRA may be undertaken by the vessel owner/operator. The VRA will determine if a vessel inspection is required. Any construction vessels mobilised from outside of Australia shall be considered high risk and inspected. They shall be dry docked and cleaned prior to entering the site.
- The Contractor(s) shall undertake an Invasive Marine Species (IMS) Inspection of all vessels assessed in the VRA as uncertain or high risk for introduction of invasive marine species. The IMS shall be undertaken by an appropriately qualified marine scientist with experience in biosecurity of marine vessels, floating plant and marine based construction equipment.
- The Contractor(s) shall arrange vessels IMS inspections for all vessels considered high / uncertain risk prior to the commencement of construction.
- Vessel antifouling on construction vessels shall be maintained to avoid the attachment and potential translocation of invasive species in and out of Twofold Bay.
- Domestic vessels shall manage ballast water in accordance with the Australian Ballast Water Management Requirements (Department of Agriculture and Water Resources 2016).
- Any ballast water exchange from international vessels shall be undertaken in accordance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM) (IMO 2016).
- For all commercial vessels and/or barges, piling or other equipment coming from overseas the Australian Government Department of Agriculture and Water Resources processes for pre-arrival, arrival and inspection and post-arrival must be followed.
- Monitoring and inspection / surveillance of construction vessels and barges should be undertaken in accordance with the Biosecurity Act 2015.
- During the removal or movement of swing moorings all fouling organisms should be collected and disposed of to appropriate landfill areas and not allowed to be disposed to the waters of the bay. Alternatively, introduced marine species surveys

of the moorings to be removed/relocated could be undertaken prior to the activity with any priority species collected and disposed of.

4.5.2 Marina habitats and vegetation

The mitigation and management measures for marine habitats and vegetation which should be adopted during the construction phase of the Cattle Bay Marina are provided below:

- The posidonia australis weed bed to the east of the marina site is to be an exclusion zone during construction.
- To minimise damage to sensitive marine habitats (seagrass and subtidal rocky reef) in the immediate construction area construction vessels should avoid anchoring over these areas. Contractors should be provided with a map of the habitat locations and limits and instructed that they cannot place anchors or other mooring apparatus into these habitats nor allow cables to trail on the seabed and 'scalp' these habitats. Anchoring should be undertaken over bare sandy habitats.
- The potential impact of cable scalping can be mitigated by the use of floating lines rather than sinking cables. If sinking cables are to be used, they would need to be buoyed off the seabed.
- Contractors should limit any unnecessary and/or temporary construction (i.e. through selection of the most appropriate construction methods) and limit any anchoring which is required by vessels to minimise unnecessary damage to habitats.
- All construction works should be undertaken by qualified and experienced Contractors to reduce the risk of errors and accidental environmental damage.
- Construction personnel should be made aware of the location of sensitive habitat within Cattle Bay and of the potential impacts that construction works may have on these areas to assist in the protection of marine habitats (especially seagrass, macroalgae and rocky reef areas).
- Reduce the potential impacts of water and sediment quality impacts on marine habitats during construction all mitigation measures outlined in 10.5 should be adopted. Monitoring of water quality (particularly turbidity) during construction should then be undertaken.
- Turbidity mitigation measures which should be implemented during construction include:
    - Silt curtains to divide construction areas from any main seagrass beds.
    - During construction monitoring to ensure that the level of total suspended solids (TSS) within 1 m outside of the silt curtains do not exceed the background TSS by more than 50 mg/l. A turbidity meter will be used to measure nephelometric turbidity units (NTU). Readings of less than 25 NTU would be considered to be less than 50 mg/l TSS. In the event that turbidity levels exceed the background levels by 25 NTU a sample of the water would be taken to be analysed for TSS, and the NTU and TSS levels would be recorded in a logbook.
    - "Stop work" protocols for occasions where turbidity values exceed those outlined, to be in place until turbidity levels fall below background + 50 mg/l TSS.

- Undertake works during periods of calm weather wherever possible so the potential for spread of suspended sediments impacting inshore seagrass beds is lessened (note that seagrasses were absent at water depths of ~7 m and greater).

- Note that much of the proposed piling work will be in areas where only sparse patchy Heterozostera is present, and much of the piling will also be undertaken in unvegetated soft sediment. The sediment is mainly sandy and is expected to fall rapidly to the seafloor.

- There is no way to mitigate the direct impacts of piling on the patchy Zostera seagrass, soft sediment seafloor habitat or benthic epifauna or infauna living within these areas in immediate piling areas. However, to reduce the potential for spread of suspended sediments and the potential for sedimentation / smothering of nearby sensitive habitats and associated flora and fauna, silt curtains should be used wherever possible to separate construction areas from mapped seagrass beds or rocky reefs and sleeves could considered for use during piling works.

