

Declaration under Part 3, Schedule 2 of the Environmental Planning and Assessment Regulation 2000

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Name and Address of the Responsible Person:

As above.

The Address of the Land

Lots 2 and 4 of DP 1138056, Cattle Bay Road and the adjoining waters of Cattle Bay within Twofold Bay, Eden NSW.

Description of Development to Which this Statement Relates

Erection of a 154 berth marina comprising three floating pontoon arms restrained by piles, a fixed wave attenuator located parallel with, and along, the southern pontoon arm, minor refurbishment of the existing wharf, landside car park comprising 97 spaces plus 3 loading/unloading spaces, and temporary building to house marina administration and toilets.

Assessment of the Environmental Impact of the Development

An assessment of the environmental impact of the development is contained in this Environmental Impact Statement.

Declaration

Pursuant to clause 6(f), Part 3, Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, we declare that this Environmental Impact Statement:

- i) Has been prepared in accordance with the requirements of the Environmental Planning and Assessment Act 1979 and Environmental Planning and Assessment Regulation 2000;
- ii) Contains all available information that is relevant to the environmental assessment of the infrastructure to which this Environmental Impact Statement relates; and
- iii) Contains information that is neither false nor misleading.



.....
Stephen McMahon



.....
Greg Britton

04 August 2014

EXECUTIVE SUMMARY

Introduction

There is a long history to the development of marina facilities in Twofold Bay. The economic and social benefits of a Marina to Eden and the Bega Valley Shire are self-evident and have long been recognised.

Eden Resort Hotel Pty Ltd has long had a vision to develop a marina in association with its approved mixed use tourist and residential development within the site of the former Heinz Cannery at Cattle Bay. The development and the marina are complimentary and provide the opportunity to finally provide a marina at Eden.

The proposal by Eden Resort Hotel Pty Ltd comprises a 154 berth marina, a fixed wave attenuator, minor refurbishment of the existing wharf; temporary car park and a temporary building to house marina administration and toilets. The temporary facilities will be replaced by the resort and residential proposal when it is developed.

It has been recognised that the Cattle Bay Marina can join the neighbouring Port of Eden Marina proposal (POEM). Thus it can represent Stage 1 of a comprehensive marina development facility adjoining Snug Cove (with the POEM proposal forming a Stage 2 extension in due course).

The Proponent

The Proponent is Eden Resort Hotel Pty Ltd; Suite 600, 72 Liverpool Street, Sydney NSW 2000

Project Objectives

The objectives that have guided the proposal are:

- Ensure customer needs are met through the provision of inviting, accessible, high quality and affordable marina facilities;
- Link and integrate the proposed marina facility with the proposed tourist facilities subject to the previous approval and the facilities and services within the Eden township;
- Deliver a marina facility that has been informed by engagement with Eden residents, business and community groups, Agencies and other key stakeholders and that demonstrates evidence based decision making;
- Support the Government's imperative to promote economic growth in Eden by increasing the potential range of tourism and resident visitation, investment and employment opportunities; and
- Contribute to environmental, social and economic sustainability by improving liveability and minimising any impact on the environment and the community.

Proposed Development

Plans of the proposed marina are presented in **Appendix 6**. It comprises:

- i) A total of approximately 154 berths in three floating pontoon arms restrained by piles;
- ii) A fixed wave attenuator;
- iii) Minor refurbishment of the existing wharf;
- iv) Provision of power, lighting, water, fire fighting equipment, mobile 'muck truck' (for small scale pump out) and security access controls to the pontoons and berths;
- v) Temporary car park comprising 97 spaces plus 3 loading/unloading spaces; and
- vi) Temporary 'portable' building to house marina administration and toilets.

Community Consultation

Consideration of the proposal for a marina at the site has the benefit of a long history of consultation that has taken place over the years regarding the future use of the former cannery site involving ERH, local Eden residents and business groups, Council and Government agencies, following ERH's purchase of the site in 2000. This is a legacy of ERH's long term commitment and involvement in the development of the site. A strong association has thus developed with all stakeholders.

While substantial consultation with all stakeholders took place with the assessment and approval of the original mixed use tourism and residential proposal (DA 05-0032) in 2007 and 2008, ERH elected to embark on a comprehensive consultation exercise to identify potential issues in recognition of the difference between the marina proposal and the proposal considered in 2007/2008.

Key elements of the methodology comprised:

- Ongoing consultation with agencies and Council. Since 2000 this has also included regular liaison with and / or formal involvement in key studies / projects such as the Snug Cove Master Plan 2005, the Eden Structure Plan Charette in 2006 and the POEM proposal; and
- Formal and informal consultation with Eden residents, business and community groups and other stakeholders, that culminated in a series of workshops between 30th October and 1st November 2012 in Eden.

The consultation has raised a number of issues that are addressed in this Environmental Impact Statement.

Generally however, the feedback received by ERH has been supportive. The plans were viewed positively by attendees at the workshops and no issue or concern gained any particular significance. The comments received by ERH suggest that the local community, businesses and Government authorities and agencies are positively disposed to the potential development of the marina at Cattle Bay.

Environmental Assessment

In accordance with the Director-General's Requirements dated 21 March 2013 the following environmental issues have been assessed in this EIS:

- Traffic and Transport
- Navigation and Safety
- Infrastructure
- Hazards Assessment
- Public Access
- Coastal Processes
- Geotechnical, Soil and Water
- Air, Noise and Water
- Heritage and Archaeology
- Local Social and Business Impacts
- Aquaculture and Fishing
- Ecology (Terrestrial and Aquatic)
- Visual Impacts
- Climate Change and Greenhouse Gas
- Waste Management

The assessment of these issues has resulted in the development of measures to avoid, mitigate and manage potential impacts. These are presented in Part 8 of this Statement.

Generally, any potential adverse effects can be mitigated by the adoption of conventional Construction and Operational Management Plans, and more comprehensive survey and investigation required to be undertaken as part of the detailed design to follow.

Other Environmental Approvals

The marina redevelopment 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 development is also a 'scheduled activity' within the meaning of Schedule 1 of the Protection of the Environment Operations Act.

Project Justification and Conclusion

The assessment in this Statement demonstrates that the proposed marina would not have any significant effect on threatened species, populations or ecological communities or their habitats arising from its construction.

Similarly, the proposal will not result in any adverse impacts on air quality, wave climate, sediments, noise, waste or water quality. The provision of modern new facilities reduce the risks of any hazardous events. Potential sources of risk associated with the development and operation of the marina including collisions; spillage; and waste can be managed with the appropriate safeguard. The marina will have minimal visual impact given its location and intended use.

Furthermore, there are significant social and economic benefits to Eden. The proposed marina addresses the demand for floating marina berths by providing facilities that cater for a variety of vessel sizes including larger vessels and will provide direct employment during the construction phase and maintain permanent employment during the operational phase. The new marina facilities will service local and visitor boating communities' needs, providing additional economic multiplier effects.

Existing public access to the foreshore, beach and jetty of Cattle Bay are maintained

In conclusion there are no environmental, social or economic impediments to Council's approval of the proposed marina at Cattle Bay.

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Note: With regard to the proposed wave attenuator for protection of the marina, a number of the Figures above show a straight attenuator aligned parallel to the outer floating arm of the marina. The final design of the proposed attenuator has evolved through the preparation of the EIS to have a 'cranked' or bent alignment as sketched in Section 6.9 of the EIS (refer Figure 29). The cranked wave attenuator has been the subject of more detailed wave studies as outlined in Appendix 16.

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ABBREVIATIONS USED IN THIS DOCUMENT

Aquatic CEMP:	Aquatic Construction Environmental Management Plan.
BVSC:	Bega Valley Shire Council
DCP:	Development Control Plan
DGRs:	Director General's Requirements for the EIS, reproduced in Appendix 1.
EIS:	Environmental Impact Statement; This document.
EP&A Act:	Environmental Planning and Assessment Act.
EPBC Act:	Commonwealth Environmental Protection and Biodiversity Conservation Act 1999
ERH:	Eden Resort Hotel Pty Ltd, The proponent and applicant.
FMA:	NSW Fisheries Management Act 1994.
IMS:	Introduced Marine Species.
KTP:	Key Threatening Process.
LEP:	Local Environmental Plan
MMPP :	Marine Mammal Protection Plan.
MPR:	Marine Pollution Research Pty Ltd
OEMP:	Marina Operational Environment Management Plan
POEM:	Port of Eden Marina
REP:	Regional Environmental Plan
SEPP:	State Environmental Planning Policy

APPENDICES ENCLOSED WITH THIS STATEMENT

Note: With regard to the proposed wave attenuator for protection of the marina, a number of the Figures in the appendices show a straight attenuator aligned parallel to the outer floating arm of the marina. The final design of the proposed attenuator has evolved through the preparation of the EIS to have a 'cranked' or bent alignment as sketched in Section 6.9 of the EIS (refer Figure 29). The cranked wave attenuator has been the subject of more detailed wave studies as outlined in Appendix 16

1. Director General's Requirements.
2. Clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.
3. Copy of Land Survey.
4. Copies of LPMA Advice and Bega Valley Shire Council and Crown Landowners' Consent.
5. Marine Pollution Research Pty Ltd, April 2013, Aquatic Ecology Assessment.
6. Schedule and Plans of Plans of Proposed Development.
7. Coriolis Marine Pty Ltd, June 2012, Eden Marina Project Report.
8. Achievement of State Plan Priorities.
9. Achievement of Objectives and Actions of NSW Coastal Policy.
10. Achievement of Coastal Policy and SEPP 71 Matters for Consideration.
11. Copy of Approved Plans of Concept Plan DA 05-0032.
12. Consultation and Issue Identification Documents.
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1. INTRODUCTION

1.1 Project Overview

Eden Resort Hotel Pty Ltd proposes to develop a 154 berth marina comprising three floating pontoon arms, a fixed wave attenuator, minor refurbishment of the existing wharf; and a landside car park comprising 97 spaces plus 3 loading/unloading spaces and temporary building to house marina administration and toilets.

The site (land and water) proposed to be occupied by the marina comprises the foreshore land upon which the former Heinz cannery at Cattle Bay in Eden was located. It extends into part of Cattle Bay within Twofold Bay surrounding and encompassing the existing wharf previously used by the cannery. The location of the site is shown in **Figure 1**.

