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**Subject: CATTLE BAY MARINA – RESPONSE TO SUBMISSIONS ON EIS
SWING MOORING RELOCATION STRATEGY**

Dear Andrew

The EIS included the 'Principles for a Swing Mooring Relocation Plan' prepared by Advanced Marina Management (AMM) (Appendix 13 of EIS). Council's letter to Eden Resort Hotel Pty Ltd dated 18 February 2015 acknowledged these principles but stated there is no certainty in the swing mooring relocation process in terms of ongoing tenure, maintenance of environmental integrity and practicality.

This letter has been prepared to provide further detail and assist with developing certainty around the process. It discusses a number of relevant factors and concludes with a proposed Swing Mooring Relocation Strategy.

1 RELATIONSHIP BETWEEN THE PROPOSED MARINA AND WAVE ATTENUATOR AND EXISTING SWING MOORINGS

Figure 1 shows the proposed marina and wave attenuator superimposed on a plan that also shows the locations of swing moorings in the vicinity of Cattle Bay. The locations of the swing moorings were supplied by Roads & Maritime Services (RMS). Those swing moorings edged red would require relocation to allow the ultimate marina and wave attenuator development. This includes swing moorings located seaward of the proposed wave attenuator¹. The total number of swing moorings that would require relocation is 24.

¹ RMS has noted during consultation in March 2015 that these swing moorings must be relocated due to concerns at the potential impacts of waves reflected from the attenuator.