- Potential impacts on bottom sediments from propeller wash can be satisfactorily mitigated by instructing contractors to minimise wash by avoiding weather and tide conditions that could heighten the risk (e.g., planning shallow water work for early morning, high or rising tide conditions and avoiding shallow water work during periods of swell that could increase the risk of 'bottoming out').

4.5.3 Marine Fauna

The mitigation and management measures to avoid or minimise potential impacts on marine fauna which should be adopted during the construction phase of the Cattle Bay Marina are provided below. In addition, a Marine Mammal Protection Plan (MMPP) should be developed and implemented during and after construction.

- A Marine Mammal Protection Plan (MMPP) is to be prepared prior to construction of the marina in consultation with the Department of Planning Industry and Environment – Biodiversity and Conservation Division. The MMPP is to be attached to this CEMP and the Operational Environmental Management Plan (OEMP) for the marina.
- Habitat Disturbance - To minimise construction related damage to marine habitats in the study area which may be utilised by marine fauna, all measures listed in Section 10.1 of the Marine Ecology Report prepared by Ocean Environmental Consulting (February 2019) to protect marine habitats should be adopted.
- Water and Sediment Quality - To reduce the indirect impacts of water and sediment quality on marina fauna during marina construction, all measures listed in Section 10.5 of the Marine Ecology Report prepared by Ocean Environmental Consulting (February 2019) should be adopted.
- Marine Debris - The risk of ingestion of, or entanglement in, rubbish / debris by marine mammals can be mitigated by implementing a marina CEMP that includes provision for waste management. In addition, post construction seabed clearance surveys should be undertaken to ensure that no construction waste has been left at

the site. Specifics regarding waste management are covered in the EIS for the proposal. In addition, all ships at sea must adhere with the amendments to the International Maritime Organisation's (IMO's) International Convention for the Prevention of Pollution from Ships (Marine Pollution: MARPOL) Annex V which came into force on 1 January 2013.

- Direct Impacts on Benthic Fauna - There is no way to mitigate the direct impacts of piling on benthic epifauna or infauna which may occur in the immediate piling footprint. However, the impacts on these benthic organisms are not expected to be significant given the widespread availability of similar habitats and assumingly similar species within greater Twofold Bay. However, potential impacts on nearby habitats and the fauna they support (e.g. through sedimentation effects) can be mitigated by separation of the immediate construction area from areas of seagrass or rocky reef.
- General Impacts on Marine Mammals - Potential construction impacts on marine mammals can be avoided by minimising construction activity in the core whale visitation season (i.e. mid-September to end November) and undertaking all work within the framework of a Marine Mammal Protection Plan (MMPP) that sets out the requirements for monitoring marine mammal proximity and protocols for ceasing and resuming works related to the proximity. Such plans are routinely used to manage potential conflicts with marine mammals. Peak usage periods for whales, dolphins and seals (refer to Section 5.1.1 of the Marine Ecology Report prepared by Ocean Environmental Consulting (February 2019) should be referred and avoided in planning any construction works.
- Cable Strike - The risk of overnight cable strike can be minimised by placing floating plant on a swing mooring rather than leaving plant in a fixed mooring configuration as the reliance on a single swing mooring line will minimise cable oscillation. The risk of cable strike can also be managed by avoiding works during the peak marine mammal visitation period and by undertaking works in the framework of a MMPP.
- Vessel Strike - The risk of vessel strike during construction may be reduced through the adoption speed limits for construction vessels within the port limits (e.g. no higher than 10 knots if travelling through the port and lower speeds e.g. < 4 knots once within Cattle Bay and the construction area). Contractors should remain a lookout for and maintain awareness of the presence of marine fauna in the local waterway so that they can adopt appropriate speeds and clearance when cetaceans are nearby. All vessels must maintain a 300 m exclusion zone from all marine mammals. All construction personnel should be educated regarding the presence of marine mammals in Twofold Bay and potential impacts on them from vessel activities. Active management such as daily information exchange on known marine mammal activity (e.g. via local residents, commercial fishers, mussel farmers, NPWS whale watch and Cat Balou Cruises).
- Lighting Impacts - To reduce the potential for construction lighting related impacts on marine fauna, construction works should not be undertaken at night. This will greatly reduce the requirement for any construction related artificial lighting (on vessels and on land).
- Piling Noise Impacts - The South Australian Government Department of Planning, Transport and Infrastructure have developed Underwater Piling Noise Guidelines (2012). These aim to:

1. Provide practical management and mitigation measures to minimise the risk of injury to marine mammals within the vicinity of piling activities; and

2. Provide a framework that minimises the risk of significant impacts to occur on marine mammals in biologically important habitats or during critical behaviours (e.g. breeding and calving).