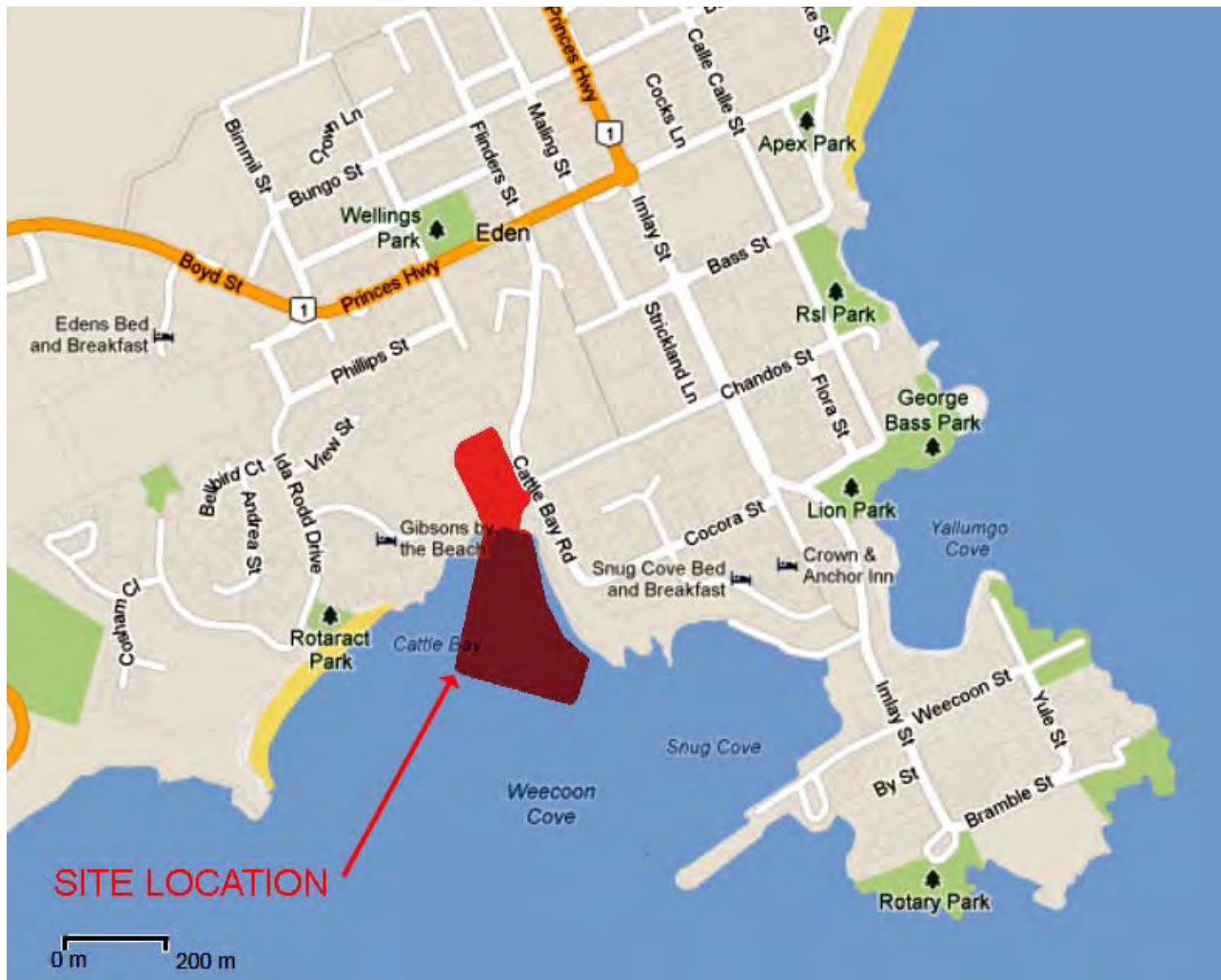


Figure 1: Location of Subject Site within Eden

(Source: Google Maps)

1.2 Project History

The proposal by Eden Resort Hotel Pty Ltd to develop the marina is associated with its proposal commenced in 2000 to develop a mixed tourist and residential development within the site. The history of the mixed tourist and residential proposal, as provided by Eden Resort Hotel Pty Ltd, and its relationship with the marina proposal is outlined in **Table 1** below.

Period/ Time	Action
Mid 2000	Eden Resort Hotels purchases the site.
Aug 2000	Bega Valley Council approves rezoning to allow development.
Nov 2002	SEPP 71 commences – Master plan required & Minister is approval authority.
Mar/ Apr 2004	Master plan placed on public exhibition.
Mid 2005	New SEPP and Part 3A legislation for Major Projects.
Nov 2005	Letter from DoP stating proposal is a major project under Part 3A.
Nov 2007	Final Environmental Assessment Lodged and placed on public exhibition (DA 05-0032).
Aug 2008	Minister for Planning grants Concept Approval (DA 05-0032).
Dec 2008	Approval for minor modification to conditions of DA 05-0032.
Jul 2010	Marina proposal (this proposal) tabled and Minister requested to declare the project a major project pursuant to Part 3A and issue assessment requirements.
Sept 2010	Director General's Environmental Assessment Requirements (DGRs) issued.
Dec 2011	Second Approval for minor modification to conditions of DA 05-0032.
Aug 2012	Advice to Department of Planning advising Part 3A Application for Marina to be withdrawn due to amendments to legislation and repealing of Part 3A, and to be replaced with Part 4 Application.
Feb – Mar 2013	Request made to Director General for new DGRs and 21 March new DGRs received.

Table 1: History of Proposal

The marina did not form part of the original proposal. It has subsequently been recognised that its inclusion in the proposal will complement the tourism component of the proposal, responding to the demand for marina berths within Eden and reinforcing the commercial viability of the development.

1.3 Proponent

The Proponent is Eden Resort Hotel Pty Ltd (ERH). It is located at Suite 600, 72 Liverpool Street, Sydney NSW 2000. ERH has been involved in the proposed development of the site since its purchase of the site in 2000.

1.4 Director General's Requirements

In February 2013 the Director General of the Department of Planning and Infrastructure was consulted to obtain the Director General's Requirements (DGRs) for the redevelopment of the Marina pursuant to Part 4 of the Environmental Planning and Assessment Act. The Director General advised of these requirements by letter dated 21 March 2013, a copy of which is included in **Appendix 1**.

The advice notes that the Environmental Impact Statement (EIS) must meet the minimum form and content requirements in Clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

Clauses 6 and 7 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 are reproduced in **Appendix 2**.

The requirements were set out under a number of general headings and are addressed in this Statement as indicated in **Table 2** below.

DGR Requirement	Where Addressed in this EIS
Clause 6	
Form Requirements	Inside Cover
Clause 7	
Summary	Page 3
Statement of Objectives	Page 35
Analysis of Alternatives and consequences of not carrying out development	Page 53
Full description of proposal	Page 35
General description of Environment and detailed description of aspects that are likely to be affected	Page 17
Likely impact on environment of the development	Page 71
Full description of measures proposed to mitigate any adverse effects and summary in single section	Page 105
List of other approvals required	Page 104
Justification of carrying out development having regard to biophysical, economic and social considerations including principles of ecologically sustainable development	Page 108
Project Specific Issues	
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Aquaculture and Fishing	Page 101
Waste Management	Page 101
Ecologically Sustainable Development	Page 102
Original Concept Plan	Page 103

Table 2: DGR Response Schedule

2. OVERVIEW OF AFFECTED ENVIRONMENT

2.1 Site Description and Ownership

The site 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 wharf and the landside area where the wharf joins the land as shown 'Subject Site Plan' in Figure 2 below. It has two parts: land; and water.



Figure 2: Subject Site Plan

(Source: NSW Department of Lands)

An aerial photograph and views of the site and its context are provided in Figure 3 below.



View south into and across site to Bay from Site Entry, Cattle Bay Road



View North into site from Wharf and Foreshore

Figure 3: Existing Development (Aerial and Views)

(Source: Aerial Photograph Google Earth, Author)

2.1.1 Land

The land component comprises Lot 2 and part of Lot 4 in DP 1138056. A copy of the survey plan prepared by RW Surveyors is enclosed in **Appendix 3**. An extract of the survey is reproduced in **Figure 4** on the following page.

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 cannery.

Lot 4 comprises a strip of foreshore land commencing northwards from the seawall to the rear of the beach. It is owned by Bega Valley Shire Council and was dedicated to Council by ERH as part of its Part 3A Concept Approval. Formal long term access is required across Lot 4 by ERH to connect the landside marina facilities in Lot 2 with the jetty pontoons and berths. Access is proposed to be secured across Lot 4 via a narrow easement for access to be placed on the Lot's title.

Land Owner's Consent has been granted by Bega Valley Shire Council for Lot 4 and is enclosed in **Appendix 4**.

2.1.2 Water

Cattle Bay is located in the north-east corner of Nullica Bay, which with Calle Calle Bay north of Eden and East Boyd Bay to the south are the three main bays of Twofold Bay, the southern-most of five oceanic bays on the NSW coast.

The part of the subject site in Cattle Bay is Crown land. The area proposed to be occupied by the marina (pontoons, berths and access ways) is approximately 7.5 hectares, subject to survey and final resolution of the design and footprint of the wave attenuator. The NSW Land and Property Management Authority (now known as the Crown Land Division of the Department of Primary Industries) has agreed to deal directly with ERH on leasing the land for the proposed marina. A letter of agreement from the Authority is attached in **Appendix 4**.

Land Owner's Consent has been granted by the Minister for Lands on behalf of the Crown and a copy is also enclosed in **Appendix 4**.

2.2 Land Part of Site

2.2.1 Existing Development

The site comprises a series of level concrete building slabs. They are the remaining foundations of the Heinz cannery buildings that previously occupied the site, the majority of which have now been demolished. Two obsolete cannery buildings, 1-3 storeys high, remain in the north eastern corner of the cleared area and are generally outside the subject site. They do not form part of the site that is subject to this proposal.

An extract of the survey is reproduced in **Figure 4** below.