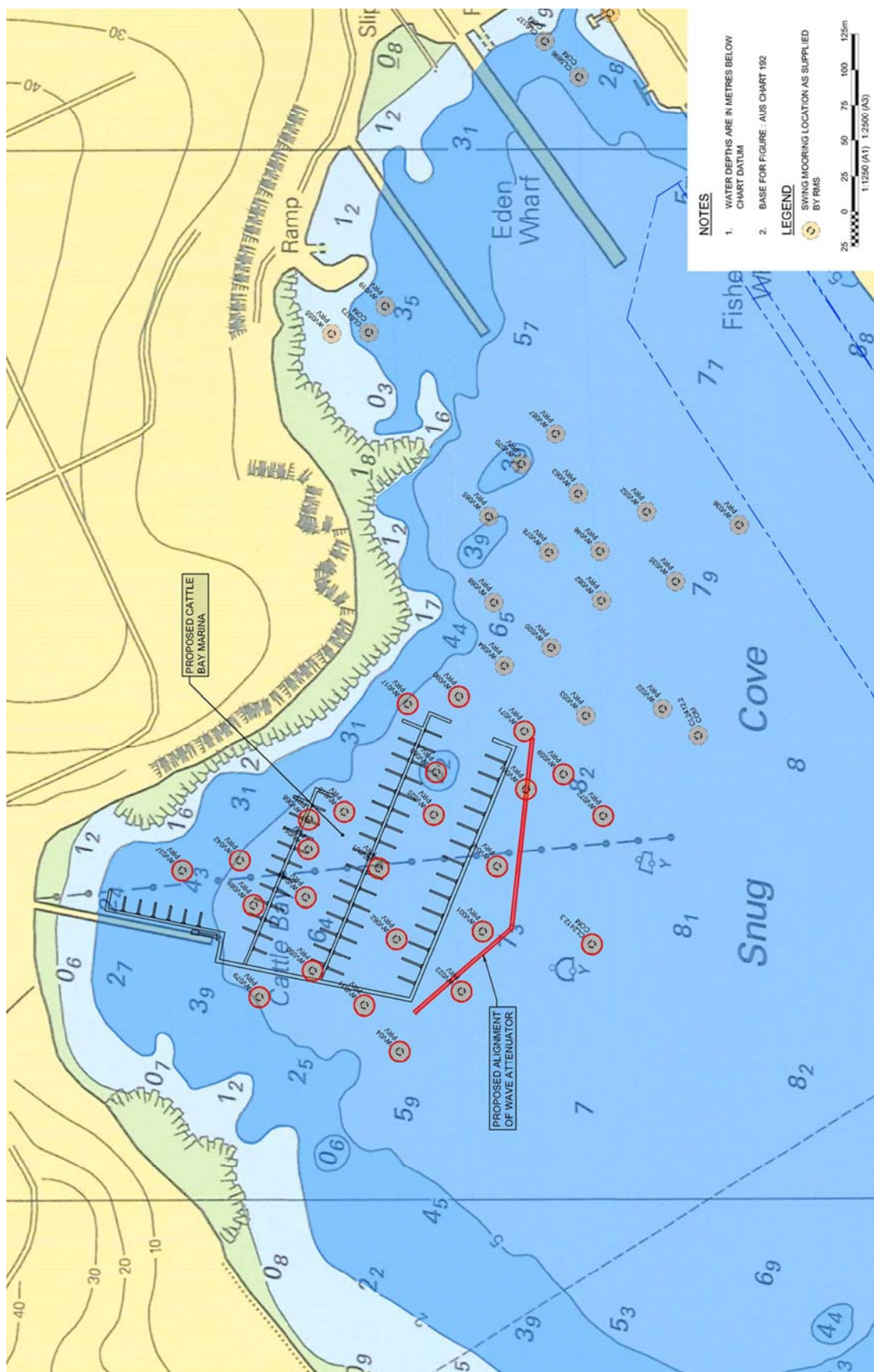


Figure 1 Proposed marina, wave attenuator and swing moorings (ultimate development)

Figure 2 shows a possible Stage 1 development of the marina and wave attenuator. It includes approximately half the total number of marina berths and the full wave attenuator. The full wave attenuator has been assumed on the basis of cost efficiencies (economy of scale).

In this Stage 1 scenario, the swing moorings edged red, 20 in number, would require relocation. It is of interest that while staging would reduce the number of swing moorings that require relocation compared to the ultimate development, for the particular staging shown, this number is not proportional to the relative number of marina berths in Stage 1 compared to the ultimate development.

Figure 3 shows a further possible Stage 1 development of the marina and wave attenuator in which the full wave attenuator is not constructed. In this Stage 1 scenario, the swing moorings edged red, 14 in number, would require relocation.