- The Guidelines do not intend to prevent all behavioural changes in marine mammals that might occur in response to audible but non-traumatic noise events. To some extent, avoidance behaviour is expected to provide a form of mitigation as it prevents the marine mammal from approaching the piling activity closely enough for noise-induced hearing injury to occur from intense or prolonged noise exposure.
- Mitigation measures to reduce the impacts of piling noise which should be adopted for the Cattle Bay Marina project include:
    - Safety Zones (including Shut Down Zones)
    - Planning of Piling Activities
    - Standard Operational Procedures
    - Compliance and Sighting Reports
    - Marine Mammal Observers

Safety Zones

Safety zones include observation and shut-down zones that are sized based on the likely noise levels produced by the piling activity. Safety zones aim to minimise the likelihood of hearing injury to occur to marine mammals, and do not intend to prevent behavioural responses to audible but non-traumatic noise events. It is likely that marine mammals near a piling activity will show an avoidance reaction, which reduces the chance of approaching the source close enough to enter the zone of hearing injury. The impacts of temporary displacement are unlikely to be significant unless they occur during critical behaviours, such as breeding, feeding and resting, or in important areas such as migratory corridors. For this reason, timing construction activities out of the main migration seasons is preferable. In the observation zone, movement of marine mammals is monitored to determine whether they are approaching or entering the shut-down zone. When a marine mammal is sighted within or enters the shut-down zone, piling activities must be stopped as soon as reasonably practical. The shut-down zones allow for the cumulative effect of multiple impacts, i.e. in the order of 30 minutes of exposure to pile driving noise for cetaceans and 2 minutes for pinniped. This allows some time to move away from the noise source thereby reducing the likelihood of hearing injury to occur.

Planning of Piling Activities

The planning stage of piling activities should consider the following:

Timing and duration – Avoid conducting piling activities during times when marine mammals are likely to be breeding, calving, feeding, or resting in biologically important habitats located within the potential noise impact footprint.

Piling method – Use low noise piling methods, such as vibro-driving, instead of impact piling methods where possible. Vibro-driving methods produce lower noise levels and are not impulsive in character. This reduces the likelihood of hearing injury.

Contract documentation – Include the standard management and mitigation procedures, and any additional measures to be put in place, in the CEMP.

Trained crew – Ensure that a suitably qualified person is available during piling activities to conduct the standard operational procedures outlined below. Likely marine mammal concentration areas, peak migration paths and times, key feeding sites, and other aggregation areas should be identified during the planning stage and this information should be provided to trained crew members and the marine mammal observer to improve the identification and observation of marine mammals.

Standard Operational Procedures

Standard operation procedures that must be undertaken by contractors during piling activities include pre-start, soft start, normal operation, stand-by operation, and shutdown procedures.

Pre-start procedure – The presence of marine mammals should be visually monitored by a suitably trained crew member for at least 30 minutes before the commencement of the soft start procedure. Particular focus should be put on the shut-down zone, but the observation zone should be inspected as well, for the full extent where visibility allows.

Soft start procedure – If marine mammals have not been sighted within or are likely to enter the shut-down zone during the pre-start procedure, the soft start procedure may commence in which the piling impact energy is gradually increased over a 10minute time period. The soft start procedure should also be used after long breaks of more than 30 minutes in piling activity. Visual observations of marine mammals within the safety zones should be maintained by trained crew throughout soft starts. The soft start procedure may alert marine mammals to the presence of the piling rig and enable animals to move away to distances where injury is unlikely.

Normal operation procedure – If marine mammals have not been sighted within or are not likely to enter the shut-down or observation zone during the soft start procedure, piling may start at full impact energy. Trained crew should continuously undertake visual observations during piling activities and shut-down periods. After long breaks in piling activity or when visual observations ceased or were hampered by poor visibility, the pre-start procedure should be used. Night-time or low visibility operations may proceed provided that no more than 3 shut-downs occurred during the preceding 24-hour period.

Stand-by operations procedure – If a marine mammal is sighted within the observation zone during the soft start or normal operation procedures, the operator of the piling rig should be placed on stand-by to shut-down the piling rig. An additional trained crew member should continuously monitor the marine mammal in sight.

Shut-down procedure – If a marine mammal is sighted within or about to enter the shut-down zone, the piling activity should be stopped immediately. If a shut-down procedure occurred and marine mammals have been observed to move outside the shut-down zone, or 30 minutes have lapsed since the last marine mammal sighting, then piling activities should recommence using the soft start procedure. If marine mammals are detected in the shut-down zone during poor visibility, operations should stop until visibility improves.

Compliance and Sighting Report

The contractor conducting the piling activities should maintain a record of procedures employed during operations. Information on any marine mammals sighted during the piling activity, and their reaction to the piling activity, may be used in the planning and assessment of future projects.

A report on the piling activity should at a minimum contain the location, date, start and completion time of the piling activity, information on the piling rig (hammer weight and drop height, pile size, number of piles, number of impacts per pile, etc.), details on the trained crew members conducting the visual observations, times when observations were hampered by poor visibility or high winds, times when start-up delays or shut-down procedures occurred, and the time and distance of any marine mammal sightings.