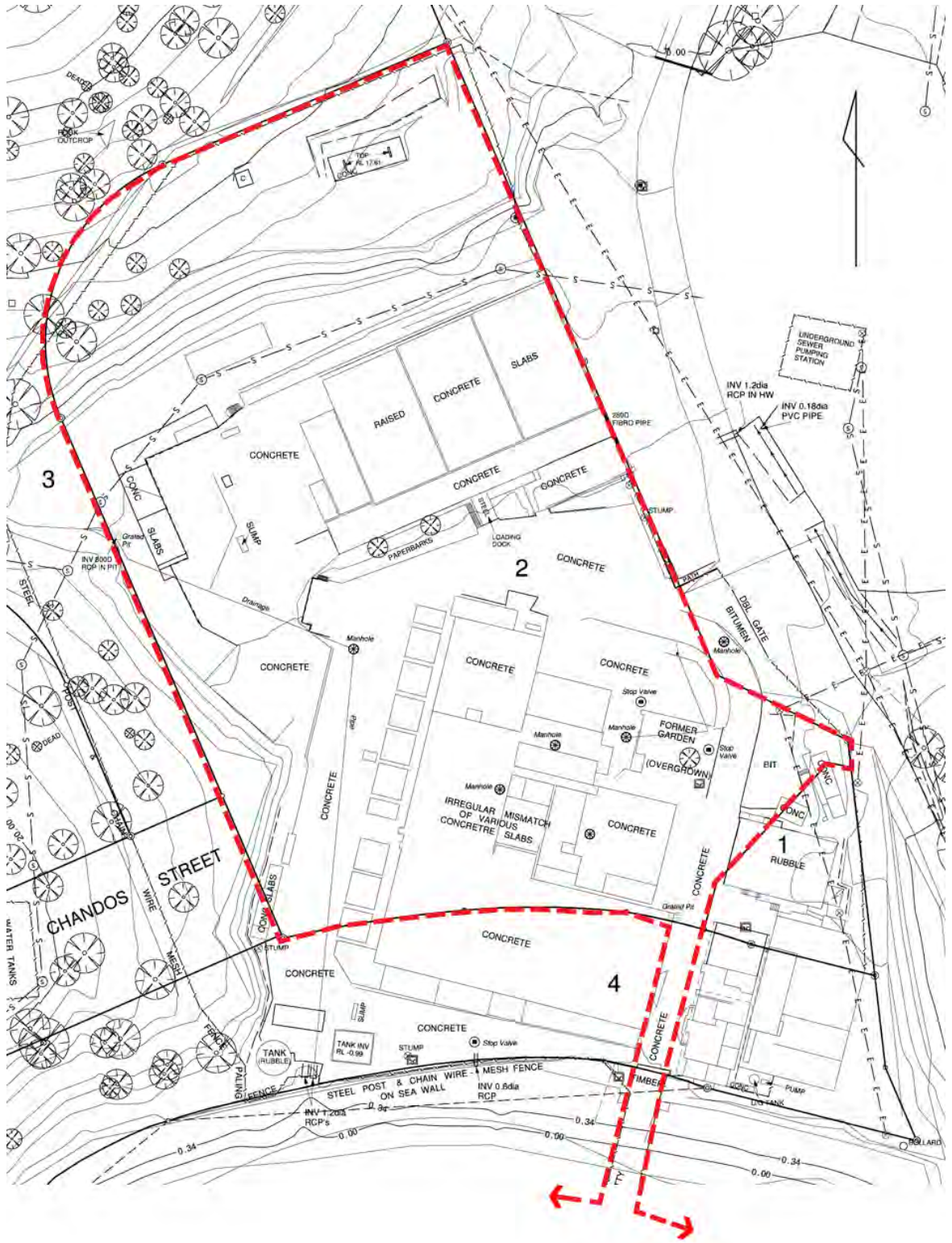


Figure 4: Extract of Survey of Lots 2 and 4 Indicating Subject Site

2.2.2 Aboriginal and European Heritage

An Aboriginal Heritage Impact Assessment was prepared by South East Archaeology in January 2007 as part of the investigations for the Part 3A Concept Application (DA 05-0032) for the tourist and residential proposal.

One Aboriginal finding (an artefact scatter, 'Cattle Bay 1') was identified in the south western corner in a location distant from the part of the site subject to this application. The Assessment concluded that there was a low potential for further aboriginal heritage evidence to occur on the site.

There are no items of environmental heritage listed in Schedule 5 of the Bega Valley LEP 2002 or on the State Heritage Register located on the site or in close proximity to the site. None of the remaining buildings or jetty are recognised as having any heritage significance.

2.2.3 Contamination

A previous site assessment prepared by Aargus Australia in June 2007 that accompanied the Part 3A Concept Application (DA 05-0032) provided an analysis of the potential contamination on the site, and the suitability of the site for the proposed tourist and residential use.

Its investigations found that all test results met the criteria for residential and tourist accommodation (National Environmental Protection Council (1999) National Environmental Protection (Assessment of Site Contamination) Measure) with the exception of heavy metals that were above the standard for both low density residential dwellings and garden areas. It concluded and recommended that the site can be made suitable for residential use with access to soil subject to scraping off the top 0.15 metres of surface soils at the site and as such was suitable for the proposed tourist and residential development based upon meeting that recommendation.

2.2.4 Stormwater, Drainage and Infrastructure

The stormwater drainage system and power, sewerage and water infrastructure supplies previously associated with the cannery facility remain within the site. Patterson Britton and Partners undertook an investigation in September 2007 as part of their preparation of an Infrastructure Strategy for the Part 3A Concept Application (DA 05-0032) and more recently in 2014 Royal Haskoning DHV undertook an updated water and wastewater servicing strategy for the building the marina and temporary (Appendix 20).

Of relevance to this proposal, the assessment noted:

- The former cannery use was a considerable potable water and energy user and the site enjoys good connections to potable water, wastewater and energy supplies. The proposed development would create only small scale water demand and wastewater loadings;
- Council has confirmed that the Cattle Bay site is located within Eden's sewer boundary and has been considered in the development of the sewer DSP. There is spare capacity at the sewage treatment plant for this development. A Council sewerage pumping station directly adjoins the site, PS3 and the onshore marina facilities can be readily connected to the gravity main adjoining the site via manhole DZ1; and
- None of the drainage corridors that pass through the site have been assessed by the (then) Department of Natural Resources as comprising 'rivers;'

2.2.5 Landform

The site is surrounded by elevated land to the north east and west with slopes varying from 10 to 25% percent to establish a vegetated amphitheatre in the centre within which is the level part of the site. The level part of the site contains the concrete slabs, comprising the remaining foundations of the former cannery buildings.

2.2.6 Flora and Fauna

Flora and fauna surveys previously carried out by Cumberland Ecology on behalf of ERH for the Part 3A Concept Application in 2007 identified a number of threatened species in the vegetated areas outside Lots 2 and 4. These comprise species listed as Vulnerable under schedule 2 of the *Threatened Species Conservation Act 1995* including the Yellow-bellied Glider; 4 microbats (Eastern False Pipistrelle, Eastern Bentwing bat, Eastern Freetail bat and Large-footed Myotis); and 2 native birds (Masked Owl and Glossy Black Cockatoo).

2.2.7 Roads and Access

Vehicular access to the site is via Cattle Bay Road which intersects with the Princes Highway approximately 500 metres to the north of the site. Transport and Traffic Planning Associates undertook an assessment of traffic and parking as part of the investigations for the Part 3A Concept Application (DA 05-0032). Of relevance to this proposal the assessment noted:

- The former cannery use at its peak of operation employed some 500 persons and involved significant car and truck movements into and out of the site; and
- Traffic surveys undertaken at the principal access intersections in the area during the morning and afternoon peak periods highlighted that Cattle Bay Road carries negligible traffic. At Cattle Bay Road south of Mitchell Street two-way morning and afternoon peak traffic is a low 33 and 39 vehicles per hour respectively

There is currently no formal public access into the site. However, limited public access is available to the beach via informal pedestrian tracks from Cattle Bay Road to the east, Bay Street to the west and the foreshore. The jetty is also used by the public, accessed from the beach and Cattle Bay Road. However, the jetty remains licensed to Eden Resort Hotel Pty Ltd and current public use of the structure is not legal and not endorsed by Eden Resort Hotel Pty Ltd.

2.3 Water Part of Site

2.3.1 Existing Development

Approximately 7.5 hectares of the site comprise the waters of Cattle Bay surrounding the existing wharf extending from the foreshore. This is subject to survey and final footprint of the wave attenuator and is generally as illustrated in **Figure 5** below. Cattle Bay is a cove located within Snug Cove, Twofold Bay adjacent and to the west of Eden Harbour, and immediately south of the town of Eden.

Approximately 24 swing moorings, leased by the RMS (Maritime) are contained within the proposed marina footprint area (though not all were occupied at the time of the photograph in Figure 5).



Figure 5: Approximate Location of Marina Water Footprint (Subject to Survey and Final Attenuator Design)

(Source of Base Plan NSW Department of Primary Industries)

The cove comprises a sandy beach backed by rock and masonry seawall structures, and contained between adjacent rocky headlands. A dominant feature of Cattle Bay is the former Heinz Cannery jetty extending some 150m from the shoreline (refer to the views in Figure 6).



View looking west along the beach at Cattle Bay from the jetty showing the masonry seawall in the foreground and rocky headland in the background (2012).



View looking east along the beach at Cattle Bay from the jetty showing the rock seawall and rocky headland (2012).



View of Cattle Bay Jetty taken in the early 1900's. Note the commercial fishing vessels lying alongside the structure and recreational fishing activity from the jetty.



View of Cattle Bay Jetty from the beach looking south-east towards Eden Harbour (2012).

Figure 6: Views of Foreshore

(Source Haskoning Australia)

2.3.2 Bathymetry

The bathymetry, or water depths, in Cattle Bay are shown in Figure 7 below and discussed in the report by Ocean Environmental Consulting in Appendix 17. The depths are expressed in metres below Chart Datum (CD). Chart Datum is approximately the level of Lowest Astronomical Tide (LAT) or a datum about 0.9m below Australian Height Datum (AHD).