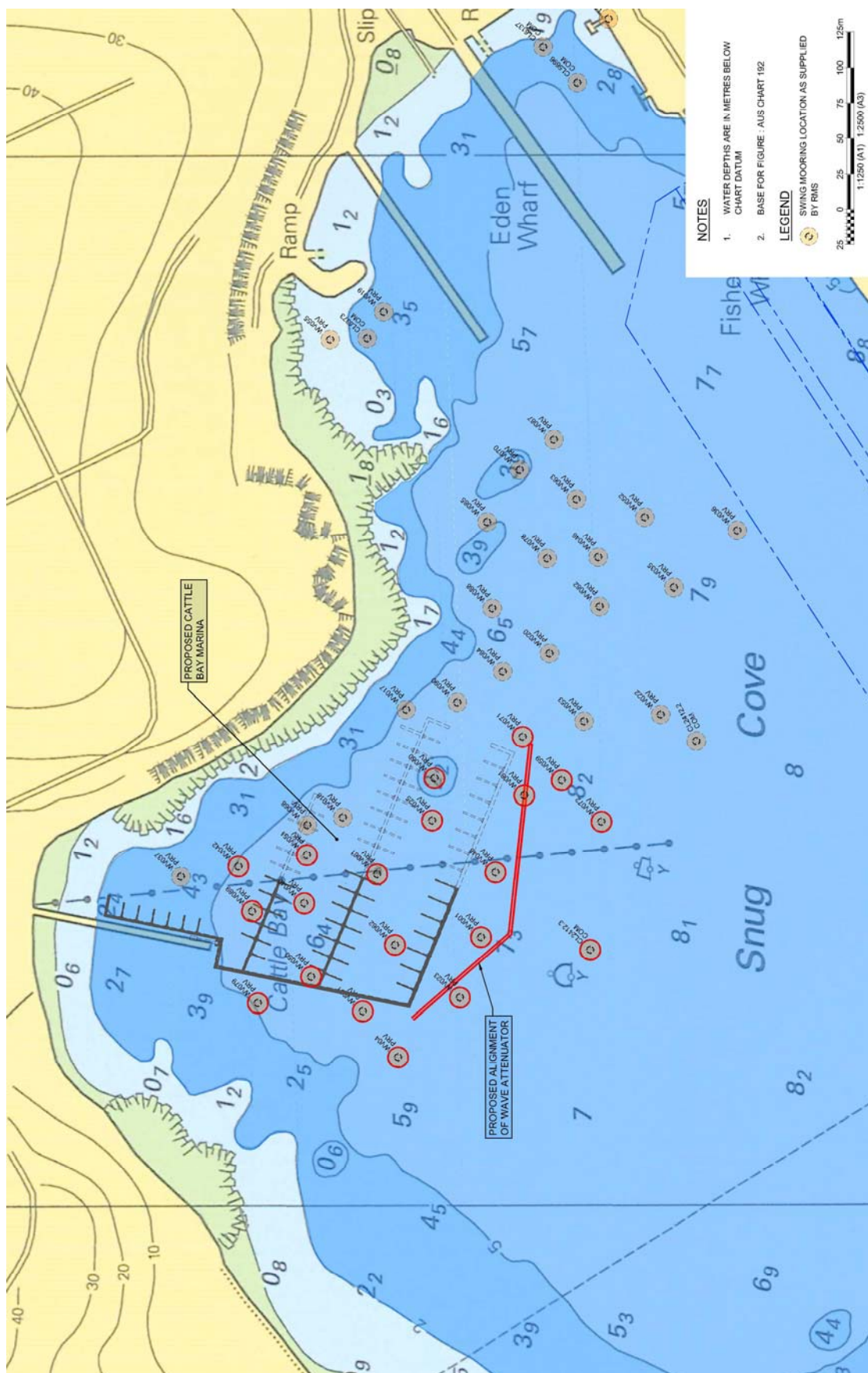


Figure 2 Possible Stage 1 of marina and wave attenuator development, and effect on swing moorings (Scenario 1)