Additional Mitigation Measures – Piling Methods

The following piling methods that may reduce impacts could also be considered:

Press-in piling – Press-in piling machines use static forces to install piles such that impacts are not required. Underwater noise levels are expected to be significantly less than those produced by conventional piling methods. Current technology allows for installation of piles with diameters of up to 1.5 m.

Suction piling – Suction piling uses tubular piles that are driven into the seabed, or dropped a few metres into a soft seabed, after which air and water are sucked out the top of the tubular pile thereby sinking the pile into the ground. Noise levels are expected to be low as the only source of noise is the pump.

Pile type selection – There is some evidence that steel H-piles produce significantly lower peak levels, potentially in the order of 10 to 20 dB, than circular concrete and steel piles. Use of alternative piles that produce less noise should be considered but may be somewhat limited as piles may not be suitable for all situations.

Bubble curtain – A bubble curtain is a sheet of air bubbles that are produced around the location where the piling activity occurs. The bubbles are created by forcing air through small holes drilled in metal or PVC rings using air compressors, with either one ring deployed on the sea bottom or several vertically stacked rings forming a bubble ‘tree’. The bubbles in the bubble curtain create an acoustic impedance mismatch between the water and air trapped in the bubble, which results in sound attenuation across the bubble curtain.

Cofferdam – A cofferdam is created by placing a solid casing around a pile and removing the water from the casing. This approach has the potential to result in significant noise reductions.

Conditions Regarding Piling

With consideration of the Underwater Piling Noise Guidelines (2012), the site specific marine mammal usage data presented and a number of recent Australian Government Department of Sustainability, Environment, Water, Populations and Communities (DSWEPC) referral

decisions in relation to piling noise impacts (refer to Ocean Environmental 2014 – Revised 2018), the following conditions on piling are to be implemented:

1. Timing of works - No construction works are to be undertaken in the highest risk months for mother / calf pods (October / November). Where possible, construction works should be undertaken between December and March to avoid the peak whale visitation season. In addition, no piling is to occur between 6pm and 7am.

2. Marine fauna observations are to be made by suitably qualified crew member/s with relevant qualifications in ecology, zoology or environmental science and experience in the identification and management of marine mammals or turtles.
Observations should be made from land and/or by boat as required to cover the required observation areas.

3. Pre-start procedure – The presence of marine mammals should be visually monitored within the pre-start observation zone by a suitably qualified crew member for at least 30 minutes before the commencement of piling (which is to employ the soft-start procedure).

4. The pre-start visual observation zones should apply as follows: a. 1,000 m for works undertaken between December to March b. 1,500 m for works undertaken between April to September

5. Soft-start procedure – At the start of the days piling, after any shut-down or for any piling which has been suspended for 15 minutes or more, a soft-start procedure must occur where the piling impact is gradually increased to allow marine fauna to remove themselves from the area. The first five impacts must be at no more than 50% of full hammer weight.

6. During piling activities, a 500 m observation zone must be maintained at all times.

7. Exclusion (shut-down) zones for marine fauna during piling should be applied as follows: a. Whales – 500 m b. Dolphins – 250 m c. Marine Turtles – 100 m d. Pinnipeds (Seals) – 20 m

Pinnipeds (Seals) – Due to the high number of seals observed daily on the nearby Eden Breakwater and the fact that these species are extremely curious and are likely to investigate the source of any noise relating to the construction activities the application of exclusion zones of any considerable distance for these species would be extremely problematic. We propose that if seals are observed within 20 m of any piling activities that piling is shut-down in accordance with the procedure below to prevent physical injury caused by the actual piling operation. Exclusion zones would not apply to seals which are seen basking on rocky shores or other structures as underwater piling noise impacts will not apply.

8. Shut-down procedure - If marine fauna are sighted within the exclusion zones listed above piling must cease within 2 minutes (or as soon as safely possible) and should not cease until the marine fauna have been observed to move out of the given area or have not been spotted for a period of 30 minutes.

9. Low impact piling methods (i.e. vibro-driving) are to be used where practically possible to reduce potential noise impacts).

Injured Marine Fauna

All injured marine mammals should be immediately reported to the ORRCA 24 hour hotline on 02 9415 3333 or NPWS on 1300 361 967. The ORRCA
telephone hotline is staffed by volunteers and keeps ORRCA members, Government Authorities and interested members of the public informed of marine mammal emergencies, incidents and sightings. ORRCA representatives will quickly mobilise to site and attempt to capture and treat the stricken animal. Construction activities may need to cease or be altered to enable the rescue of the animal.