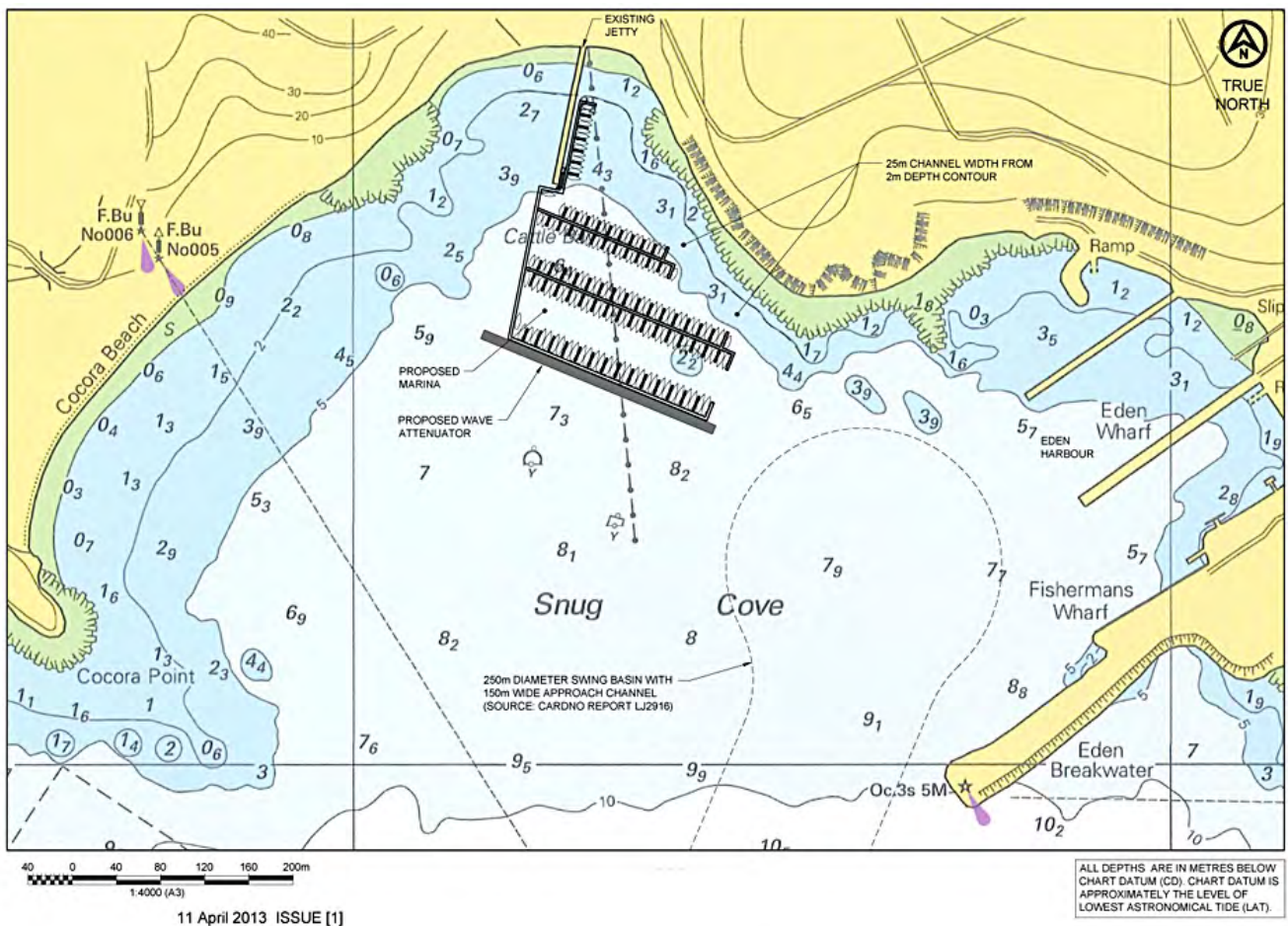


Figure 7: Cattle Bay Water Depths

(Source Haskoning Australia)

The following is evident from Figure 7:

- Water depths within the waterway north of a line joining Cocora Point and Eden Breakwater are generally less than 10 metres below CD (-10m CD);
- The water depth at the end of Cattle Bay Jetty is approximately -5 metres CD;
- Seabed slopes off the sandy Cocora Beach out to the -5m CD depth contour are typically about 1 vertical to 22 horizontal (1V:22H). Seabed slopes off the headland to the east of Cattle Bay between Cattle Bay and Eden Harbour, are steeper indicating a rocky seabed;
- There are a number of isolated shallow spots in the vicinity of Cattle Bay, for example:
 - > a depth of -0.6m CD within the -2 and -5m CD depth contours off the northern end of Cocora Beach;
 - > a depth of -2.2m CD beyond the -5m CD contour on the eastern side of Cattle Bay; and
 - > two depths of -3.9m CD beyond the -5m CD contour off Thompsons Point between Cattle Bay and Eden Harbour.

The shallow spots are likely to be rock pinnacles, such as that observed during the diver inspection in January 2013 conducted for the marine ecology survey (refer to view in Figure 8 below).



Figure 8: Rock Pinnacle

View of underwater rock pinnacle observed during marine ecology survey.

The map in **Figure 7** also depicts a submarine pipeline running approximately north-south commencing in a depth of about -8m CD and connecting to land near the base of the Cattle Bay Jetty. The Admiralty symbol for the pipeline on the Chart suggests it is an oil pipeline, which is expected to now be redundant since closure of the Cannery site. This would need to be confirmed during detailed engineering design for the proposed marina and wave attenuator.

2.3.3 Water Levels

Still water levels in Cattle Bay are dominated by astronomical tide. Tidal planes at Eden are shown in **Table 2**, relative to both Chart Datum (CD) and Australian Height Datum (AHD).

Highest Astronomical Tide (HAT)	2.1 m CD	1.0 m AHD
Mean High Higher Water (MHHW)	1.8 m CD	0.7 m AHD
Mean Lower High Water (MLHW)	1.2 m CD	0.1 m AHD
Mean Sea Level (MSL)	1.0 m CD	-0.1 m AHD
Mean Higher Low Water (MHLW)	0.8 m CD	-0.3 m AHD
Mean Lower Low Water (MLLW)	0.2 m CD	-0.9 m AHD
Lowest Astronomical Tide (LAT)	0.0 m CD	-1.0 m AHD

Table 2 Tidal Planes at Eden

(Source: Cardno 2011)

At times of ocean storms, still water levels can be further elevated by the effects of storm surge (barometric setup¹ and wind setup²) and wave setup (caused by breaking waves³). Individual waves also cause temporary water level increases above still water level due to the process of wave run-up or uprush. In addition, sea level is also predicted to rise due to climate change (the Greenhouse Effect).

The Office of Environment and Heritage (previously the Department of Environment Climate Change and Water) has provided an estimate of design ocean still water levels (excluding wave setup and wave run-up, but including sea level rise⁴) for the NSW coastline for various average recurrence interval (ARI) ocean storm events and planning periods, relative to AHD. These values are set out in Table.

ARI (years)	Design Still Water (m AHD)		
	2010	2050	2100
0.02	0.97	1.31	1.81
0.05	1.05	1.39	1.89
0.1	1.00	1.44	1.94
1	1.24	1.58	2.08
10	1.35	1.69	2.19
50	1.41	1.75	2.25
100	1.44	1.78	2.28

Table 4: Potential ocean still water levels (excluding wave setup and wave run-up) in NSW for various ARI's and planning periods

(source: DECCW 2010)

2.3.4 Wind Climate

Wind data is available from two weather stations operated by the Bureau of Meteorology (BOM) at Merimbula Airport and at Green Cape. Cardno (2011) and MHL (2007) provide various analyses of this data, including time series, frequency distributions and wind roses.

¹ Barometric setup is a localised vertical rise in the still water level due to a reduction in atmospheric pressure. The increase in water level is approximately 0.1m for each 10 hectopascal drop below normal barometric pressure of 1013 hPa (MHL, 1992). Note that hectopascals are approximately equivalent to millibars.

² Wind setup is the vertical rise in the still water level on the leeward side of a body of water caused by wind stresses on the surface of the water.

³ Wave setup is defined as the super elevation of the mean water level caused by wave action alone. The phenomenon is related to the conversion of the kinetic energy of wave motion to quasi-steady potential energy. It is manifested as a decrease in water level prior to breaking, with a maximum set down at the break point; from the break point the mean water surface slopes upward to the point of intersection with the shore (Coastal Engineering Research Centre, 1984).

⁴ The sea level rise estimates included in Table 4 were the planning benchmarks set out in the NSW Government's Sea Level Rise Policy Statement (NSW Government, 2009), namely projected rises in sea level (relative to 1990 mean sea level) of 0.4m by 2050 and 0.9m by 2100. In September 2012, the NSW Government announced significant changes to the way the NSW coast will be managed, including that the 2009 NSW Sea Level Rise Policy Statement is no longer NSW Government Policy. Any reference to the 'NSW sea level rise planning benchmarks' in guidelines and documents were to be taken as meaning 'Council's adopted sea level rise projections', where available. It is understood that at the present time BVSC has retained adoption of the original NSW Government's planning benchmarks for sea level rise, hence the potential still water level values in Table 4 still apply.

The winds of most significance to the proposed Cattle Bay Marina are those from the south to south-south-west which blow over a fetch length of more than 4 km and create relatively high local wind waves (sea) at the subject site and within the adjacent Eden Harbour.

2.3.5 Wave Climate

Wave climate information for the Cattle Bay area is available from two main sources; wave data recorded by MHL (MHL, 2007) and numerical modelling of waves undertaken by Cardno (Cardno, 2011 and 2014 in **Appendix 16**).

Recorded Data

Wave data have been recorded by MHL at two locations within Eden Harbour, using a EWS (electronic wave and tide monitoring system) fixed to the western jetty (in 4m water depth), and a waverider buoy (in 9m water depth). The EWS recorded data from 1984 to the present and the buoy recorded data from 1984 until 1987. The location of the EWS device is shown in **Figure 9** below.