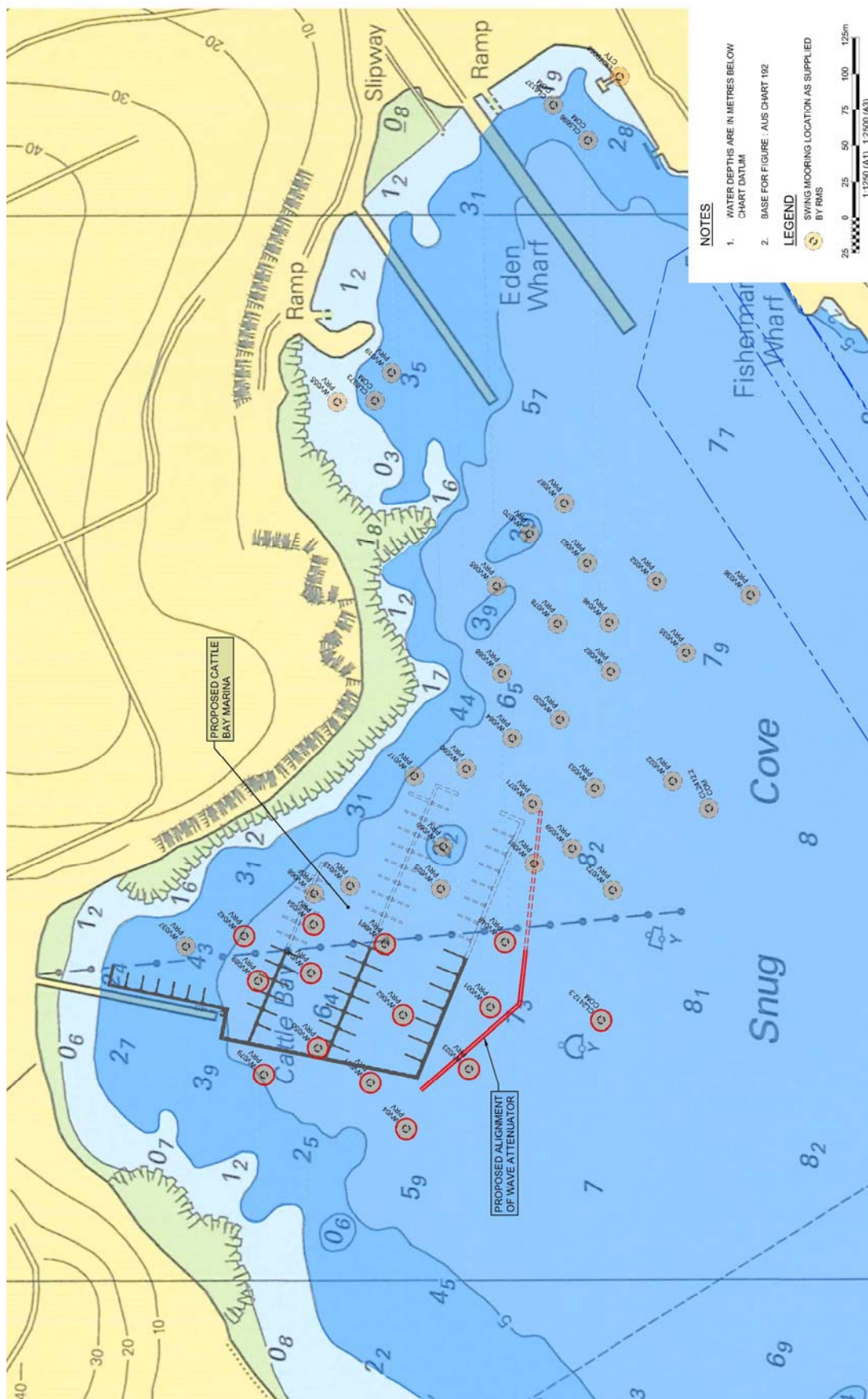


Figure 3 Possible Stage 1 of marina and wave attenuator development, and effect on swing moorings (Scenario 2)

2 POTENTIAL AREAS AVAILABLE FOR RELOCATION OF SWING MOORINGS AND TYPES OF MOORINGS

2.1 Regionally in Twofold Bay

There are really only two areas available along the northern side of Twofold Bay for provision of swing moorings, having regard to shelter and access from the shore; these are Snug Cove at Eden and Quarantine Bay located about 4km by road west of Eden.

Discussions with RMS in March 2015 suggest that the opportunity could exist for provision of nominally an additional five or six swing moorings at Quarantine Bay. **Figure 4** shows the location of existing swing moorings in Quarantine Bay, as supplied by RMS, superimposed on an air photo, and the potential areas for provision of additional swing moorings (shown hatched).