4.5.4 Aquaculture

The mitigation and / or management measures for aquaculture which should be adopted during the construction phase of the Cattle Bay Marina are provided below:

- The Proponent shall notify the aquaculture permit holder(s) at least one week prior to commencement of any construction work (e.g. piling) that may result in the disturbance of any sediment.
- To reduce the potential impacts of resuspended sediments on the mussel aquaculture lease areas located near Cattle Bay during construction, all mitigation measures associated with containing resuspended sediments in Section 10.1 of the Marine Ecology Report prepared by Ocean Environmental Consulting (February 2019) should be adopted.
- To reduce the potential impacts of water quality (e.g. hydrocarbon spills, sewage spills, nutrients) on the nearby mussel aquaculture lease area during construction, all mitigation measures associated with water quality in Section 10.5 of the Marine Ecology Report prepared by Ocean Environmental Consulting (February 2019) should be adopted.
- If any construction works cause water quality impacts that result in aquaculture lease area being closed to harvest by the NSW Food Authority, the Contractor must cease such works immediately and not recommence until the risk of adverse water quality impacts has been eliminated. If shellfish harvesting closure occurs as a result of water quality deterioration caused by construction works, the Proponent in cooperation with aquaculture permit holder(s) is to undertake testing, at the Proponent's cost, of the farmed shellfish to determine when shellfish is suitable for human consumption and the closure to harvest can be lifted.
- Fisheries NSW (1800 043 536) shall be immediately notified of any fish kills in the vicinity of the construction works. In such cases, all works other than emergency response procedures are to cease until the issue is rectified and written approval to proceed is provided by Fisheries NSW.

4.5.5 Water and Sediment Quality

The mitigation and / or management measures for water quality and sediment quality which should be adopted during the construction phases of the Cattle Bay Marina are provided in the Sections below.

The publications “Environmental Action for Marinas, Boatsheds and Slipways” (DECC 2007) and “Best Practice for Marinas and Boat Repair Facilities” (EPA 1999) provide information on managing water impacts from marinas and should also be referred to by construction personnel (during construction) and marina management (during operation).
The following mitigation / management measures to avoid or manage potential impacts to water and sediment quality should be adopted during construction:

- Timing of works should avoid periods of high rainfall or poor weather conditions to reduce the potential for water quality impacts and large increases in turbidity.
- Works occurring in shallow water should be undertaken during high tide to reduce the potential for disturbance of bottom sediments by construction vessels and to prevent unnecessary increases in turbidity or disturbance of sediments.
- Turbidity control barriers (i.e. silt curtains) are a widely used and effective method for containing sediments disturbed by construction activities. The use of silt curtains will also be effective in reducing sedimentation on seagrasses, marine macroalgae and sessile invertebrates inhabiting subtidal and intertidal habitats.
- Water quality monitoring (of turbidity) during construction is recommended.
- The marina will utilise the existing stormwater management system on site from the old cannery and include provision of an additional gross pollutant trap in it.
- Bunding of all chemical storage areas on site to prevent leakage into the waterway.
- Spill response kits should be located around the marina and on construction vessels.
- A spill response strategy should be included as part of any site induction.
- Spill response strategy / procedures should include the contact details of the authorities that are to be notified in the event of a spill, including Port Authority of NSW. o Harbour Master / Pilot, Port Authority of New South Wales ▪ Port of Eden, Main Jetty, Eden, NSW, 2551, Australia ▪ T: +612 6496 1719, E: edenpilots@portauthoritynsw.com.au ▪ Web: http://edenport.com.au/contact_us
- All excavation and demolition products generated during the construction process should be contained during works and then removed from the site and disposed of appropriately to prevent them from entering the marine environment.
- All general rubbish generated during the construction phase should be contained and disposed of appropriately.
- All equipment and vessels used during construction should be well maintained and serviced to reduce the likelihood of oil / fuel leaks and spills.
- Limit the use of anchor lines from construction barges / vessels where possible to limit disturbance of the seafloor.

4.6 Terrestrial Ecology

The land portion of the site is highly disturbed due to its former use as the Heinz cannery. As a result of disuse, the site has been subjected to regrowth with weed vegetation. Construction works undertaken on this area of the site will include the removal of weeds from in between the existing concrete slabs.

To prevent the spreading of weed species to surrounding vegetated areas and to minimise site disturbance, removal of weeds shall be carried out in a controlled manner by hand, with

vegetation contained and disposed of at a landfill facility. Weeds may be eradicated by environmentally acceptable methods using a non-residual glyphosate herbicide in any of its registered formulae.

4.7 Air Quality

The proposed construction works are not expected to have any significant impacts on air quality.

Notwithstanding, the following mitigation measures shall be adopted as best practice:

- all plant and equipment should be registered to ensure it does not emit unacceptable levels of smoke/fumes; and,
- uncovered or stockpiled materials that may lead to the generation of dust should be covered or watered down.

4.8 Noise and Vibration

The construction works are expected to generate noise, with the main source of noise being from piling activities and use of a hydraulic hammer in lowering the rock pinnacle. The generation of noise by the predominantly water-based construction activities could have a potential impact on nearby residential dwellings and on marine mammals (refer Section 4.5).