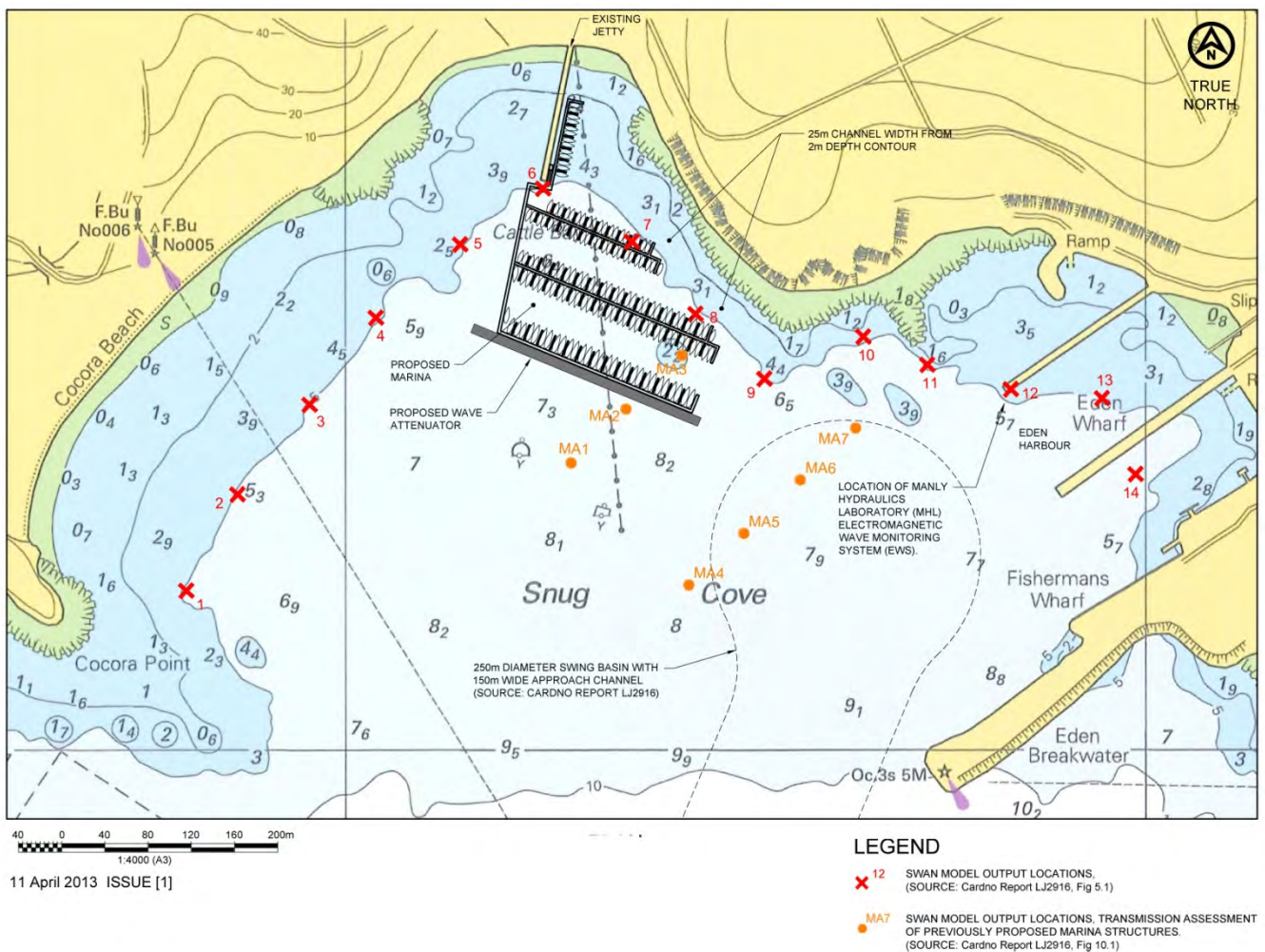


Figure 9: Location of Wave Data Information

(Source Haskoning Australia)

Storm event wave data recorded at Eden Harbour EWS, defined here as events having a peak significant wave height H_s greater than 0.6m, are presented in **Table** below for the time period 1984 to 2006. These data are representative of local seas, having wave periods less than 3.0-3.5 seconds.

It is evident from **Table 5** that a peak significant wave height greater than 0.6m has been recorded in Eden Harbour on some 28 occasions over the 22 year period of records, or slightly greater than on one occasion per year on average. As the local seas measured at the EWS site are also representative of the Cattle Bay marina site⁵, and this incident wave climate exceeds the acceptable wave climate criteria in small craft harbours set out in the Australian Standard AS3962-2001 'Guidelines for Design of Marinas', some form of attenuation of incident wave climate is required for satisfactory development of a marina at Cattle Bay (further discussed in **Section 3.2.4**).

Event Start Date	Event Finish Date	Peak H_s (m)	Peak H_{max} (m)	Average T_{p1} (sec)	Event Duration (hrs)
09-Jan-1985	09-Jan-1985	0.60	1.31	2.9	1
06-Aug-1988	06-Aug-1988	0.64	1.06	2.9	2
18-Sep-1988	18-Sep-1988	0.63	1.07	2.6	2
12-Oct-1988	12-Oct-1988	0.66	1.11	3.0	2
14-Apr-1989	14-Apr-1989	0.61	1.17	2.6	1
11-Jul-1989	11-Jul-1989	0.64	1.11	2.7	3
02-Sep-1989	02-Sep-1989	0.66	1.29	2.9	1
21-Apr-1991	21-Apr-1991	0.70	1.28	2.8	4
26-Oct-1993	26-Oct-1993	0.64	1.00	3.3	1
06-Dec-1995	06-Dec-1995	0.73	1.27	3.6	1
21-Jul-1996	21-Jul-1996	0.77	1.31	2.8	3
12-Oct-1996	12-Oct-1996	0.63	1.14	2.8	2
12-Mar-1997	12-Mar-1997	0.69	1.24	2.7	1
06-Apr-1997	06-Aug-1997	0.67	1.11	2.7	1
09-Jul-1997	09-Jul-1997	0.62	1.07	2.9	1
24-Aug-1997	25-Aug-1997	0.74	1.15	2.8	4
02-Dec-1997	02-Dec-1997	0.62	1.03	3.0	1
13-Apr-1998	13-Apr-1998	0.73	1.38	2.7	3
24-Jun-1998	24-Jun-1998	0.86	1.41	3.1	5
10-Jul-1998	10-Jul-1998	0.80	1.37	3.0	2
15-Jan-2001	15-Jan-2001	0.98	1.74	3.4	3
18-Nov-2001	18-Nov-2001	0.92	1.70	3.9	2
09-Feb-2002	10-Feb-2002	0.78	1.40	2.8	5
10-Jul-2002	10-Jul-2002	0.85	1.35	3.0	4
06-Dec-2002	06-Dec-2002	0.63	1.20	2.7	2
09-Mar-2004	09-Mar-2004	0.61	1.06	2.8	1
14-Dec-2004	14-Dec-2004	0.70	1.33	2.5	3
29-Nov-2006	29-Nov-2006	0.69	1.26	3.2	1

Table 5: Eden Harbour EWS, Events with Significant Wave Height Greater than 0.6m November 1984 to March 2007 (Source: MHL 2007)

Note:

¹ A number of events may not have been recorded due to EWS system failures.

² Peak H_s is the highest significant wave height recorded during a storm event, where significant wave height is the average height of the one-third highest waves of a given wave group.

⁵ This has been demonstrated in the numerical modeling studies by Cardno (2011).

³ Peak H_{max} is the highest maximum wave height recorded during a storm event.

⁴ Average T_{p1} is the average spectral peak recorded during a storm event.

Numerical Modelling

Cardno (2011) developed a calibrated two dimensional (2D) numerical wave model to estimate the incident wave climate at a number of 'output locations' from Eden Harbour west to Cocora Point which includes the shoreline of Cattle Bay. These output locations are shown in **Figure 9** above.

Wave conditions were determined for the 1 year ARI and 50 years ARI storm events. These two ARIs are relevant as they form the basis for the criteria in Australian Standard AS3962-2001 "Guidelines for Design of Marinas" governing acceptable wave climate in small craft harbours.

Wave conditions were determined in terms of both local seas, due to winds blowing across Twofold Bay, e.g. from the south to south-west, and from ocean swell, due to ocean storms emanating from a number of offshore swell directions. For convenience it is useful to consider the local seas and ocean swell separately. It is also fair to say that the swell directions which give rise to the greatest swell wave height at Cattle Bay (swell from the east and east-south-east) are not likely to be associated (simultaneously) with winds on Twofold Bay from the south to south-west.

Swell

Eden Harbour is well protected against ocean swell activity, afforded by headlands and Eden Breakwater. Cattle Bay is slightly more exposed but is still offered significant protection.

Cardno (2011) undertook numerical modelling of ocean swell penetration into Snug Cove. Results have been extracted for various locations as shown in **Figure 9** above. The estimated swell waves within Cattle Bay and west and east of Cattle Bay are set out in **Table** below.

Generally, for craft at marinas, the occurrence of longer period ocean swell is not as critical as the shorter period local wind generated waves (seas), since the natural period of motion of marina craft is similar to the period of the local seas, e.g. around 3 seconds, and thus local seas can accentuate the roll and pitch of marina craft.

Model Output Location	Average Recurrence Interval (Years)				Offshore Direction
	1		50		
	Hs (m)	Tp (s)	Hs (m)	Tp (s)	
3	1.32	10.4	1.68	12.2	ESE, E
4	1.01	11.0	1.30	12.7	ESE, E
5	0.71	11.5	0.93	13.2	ESE, E
6 (Cattle Bay)	0.42	11.8	0.56	13.3	ESE, E
7	0.49	12.5	0.65	14.0	ESE, E
8	0.42	12.6	0.55	14.1	ESE, E
9	0.34	12.6	0.45	14.2	ESE, E

Table 6: Incident Wave Climate - Ocean Swell

(Source: Cardno 2011)

Local Wind Waves

The results of the Cardno (2011) modelling of the local wind waves are summarised in **Table 7** below. The results are generally consistent with the recorded data at the EWS site (refer Model Output Location 12). It is also noted that the results for the proposed Cattle Bay marina site are quite similar in terms of significant wave height and period to the EWS site, although the critical wave approach directions are slightly different, namely 188°TN versus 218°TN, i.e. critical waves for the Cattle Bay site are more southerly, as would be expected.

The numerical modelling results confirm that attenuation of the incident local wind generated wave climate (seas) would be required in order to satisfy the Australian Standard AS3962-2001 'Guidelines for Design of Marinas' for acceptable wave climate criteria within a marina.

Model Output Location	Average Recurrence Interval (Years)				Direction (°TN)
	1		50		
	Hs (m)	Tp (s)	Hs (m)	Tp (s)	
3	0.75	3.1	1.10	3.7	175
6 (Cattle Bay)	0.68	3.1	1.03	3.8	188
9	0.78	3.1	1.18	3.9	202
12 (EWS)	0.66	3.1	1.00	3.8	218
MA1	0.78	-	1.12	-	-
MA2	0.75	-	1.0	-	-
MA3	0.7	-	1.05	-	-

Table 7: Incident Wave - Climate Local Sea

(Source: Cardno 2011)

2.3.6 Geotechnical Conditions

The surface sediment samples collected within the general proposed marina area as part of the diver inspection conducted for the marine ecology survey showed the surface material to generally comprise fine to medium grained sand with less than 10 to 15% by weight mud (silts and clays). The existence of isolated rock pinnacles with the Cattle Bay marina area (refer to **Figure 8**) indicates that rock may be near the seabed surface in places and some piles may need to be potted into rock.

A rock pinnacle is located within the proposed marina footprint, between Arms 'B' and 'C'. This rock pinnacle would require lowering to allow safe berthing and navigation. Further discussion is provided in **Part 6.11.1**.

Additional geotechnical comment is provided by Royal HaskoningDHV in **Appendix 19**. It is evident that geotechnical conditions are no impediment to the installation of piles for construction of the marina and wave attenuator.

2.3.7 Aquatic Flora and Fauna

Marine Pollution Research Pty Ltd has prepared a comprehensive aquatic ecology assessment of the site comprising review of previous studies and site inspection and Ocean Environmental Consulting has undertaken additional investigation including hydrographic mapping and marine mammal risk profiles. These reports are enclosed in **Appendices 5 and 17** respectively.