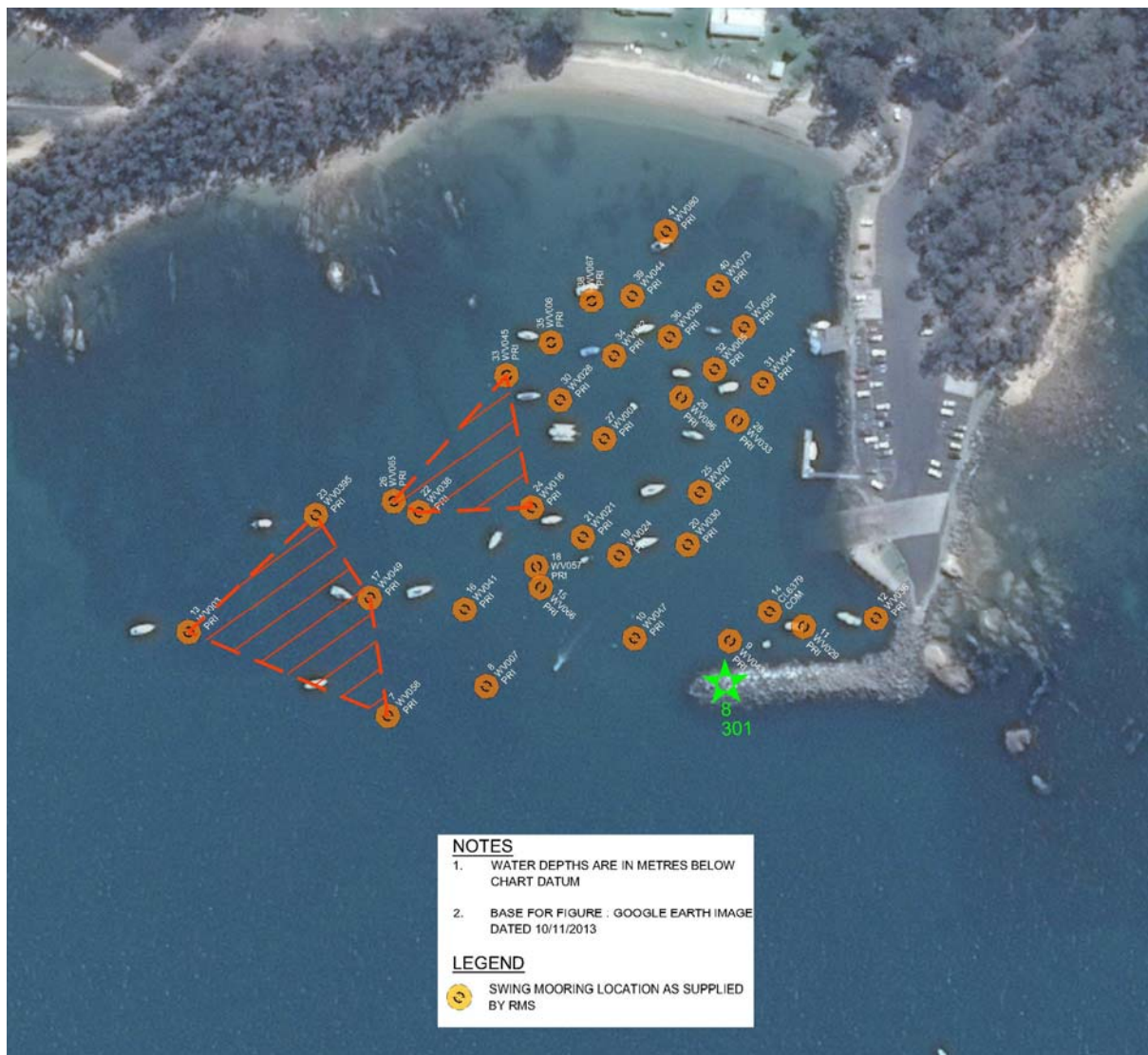


Figure 4 Quarantine Bay – potential areas for additional swing moorings

2.2 Locally in Snug Cove

The ability to relocate swing moorings to areas locally within Snug Cove (includes Cattle Bay) is dependent on a number of factors including water depth, wave exposure, impact on navigation and impact on marine ecology.

A constraints and opportunities approach has been taken to identify areas potentially suitable for relocation of moorings. Information on marine ecology constraints has been established from the Aquatic Ecology Assessment prepared by Marine Pollution Research Pty Ltd (April 2013) (Appendix 5 of the EIS), the Hydrographic Mapping & Marine Mammal Risk Profile report prepared by Ocean Environmental Consulting (July 2014) (Appendix 17 of the EIS) and discussions with Dr Katie Smythe of Ocean Environmental Consulting.

A number of the opportunities and constraints are summarised below:

- moorings should be located in water depths greater than about 3m below Chart Datum, in other words -3m CD (CD is Lowest Astronomical Tide);
- no moorings in areas where they could be affected by reflected waves off the wave attenuator;
- no moorings in areas where they could interfere with navigation to existing facilities in Snug Cove or navigation associated with the proposed marina;
- avoid locating moorings over shallow subtidal reef where possible;
- east of the existing jetty, avoid locating moorings over *Posidonia* seagrass patches;
- west of the proposed marina, avoid locating moorings over dense areas of *Zostera* seagrass and areas close to Cocora Beach (dolphin feeding areas);
- locating moorings over bare sand areas is acceptable;
- locating moorings over rubble reef/patchy seagrass is acceptable if seagrass friendly moorings are used (see **Section 2.3**).

Figure 5 shows the constraints and opportunities plan together with the possible Stage 1 development (Scenario 1)². The -3m CD depth contour has been taken from the hydrographic mapping reported in Ocean Environmental Consulting (July 2014)³. Habitat mapping is from both Marine Pollution Research (2013), comprising the white edged annotated zones, and from Ocean Environmental Consulting (2014), comprising the coloured dots. The areas potentially suitable for relocation of moorings are shown cross-hatched.

² Scenario 1 has been adopted as it conservatively requires the greatest number of swing moorings to be relocated.

³ Not all depth contours are shown, for clarity.