The Construction Noise Management Plan (West and Associates, 2015) shall be implemented by the Contractor, which comprises the following measures:

- general construction activities shall be restricted to the following hours:
    - Monday to Friday 7.00 am to 6.00 pm;
    - Saturday 8.00 am to 1.00 pm; and,
    - No work on Sundays and Public Holidays.
- piling activities shall be restricted to Monday to Friday 8.00 am to 12.00 midday and 2.00 pm to 5.00 pm;
- the construction hours above do not apply to the delivery of material outside the hours of operation, if that delivery is required by police or other authorities for safety reasons; and/or the operation or personnel or equipment are endangered. In such circumstances, prior notification is provided to the EPA and affected residents as soon as possible, or within a reasonable period in the case of emergency.
- the construction hours may be varied with written consent of the EPA if satisfied that the amenity of the residents in the locality will not be adversely affected.
- to reduce noise during impact piling, acoustically treated driving heads shall be used and pile driving noise shall be limited to a Sound Power Level $L_{A10,t=15\ min}$ of 105 dB(A);
- noise from site radios shall not exceed 50 dB(A) at the construction site boundaries;

- distribution of an introductory letter, construction program and sketches of the project works to all residences within a 250 metre radius of the construction site as measured from the end of the existing wharf structure;
- maintenance of a Noise Register by the Site Superintendent, which would record:
    - field noise measurements, including noise from radios at the site boundary and for required vehicles; and,
    - details of noise complaints received and rectification measures implemented.
- induction of all Contractor staff in noise management measures and procedures, including:
    - construction hours for the site shall be displayed on the site shed;
    - communication by construction staff to be done in close proximity or using two-way radios;
    - shouting, use of horns, load speakers etc. shall not be used to communicate over a distance;
    - vehicle horns shall only be used as an emergency warning device;
    - minimise slamming of vehicle doors;
    - checking of noise levels from radios by the Site Superintendent and disallowed use of radios for repeat offenders;
    - immediate reporting of noise complaints to the Site Superintendent; and,
    - maintenance of equipment shall not be allowed on site except for the bobcat and front end loader and then only carried out during construction hours.

The following general measures shall also be implemented to reduce noise impacts:

- provision of signage at the perimeter of the site including Council information / feedback contact details for the works;
- prior approval of any variation of the above working hours by Council;
- provision of notification to residents and business regarding any variation of the above working hours and the duration of any change;
- use of equipment in good repair and condition;
- regular maintenance of all plant and equipment;
- fitting of appropriate silencers and mufflers on all plant and equipment when directed by Council;
- construction time on site shall be minimised through measures such as completing subassembly of the marina elements off site;
- multiple use of items of equipment shall be limited to avoid aggregation of noise levels;

- the Contractor would be required to meet all Occupational Health and Safety Regulations associated with workplace noise. This may include but is not limited to monitoring and appropriate control measures; and,
- all noise complaints received by the Site Superintendent / Council would be assessed and directed to the Contractor for immediate action and recording in the Noise Register.

Prior to the issue of any construction certificate, the proponent shall submit to the Principal Certifying Authority a dilapidation report for all individual properties likely to be affected by vibration associated construction piling.

Construction is to be carried out in accordance with German Standard DIN 4150 – 3 – Effects of vibration on structures 1999 or any subsequent Standard.

4.9 Navigation and Waterway Usage

The constructions works will impact on navigation and waterway usage as a result of the relocation of a number of existing swing moorings and occupation of the footprint of the proposed marina throughout the construction period. Construction vessels delivering plant, equipment and materials from the port area within Snug Cove to the site within Cattle Bay will also interact with existing shipping operations and will be required to navigate through existing swing moorings.

Mitigation measures to minimise navigation and waterway usage impacts during construction include:

- preparation and implementation of a Swing Mooring Relocation Strategy in coordination with RMS;
- in coordination with the Harbour Master and other relevant authorities, a 'Notice to Mariners' shall be issued to advise the boating community of the extent, nature and duration of the construction activities;
- provision of special marker buoys, lighting of marker buoys and moored construction vessels for night-time navigation and appropriate signage to delineate construction areas in accordance with the requirements of the Harbour Master and other relevant authorities;
- construction vessels navigating from Snug Cove to Cattle Bay shall:
    - follow all Harbour Master directions;
    - adhere to the guidance provided in the 'Safety on the Water' sections of the RMS Boating Handbook;
    - comply with the International Regulations for Preventing Collisions at Sea which are adopted in NSW through the *Marine Safety (General) Regulation 2009*;
    - when navigating near, in or through a mooring area:
        - drive slowly and keep wash to a minimum;

- keep a lookout for people in the water, small dinghies, and trailing ropes; and,
- when travelling at 10 knots or more stay at least 30 m from any moored vessel.