In summary the assessments note the following:

- The main aquatic habitats in Cattle Bay are:
 - > Bare sand habitats (the beach, shallow intertidal sands and offshore sands). The sub tidal sand habitat supports shallow inshore seagrass beds or patches and more sparse and irregular cover of seagrass in deeper waters;
 - > Rock habitats (intertidal rocky shores and shallow to deep rock reefs or boulder reefs);
 - > Constructed habitat (the wetted surfaces of the jetty support piles, mooring tackle and pipelines).
- The sandy sediments within Cattle Bay would be expected to support a diverse benthic fauna of polychaete worms, molluscs and crustaceans as evidenced by the abundance of borrows observed in the sand;
- Surrounding the existing jetty there is a patchy cover of assorted timber, tyre and metal rubbish associated with the old cannery;
- The concentrations of contaminants found in the sediments are low; and
- Marine mammals (various whales, dolphins and seals) make use of Twofold Bay predominantly seasonally but also all year round, and there are a number of introduced marine species in Twofold Bay.

More detail is provided in **Appendices 5 and 17**.

2.4 Surrounding Development

Beyond the wooded areas in and surrounding the site are low density housing areas in the residential streets of the town of Eden.

To the north east, on Imlay Street, is Eden town centre and to the south east, is the working port of Snug Cove.

Further west of Cattle Bay is Cocora Beach, a relatively wide and long sandy beach, popular for swimming and general recreation. It is separated from Cattle Bay by a significant rocky outcrop and headland (refer to the views in **Figure 10** below).

To the east of Cattle Bay is Eden Harbour, the base for commercial fishing and other commercial maritime activities (refer to **Figure 3**). The foreshore between Cattle Bay and Eden Harbour comprises principally rocky headland, gravel beaches and rock seawalls (refer to the views in **Figure 11** below).



View looking south-west over Cattle Bay and Cattle Bay Jetty to Cocora Beach



Rocky outcrop at the northern end of Cocora Beach separating this beach from Cattle Bay. Cattle Bay Jetty is visible in the background

Figure 10: Views of Cocora Beach

(Source Haskoning Australia)



View looking west from Eden Harbour to the rocky headland and gravel beach (2012).



View of rock seawall within Eden Harbour (2012).

Figure 11: Views of Foreshore Between Site and Eden Harbour

(Source Haskoning Australia)

2.5 Views into and Out of the Site

Due to the elevation of the land and the presence of vegetation there is negligible overlooking of the site and the waters of Cattle Bay from dwellings immediately adjoining the site.

That said, filtered views through trees are available from surrounding roads (primarily the southern end of Cattle Bay Road) and extensive, but distant, ground level views are available into the site from the western end of Cocora Beach, 650 metres to the west and viewing points further afield. At the eastern end of the beach, direct views (comprising a distance of approximately 200 metres) are available into the site on the rocky promontory that terminates the beach strip.

The views from Cocora Beach also extend to the existing swing moorings and Snug Cove to the south of the site. The extent and character of the principle views are illustrated in Figure 12 below.



Figure 12: Views Into and out of the Site

(Source: Aerial Photograph Department of Primary Industries, Inspire Planning)

3. THE PROPOSAL

3.1 Objectives

The objectives that have guided the proposal are:

- Ensure customer and visitor needs are met through the provision of an inviting, accessible, high quality and affordable marina facilities;
- Link and integrate the proposed marina facility with the proposed tourist facilities subject to the previous approval;
- Deliver a marina facility that has been informed by engagement with Eden residents, business and community groups, Agencies and other key stakeholders and that demonstrates evidence based decision making;
- Support the Government's imperative to promote economic growth in Eden by increasing the potential range of tourism and resident visitation, investment and employment opportunities; and
- Contribute to environmental, social and economic sustainability by improving liveability and minimising any impact on the environment and the community of Eden and Twofold Bay.

3.2 Description and Layout

3.2.1 Overview

Plans of the proposed marina prepared by Black Architects and Haskoning Australia are summarised in the site plan in **Figure 13** below and provided in detail in **Appendix 6**.

The proposal comprises:

- i) A total of approximately 154 berths in three floating pontoon arms restrained by piles;
- ii) relocation of 24 swing moorings outside the marina area in locations to be confirmed with the RMS (Maritime) and the Eden Port Authority;
- iii) A fixed wave attenuator located parallel with, and along, the southern pontoon arm;
- iv) Minor refurbishment of the existing wharf;
- v) 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. The exact mix of berth sizes will be finalised in the preparation of final documentation for the project;
- vi) Provision of power, lighting, water, fire fighting equipment, mobile 'muck truck' (for small scale pump out) and security access controls to the pontoons and berths;
- vii) Connection to existing potable water, sewer and power supplies to serve the temporary building and fire fighting;

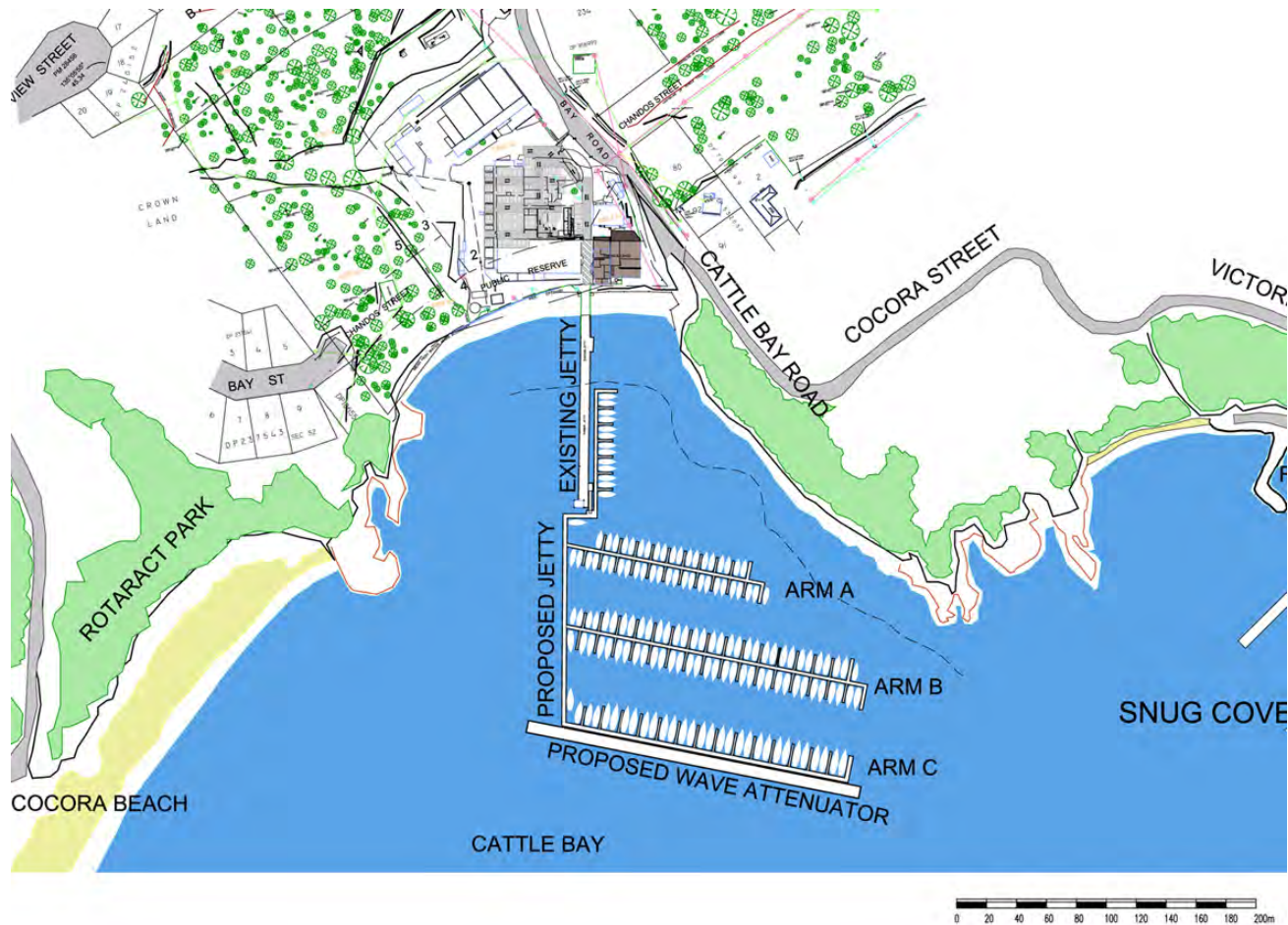


Figure 13: Plan of Proposed Development

(Note: wave attenuator final design will differ as it has evolved through the EIS process as sketched in Section 6.9; refer Figure 29).

(Source: Black Architecture, not to scale)

- viii) 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);
- ix) 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);
- x) The car park will utilise the existing site access gate off Cattle Bay Road; and
- xi) Temporary (portable) building to house marina administration and toilets. Access will meet disability standards.

No fuelling or fixed sewerage pump out 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.

3.2.2 Design Approach

The layout of the proposed marina and wave attenuator superimposed on the available bathymetric (water depth) information is shown on **Figure 14**. A more detailed general arrangement of the proposed marina showing principal dimensions is shown in **Figure 15**.