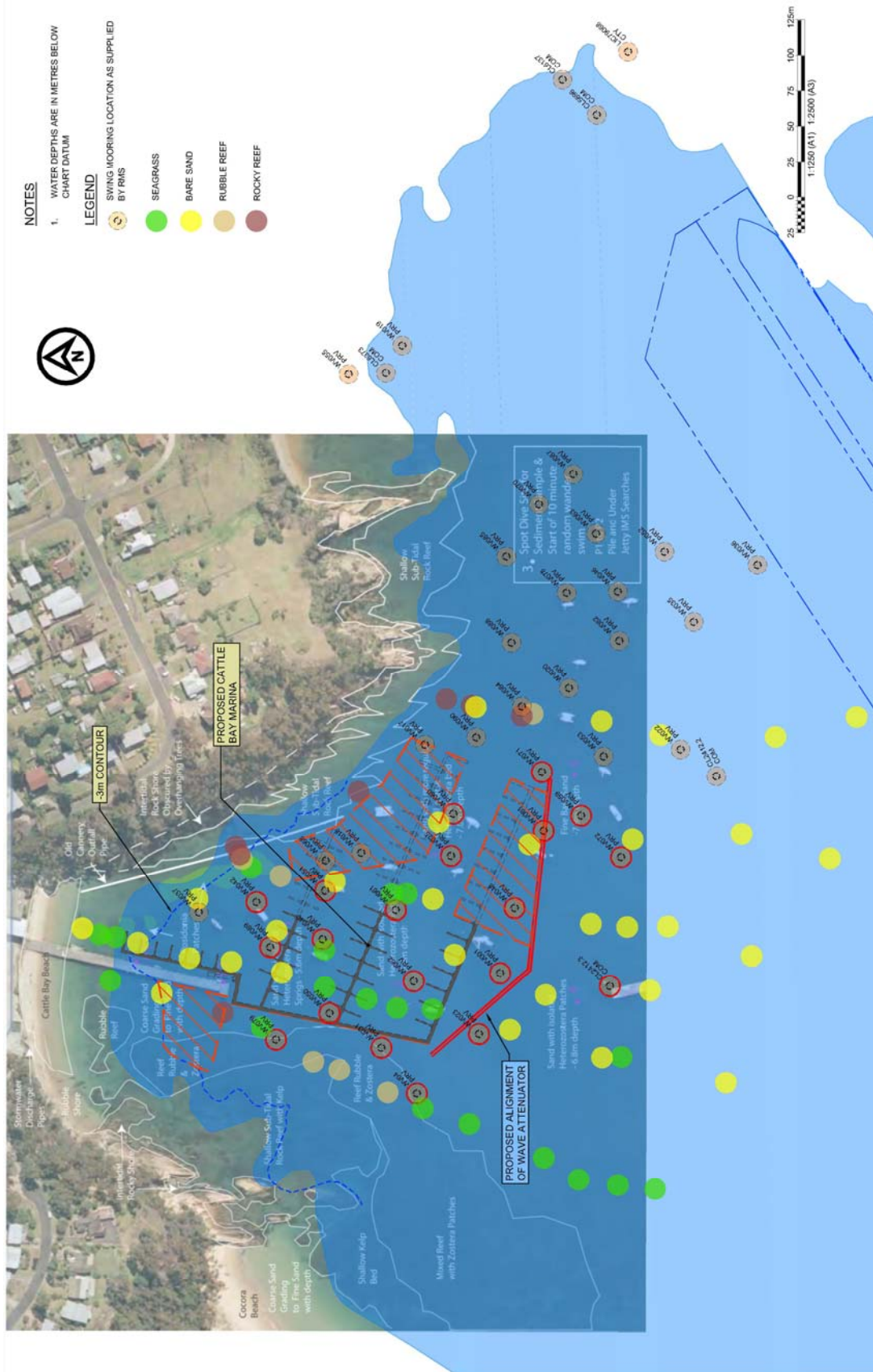


Figure 5 Constraints and opportunities plan with the possible Stage 1 development (Scenario 1), showing potential areas for relocation of swing moorings

2.3 Types of Mooring

There are several possible mooring types that could be employed for the moorings that are relocated:

- **conventional single point swing mooring:**
This is the type of mooring currently employed. It comprises a mooring weight, ground chain, wear chain, riser chain or rope, and marker buoy. This type of swing mooring can damage seagrass by virtue of the sweeping action of the ground chain/wear chain over the seabed, creating 'crop circles'. It is suitable for use in bare sand areas.
- **seagrass friendly single point swing mooring:**
This type of mooring system has been developed to reduce damage to the seabed. An example system involves use of a single, screwed into place, mooring post as the anchor point. Attached to the mooring post just below the seabed is a set of load spreaders to stabilise the post. A shock absorber and swivel head is attached to the mooring post and a rope runs from shock absorber to the marker buoy.
- **two-point swing mooring:**
A two-point swing mooring consists of two sets of apparatus similar to those used for a single point swing mooring. The apparatus could be of the conventional type or seagrass friendly. A moored vessel can still turn through 360° to head into the weather but the area occupied by the swing circle of the vessel is restricted in comparison to that of a single point swing mooring. This could be an advantage given the restricted space potentially available for relocation of swing moorings within Snug Cove.
- **fore-and-aft mooring:**
The term fore-and-aft mooring can apply to any system where a vessel is moored both from the bow and the stern. The mooring apparatus could be conventional or seagrass friendly, or piles. Fore-and-aft moorings are suitable where the approach direction of the wind/seas are quite unidirectional, e.g. within a 30° window. This would largely be the case for the longest fetch across Twofold Bay to the south/south-south-west. The fore-and-aft moorings also allow a significantly greater mooring density which is an advantage given the restricted space potentially available for relocation of swing moorings within Snug Cove.