4.10 Aboriginal Heritage

Following the identification of an Aboriginal heritage site outside the subject site for the proposed construction works, further investigations have identified a moderate to high potential for Aboriginal heritage evidence to occur in the form of shallow sub-surface deposits of stone artefacts across those portions of the site not entirely affected by recent land use (i.e. former cannery). However, the proposed construction works will involve minimal disturbance of the land portion of the site as land-based activities will be limited to installation of a temporary (portable) building, connections to existing potable water, sewerage and power services, and weed removal from the concrete slabs.

The following measures shall be implemented to mitigate the risk of the recovery of Aboriginal heritage artefacts on the site:

- Prior to the commencement of any works associated with the renovation of the existing concrete slabs, the provision of service infrastructure and site landscaping under the slabs on Lot 2 DP 1138056, an Aboriginal Heritage Management Plan (AHMP) shall be prepared by a qualified archaeologist in consultation with the Office of Environment and Heritage and submitted to Council for endorsement.
- No Aboriginal objects may be harmed unless an Aboriginal Heritage Impact Permit has been issued by the NSW Office of Environment and Heritage.
- If any Aboriginal objects are unearthed during construction all work must cease immediately and the NSW Office of Environment and heritage must be contacted for advice before any works re-commence.
- All site workers and contractors must be provided with induction training on the identification of Aboriginal artefacts, Aboriginal cultural awareness and procedural protocols as outlined in the Aboriginal Heritage Management Plan during the construction phases of the development.
- If any item of indigenous significance is found during construction, work shall cease in the immediate area and the matter referred to Council, DPIE Biodiversity and Conservation Division, and the Local Aboriginal Land Council, in accordance with the National Parks and Wildlife Act 1974; and,
- All construction personnel shall be briefed on the known and potential location(s) of Aboriginal heritage artefacts and the associated control and management measures during site induction.

4.11 Waste Management

Minimal waste will be generated on site due to the significant prefabrication of the marina components off site. Where waste generation is unavoidable the following waste management arrangements are to be made.

Waste storage facility
A waste storage facility on site shall provide containers for temporary storage of solid and liquid wastes for collection and disposal off-site. The waste storage facility is to be enclosed with bunding or similar to prevent dispersion of waste.

Solid Waste
Solid construction waste shall be appropriately separated and temporarily stored in the waste storage facility as recyclable and non-recyclable material for collection and disposal off-site.

All recyclable waste is to be collected and disposed to a licensed waste recycling facility to limit the use of landfill.

All non-recyclable materials shall be disposed to an appropriate licensed waste facility.

Liquid Waste
The waste storage facility shall provide containers for temporary storage and collection of any liquid waste for disposal. The containers are to be double lined and serviced periodically by a commercial waste collector.

Any liquid waste from construction operations is to be collected and disposed to a suitably licensed waste facility off-site without spillage on the ground or into any water body.

No liquid wastes shall be released into the sewer, stormwater drains, on the ground or water body.

General Management
The construction manager shall conduct daily inspections to monitor the site for litter, leaks and spills.

A waste litter and spill kit clearly labelled and easily accessible shall be in place. This litter and spill kit shall include absorbent booms to prevent further waterway pollution. The booms will be adequate to fit around spills and all adjacent drains. Marina staff and users shall be trained in the correct procedures and correct usage of the litter and spill kit.

Marina construction staff shall undergo hazardous materials handling training and be trained to a high level of competency.

All Contractors and sub-contractors shall be instructed to keep tools and materials, and to maintain a tidy work space, to ensure that items do not enter any water body. Items that fall into the water shall be immediately removed.

4.12 Public Access and Safety

Existing public access to the beach at the site is provided by informal pedestrian access tracks from Cattle Bay Road to the east, Bay Street to the west and the foreshore. The jetty is also used by the public informally as it can be accessed from the beach and from Cattle Bay Road. The surrounding waterway is occupied by swing moorings and can be accessed by boat users and for passive recreation (e.g. kayaks and canoes).

Council's foreshore public reserve (Lot 4 DP 1138056) and Cocora Beach and adjacent foreshore areas are not to be used as a staging area for works associated with the refurbishment of the existing wharf or the construction of the floating components of the marina or wave attenuator.

Security fencing is to be provided on the boundaries of Council's foreshore public reserve (excluding the access corridor) to Council's satisfaction for the purpose of precluding direct access from the construction site and Cattle Bay Beach during construction.

During construction it is anticipated that public access would be temporarily restricted in the following areas:

- area of the land portion of the site occupied by the work compound and vehicle access for deliveries;
- the jetty;
- waterway area beneath and around the jetty;
- the area of the beach immediately adjacent to the jetty; and,
- the waterway area in the footprint and around the perimeter of the proposed marina and wave attenuator and swing mooring relocation areas.