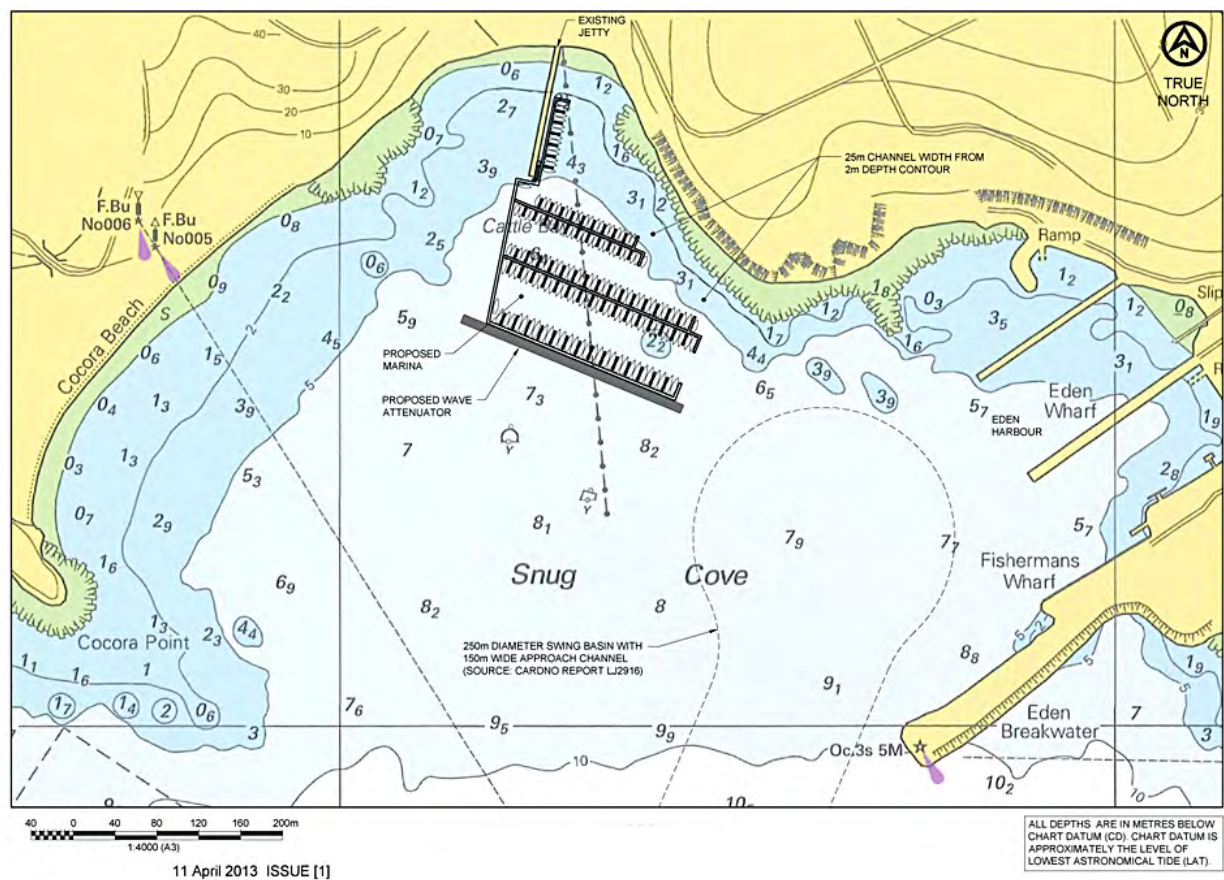


Figure 14: Siting of Marina and Water Depth

(Note: wave attenuator final design will differ as it has evolved through the EIS process as sketched in Section 6.9; refer Figure 29)

(Source: Haskoning Australia)

The main components of the proposal are described in the following sections. It is noted that the marina has been located within adequate natural water depths to comply with the Australian Standard AS 3962-2001 'Guidelines for Design of Marinas', hence no dredging is required. (Lowering of an isolated rock pinnacle, which would otherwise be a navigation hazard, will be required. This is described in **Part 6.11** below).

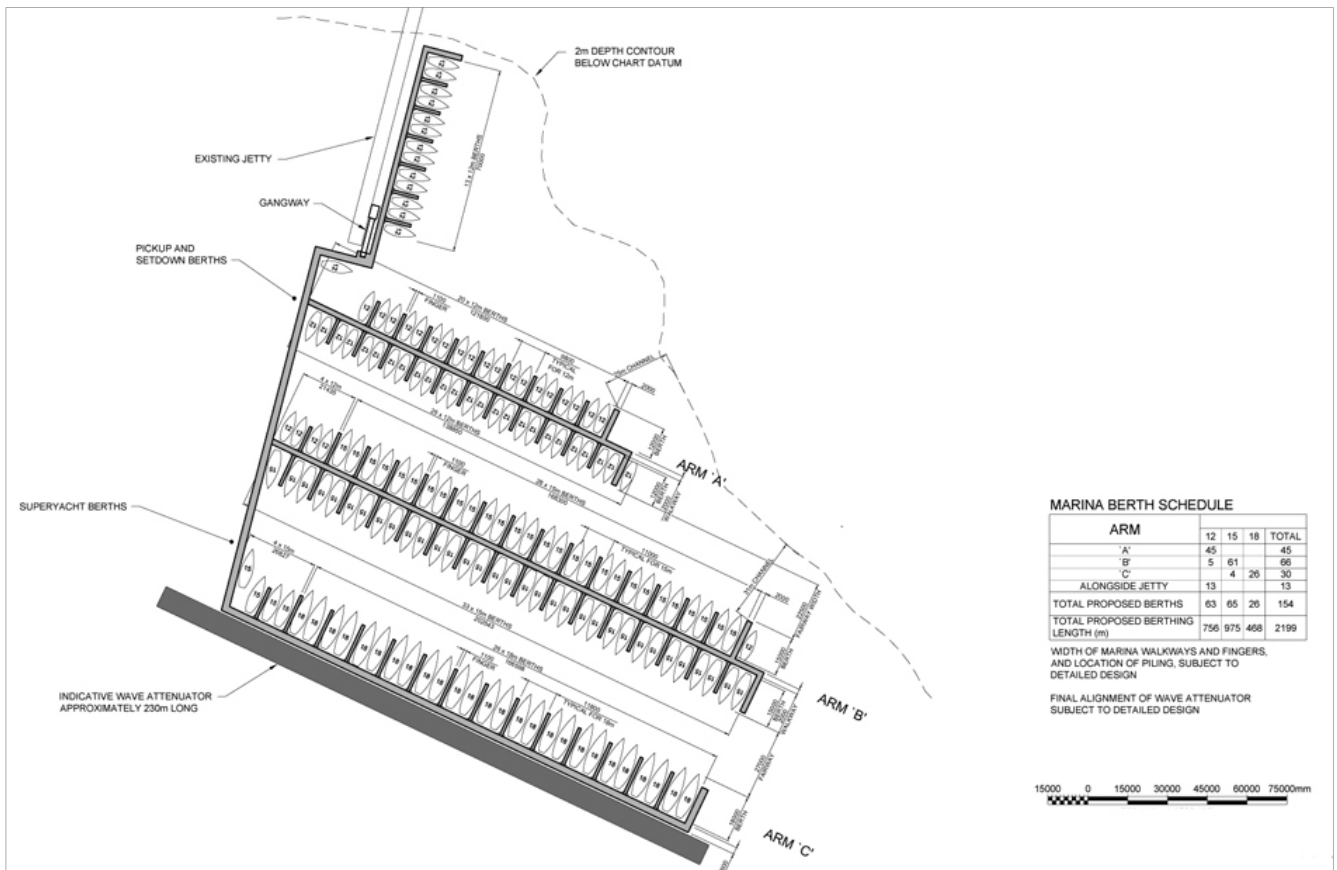


Figure 15: Detail of Marina

(Note: wave attenuator final design will differ as it has evolved through the EIS process as sketched in Section 6.9; refer Figure 29)

(Source: Haskoning Australia)

3.2.3 Refurbishment of Existing Cattle Bay Jetty

The existing jetty will be retained and refurbished as part of the proposed marina development. The jetty will provide the means of access from the foreshore to the marina. Casual berthing of vessels will also take place along the western side of the jetty as was the case in the past (refer to historic photo in Figure 6).

The existing jetty is generally in reasonable condition. A detailed condition assessment of the existing structure will be undertaken prior to detailed design to identify individual members within the structure which may require replacement or upgrading (for example individual piles, headstocks, decking, kerbs and fendering). This will ensure that the structure is fit for its future purpose, which is fit for public access and for berthing of the design vessel(s).

The materials used in the refurbishment would be timber, in keeping with the existing appearance of the structure. The timber species would be selected for their durability in the marine environment.

The proposed upgrade to the wharf is consistent with the terms of the lease and ordinarily does not require approval under Part 4 of the EP & A Act.

3.2.4 Wave Attenuator

Wave Attenuation Performance Requirements

The incident wave climate at the proposed Cattle Bay marina site, described in **Section 2.4.5** above, is such that wave attenuation is required in order to satisfy the Australian Standard AS3962-2001 'Guidelines for Design of Marinas' for an acceptable wave climate within the marina.

The critical incident wave climate comprises the local wind generated waves from the south/south-south-west generated by strong winds blowing over a fetch of more than 4km. The wave periods associated with the local wind waves, typically up to 3.0 to 3.5 seconds, are close to the natural period of motion of marina craft and thus can cause accentuated roll and pitch of the marina craft. On the other hand, marina craft tend to 'ride over' longer period swell and thus the swell wave climate is less critical.

Table 8 sets out the criteria for a 'moderate' wave climate in small craft harbours from Australian Standard AS3962-2001 'Guidelines for Design of Marinas'. Adoption of the 'moderate' wave climate in this case is considered reasonable based on the commentary in the Australian Standard for vessels less than 20m in length (the situation for the proposed Cattle Bay Marina) and on the basis that the moderate criteria have been adopted for a number of other marina developments exposed to relatively long fetches.

Direction & peak period of design harbour wave	Significant Wave Height (Hs)	
	Wave event exceeded once in 50 years	Wave event exceeded once a year
Head seas greater than 2 secs	less than 0.75m	less than 0.38m
Oblique seas greater than 2 secs	less than 0.50m	less than 0.38m
Beam seas greater than 2 secs	less than 0.31m	less than 0.19m

Table 8: Criteria for 'Moderate' Wave Climate in Small Craft Harbours
(adapted from AS3962-2001)

Table 9 below sets out the predicted incident local wind generated wave climate based on the numerical modelling study undertaken on behalf of Crown Lands NSW and Bega Valley Shire Council by Cardno (2011). The incident wave climate is listed for four model output locations, the positions of which are shown on **Figure 16**.