3 PROPOSED SWING MOORING RELOCATION STRATEGY

3.1 Outline

It is evident that in Stage 1 of the marina and wave attenuator development up to 20 swing moorings could require relocation. The following mix of options would be offered to existing Mooring Licence holders, in consultation with RMS and the individual Mooring Licence holders.

- **relocation to Quarantine Bay:**
The Proponent of the marina would meet the cost of the relocation of swing moorings to Quarantine Bay plus provide each Mooring Licence holder that is relocated with a dinghy and motor, and fund dinghy rack storage for all relocated moorings (design and location of dinghy rack storage to be agreed with all relevant parties, including Council). This might involve five or six of the existing Mooring Licence holders in Snug Cove.

- relocation onto the Cattle Bay Marina:
The Proponent would enter into commercial discussions with individual Mooring Licence holders who may wish to obtain a berth in the marina. The Proponent would meet the cost of removal and disposal of the existing mooring. It is anticipated this could involve five or so existing Mooring Licence holders.
- relocation to nearby suitable areas in Snug Cove:
The Proponent would meet the cost of relocation to areas shown hatched in **Figure 5**, including the cost of alternative types of moorings as may be required based on available space and ecological factors, e.g. seagrass friendly swing moorings or fore-and-aft moorings. The Proponent would provide an undertaking that further relocation would not be required until Stage 2 of the marina development and would nominate a minimum period for such relocation to provide certainty. If it became necessary to relocate a mooring earlier than this minimum period the Proponent would make a marina berth available to the subject Mooring Licence holder at no additional cost above the mooring fees until such time as a new mooring location was established. It is expected that a minimum of 10 moorings could be accommodated in the areas shown hatched in **Figure 5**.

Stage 2 of the marina would be constructed in response to demand but probably about 5 to 7 years after completion of Stage 1. At this time, additional swing moorings would need to be relocated but these would be expected to be few in number (as the majority of the relocations are required in Stage 1). The options available at this time would be further relocation to Quarantine Bay or further relocation onto the marina. It is also possible that swing moorings may also be able to be placed seaward of the wave attenuator as there would be some history of wave conditions in this area at this time.

3.2 Implementation Program and Process

The proposed implementation program and process for the proposed Swing Mooring Relocation Strategy is set out in **Table 1**.

Table 1 Swing Mooring Relocation Strategy – Implementation Program and Process

| Stage of Marina Development | Task | Timeframe for Completion |
|-----------------------------|--|---|
| Pre-Development | <ul style="list-style-type: none"> • Notification to Mooring Licence holders of proposed relocation strategy and information session; • Information session for Mooring Licence holders. | Prior to commencement of works |
| Stage 1 | • Negotiation and agreement with those Mooring Licence holders of moorings affected by Stage 1 for alternative mooring or berth | Prior to commencement of works on Stage 1 |
| | • Installation of new moorings for Mooring Licence holders affected by the wave attenuator | Prior to commencement of works on wave attenuator |
| | • Installation of new moorings for Mooring Licence holders affected by the marina berths | Prior to commencement of works on the marina berths |

| Stage of Marina Development | Task | Timeframe for Completion |
|-----------------------------|---|---|
| Stage 2 | <ul style="list-style-type: none"> Negotiation and agreement with those Mooring Licence holders of moorings affected by Stage 2 for alternative mooring on berth | Prior to commencement of works on Stage 2 |
| | <ul style="list-style-type: none"> Installation of new moorings for Mooring Licence holders affected by wave attenuator (if attenuator is staged) | Prior to commencement of works on wave attenuator |
| | <ul style="list-style-type: none"> Installation of new moorings for Mooring Licence holders affected by the marina berths | Prior to commencement of works on marina berths |

Please contact the undersigned should you require any clarification or additional information.

Yours faithfully
Haskoning Australia Pty Ltd



G W Britton
Resident Director