Protection of public safety would be achieved by public notification, signage and physical demarcation of work areas. Mitigation measures to minimise public access and safety impacts during construction include:

- notification of the construction schedule to local business owners, residents, waterway user groups and swing mooring licence holders;
- barricading / fencing off of the proposed construction site including the site compound;
- provision of adequate signage around the construction site;
- provision of safe access to pedestrians around the site including appropriate signage and barricades, with construction personnel stationed at site entry/exit points to direct pedestrians;
- continuity of beach access shall be facilitated where possible by designated construction personnel ensuring safe passage of pedestrians, subject to the nature and proximity of construction activities being undertaken; and,
- implementation of the navigation safety measures outlined in Section 4.9.

4.13 Traffic and Parking

During construction it is not anticipated that construction traffic would have a significant impact on local traffic flow around Cattle Bay. Use of local roads would be episodic and related to short duration activities such as site establishment, plant and equipment mobilisation, delivery of materials to the site, waste disposal, delivery of the temporary (portable) building, parking of vehicles by construction personnel and site disestablishment.

The hardstand area provided by the existing concrete slabs is more than adequate to accommodate parking and manoeuvring requirements of construction personnel and deliveries to site.

The existing wharf facilities in the port area within Snug Cove would be used for delivery of piles, pontoon units and precast concrete panels. This area has established wharf areas for these activities and can accommodate traffic associated with the delivery of equipment and materials required for the proposed works.

5 MANAGEMENT AND REPORTING

5.1 Management Responsibilities

The Project Manager for construction of the Cattle Bay Marina (to be appointed by the Proponent) shall be responsible for the following:

- ensuring all appropriate licences and consents are obtained for the construction works;
- ensuring all contractors comply with statutory and licence requirements;
- overseeing construction works and overall implementation of the CEMP; and,
- undertaking monitoring and inspections of the site, as required.

The Contractor (to be appointed) shall be responsible for the following:

- ensuring that all Work, Health and Safety regulatory requirements are met including preparation, maintenance, implementation and administration of a Work, Health and Safety Plan;
- ensuring implementation of the CEMP at site level;
- ensuring compliance with any relevant conditions of the DA consent and regulatory requirements;
- ensuring all records are completed as required in the CEMP;
- ensuring that all environmental protection measures are in place and functioning correctly;
- ensuring daily site inspections (Work, Health and Safety and environmental) are undertaken and recorded and reported appropriately;
- undertaking continuous visual monitoring of surface water within the silt curtains;
- ensuring incident reports and complaint reports are completed and followed up as required;
- ensuring adequate training of all employees and contractors;
- ensuring monitoring is conducted as required in the CEMP;
- ensuring non-conformance and corrective actions reports are reported to the Project Manager;
- ensuring corrective actions are undertaken in response to the requests made by the Project Manager regarding specific environmental or safety issues; and,
- ensuring all sub-contractors comply with statutory and licence requirement and conditions of the CEMP.

5.2 Reporting

The following reporting shall be undertaken:

- weekly reporting on piling operations, including any complaints, incidents, marine mammal sightings or evidence of non-compliance;
- weekly reporting covering outcomes of pollution and turbidity control and waste management;
- environmental incident reports (refer Appendix A), to be completed on site and promptly notified to the Project Manager. All complaints shall be noted and reported to the Proponent and relevant authority if appropriate. Where appropriate, the incident shall also be investigated and action taken to minimise any adverse environmental effects wherever possible;
- site walkover check, to be completed by the Project Manager during regular site inspections to check compliance and record corrective measures required; and,
- site personnel register, to be completed at induction.

6 REFERENCES

Ocean Environmental Consulting (December 2018), *Cattle Bay Marina Water Quality Management Plan* prepared on behalf of Eden Cattle Bay Marina Pty Ltd.

Ocean Environmental Consulting (February 2019), *Cattle Bay Marina Marine Ecology Report* prepared on behalf of Eden Cattle Bay Marina Pty Ltd.

Ocean Environmental Consulting (20 September 2019), Responses to agency submission regarding Development Application 2019.208, Cattle Bay Marina Lot 2 DP1138056 and Lot 4 DP 1138056, Cattle Bay Road Eden

West and Associates (2015), *Cattle Bay Marina Development Application Acoustic Report*, prepared for Eden Cattle Bay Marine Pty Ltd, April 2015.

APPENDIX A
ENVIRONMENTAL INCIDENT / COMPLAINT REPORT

ENVIRONMENTAL INCIDENT/COMPLAINT REPORT

Any accident or incident which may impact on the environment **MUST** be reported.
Any complaint **MUST** be recorded and reported.

Accident/Incident Date: _____ Time: _____

Time, Date, Location and Duration of Incident:

_____

_____

_____

Person Reporting: _____

Nature / Details of Incident / Quantity of Pollutants etc:

_____

_____

_____

_____

Actual or Suspected Cause:

_____

_____

Action Taken or Proposed Action – Management & Prevention:

_____

_____

Contractor: _____

Reported to: _____

Signature: _____