Model Output Location	Average Recurrence Interval (years)				Direction (°TN)
	50 years		1 year		
	H _s (m)	T _p (s)	H _s (m)	T _p (s)	
3	1.10	3.7	0.75	3.1	175
6 (Cattle Bay)	1.03	3.8	0.68	3.1	188
9	1.18	3.9	0.78	3.1	202
Average for 3, 6 and 9	1.10	3.8	0.74	3.1	188

Table 9: Incident Wave Climate – Local Wind Generated Waves

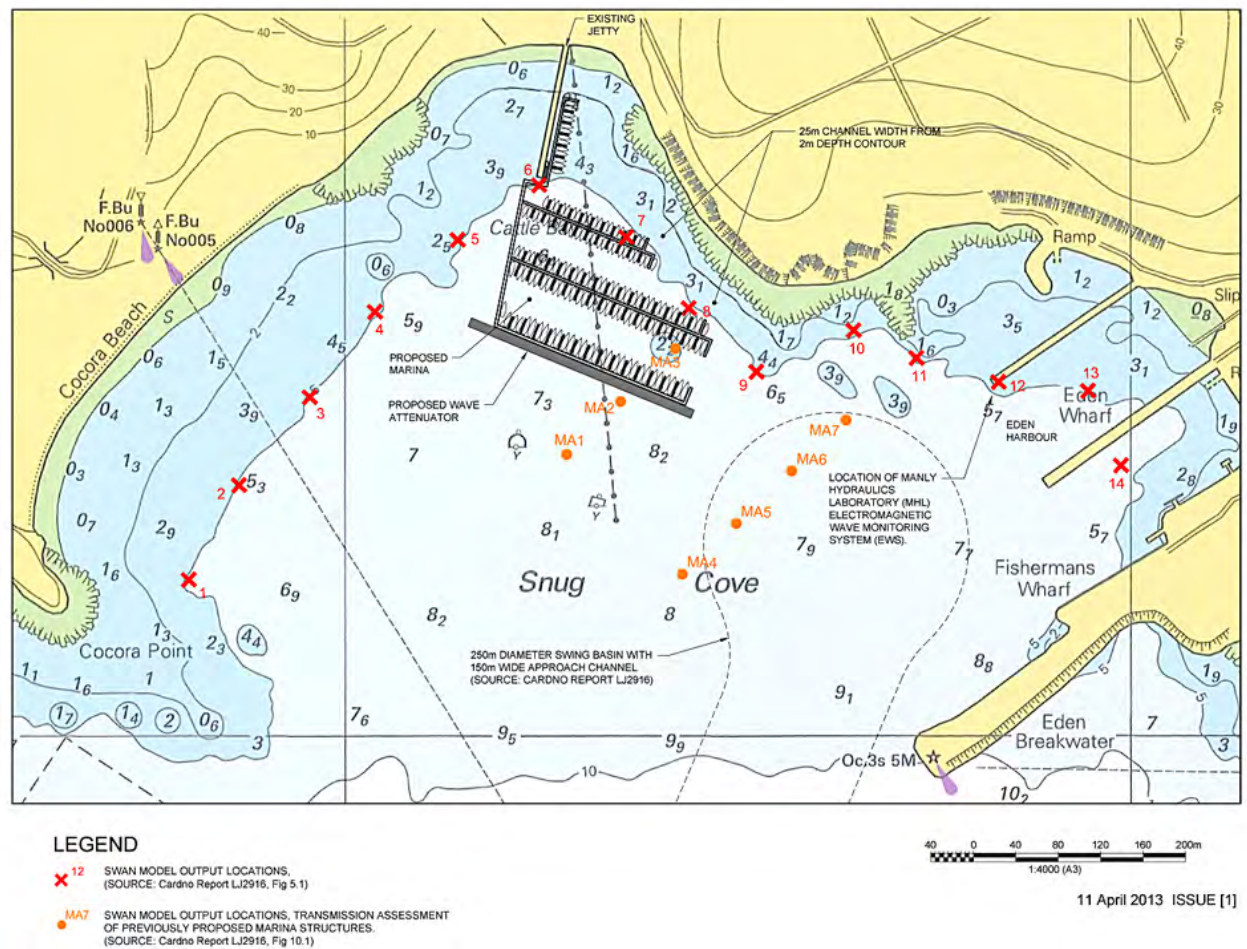


Figure 16: Model Output Locations

(Source: Haskoning Australia)

Based on this incident wave climate and the 'moderate' wave climate criteria in **Table 8**, it is possible to determine the transmission coefficient K_T that the wave attenuator must achieve (The transmission coefficient K_T is the ratio of the transmitted wave height H_T , i.e. the wave that passes through the wave attenuator, to the incident wave height H_i , for the given wave period. The lower the required value of K_T , the greater attenuation that must be achieved).

For purposes of concept design the incident wave climate has been taken to be the average of the wave climates for model output locations 3, 6 and 9 (slightly conservative given that wave heights are larger for locations 3 and 9 compared to location 6 'Cattle Bay'). The required transmission coefficients based on the average wave climate are shown in **Table 10** below.

Direction and peak period of design harbour wave	Required Transmission Coefficient	
	Wave event exceeded once in 50 years	Wave event exceeded once a year
Head seas greater than 2 secs	0.68 ($T_p = 3.8s$)	0.51 ($T_p = 3.1s$)
Oblique seas greater than 2 secs	0.45 ($T_p = 3.8s$)	0.51 ($T_p = 3.1s$)
Beam seas greater than 2 secs	0.28 ($T_p = 3.8s$)	0.26 ($T_p = 3.1s$)

Table 10: Required Transmission Coefficients for Wave Attenuator to Achieve a 'Moderate' Wave Climate

It is proposed to align the marina craft 'head-to' the incident wave climate. Therefore the required transmission co-efficient that the wave attenuator must achieve is either 0.68 (for $T_p = 3.8$ sec) or 0.51 (for $T_p = 3.1$ sec), whichever controls.

Description of Wave Attenuator

Following consideration of whether to install a fixed panel wave attenuator (wave screen) or a floating wave attenuator, a wave screen has been selected (refer **Section 3.6.3** for discussion of alternatives).

The wave attenuator will be approximately 230m long and will be generally aligned perpendicular to a direction in the range 190-200 degrees True North ($^{\circ}$ TN). In this way it will be approximately perpendicular to the incident local wind generated wave climate (refer **Table 9**). The final alignment will be selected during detailed design. However, it will involve a 'cranking' or bend in the alignment to ensure no significant impact on wave climate and alignment of Cocora Beach (refer **Section 6.9**). The attenuator will be situated in water depths of -6 to -8m CD.

The construction of the wave attenuator will comprise a series of vertical and raked piles (or possibly two vertical piles) with an insitu or precast concrete cap, supporting precast concrete panels that span between the pile caps and extend a sufficient distance below the water level to provide the required wave attenuation performance (refer below). Photos A, B and C in **Figure 17** below show the construction of a similar wave attenuator in Hobart. Photo D shows the completed structure with the floating marina visible in the lee of the structure.

The top of the wave attenuator will be set at a level similar to the deck level of the Cattle Bay Jetty, which is situated at a level of approximately 2m AHD or 2.9m CD. As noted above, the panels must extend a sufficient distance below the water level to provide the required wave attenuation performance (i.e. required wave transmission coefficient, refer **Table 10**). The critical design case is low tide, taken to be Mean Lower Low Water (MLLW). Based on the calculated wave transmission performance of attenuation structures outlined in Cardno (2011), which was based on the work of Wiegel (1960) and Pierson and Cox (1989), the level proposed for the bottom of the wave attenuator is approximately -2.0m CD (2.2m below MLLW), subject to detailed design.

As the wave attenuator will be situated in water depths of -6 to -8m CD, the clearance below the attenuator to the seabed will be in the range 4 to 6m subject to detailed design and position along the structure.

A wave attenuator can be readily designed for survivability to accommodate the severe wave conditions experienced in Cattle Bay due to ocean storms and strong winds from the south/south-south-west. Design criteria would conform to Australian Standard AS4997-2005 'Guidelines for the Design of Maritime Structures'.



Photo A: Construction of fixed panel wave attenuator – showing fixed panel being lifted into place by floating crane.



Photo B: Construction of fixed panel wave attenuator – showing fixed panel being positioned onto pile caps



Photo C: View along pile caps showing fixed panels in place.



Photo D: View of completed wave attenuator and floating marina.

Figure 17: Views of Similar Wave Attenuator, Hobart

(Source: Haskoning Australia)

3.2.5 Floating Marina

The position and layout of the proposed Cattle Bay Marina have been influenced by a range of factors:

- Available natural water depths (avoidance of dredging);
- Connection to existing jetty (for access from shore);
- Incident wave climate at the site (wave height, period and direction);
- Existing navigation channel and swing basin associated with use of Eden Harbour by commercial vessels;
- The location of the Port of Eden Marina (PoEM) development proposal; and
- Minimum dimensions for berths, channels and fairways set out in the Australian Standard AS3962-2001, 'Guidelines for Design of Marinas' and in Guidance Notes prepared by the NSW Maritime Authority (formerly Waterways Authority).

Berth Schedule

The berth schedule proposed at the site is set out in **Table 11**. The size of berths ranges from 12m to 18m.

Berth Length (m)	Number	%
12	63	41
15	65	42
18	26	17
	154	100%

Table 11: Berth Schedule

Type and Layout of Berths

The marina berths will comprise a floating system of walkways, with finger units at right angles to the walkways creating the berthing pens and providing access alongside the craft. The floating berths will be located in place by vertical piles driven or potted into the sea bed. These piles will probably comprise circular reinforced hollow spun concrete piles, with possibly a number of composite piles (concrete pile inserted within a steel pile at depth) at locations where increased water depth or loading conditions are encountered.

Intermediate mooring piles may be provided between the outer (southern-most) double berths for ease of berthing and additional mooring security. AS 3962-2001 recommends mooring piles in double berths where wind generated waves or boat wake exceed 300mm in height. The width of the double berth is then increased by the width of the pile. The total number of marina piles will be in the range 120 to 140, subject to detailed design.

It is proposed that the main north-south walkway leading to Arm 'C' and Arm 'C' itself will have a width in the range 2.5 to 3.0m. The remaining walkways will be typically approximately 2m wide. These widths are in excess of the minimum requirements of AS 3962-2001 which states that:

- walkways should not be less than 1.5m wide;
- for walkways in the length range 100 to 200m the minimum width should be 1.8m;
- for walkways in excess of 200m the minimum width should be 2.4m.

The fingers leading from the walkways will range in width from typically 1m up to 2.0m wide. These finger widths are considered acceptable for purposes of safely boarding and leaving a boat (the requirement of AS 3962-2001). A minimum finger length of 0.8L has been adopted, where L is the overall length of the longest boat that may use the berth, in accordance with AS3962-2001.

The final widths of walkways and fingers will be dependent on the actual proprietary flotation system adopted for the marina, of which there are a number to select from, and detailed design activities. However, dimensions are unlikely to change significantly from those nominated above.

Internal channels or fairways within the proposed marina vary in width depending on the size of the craft in the adjoining berths. A minimum clear fairway width of $1.5 \times L$ has been adopted where L is the overall length of the longest boat using that fairway. This is the minimum width recommended by AS 3962-2001.

The location and type of any navigational markers will be determined in consultation with NSW RMS (Maritime).

3.2.6 Services and Sewage Pump out to Marina

The following section describes the services which will be provided to the floating marina. Note that it is not proposed to supply fuel at the marina. Fuel for marina craft will be obtained from existing suppliers in Eden Harbour.

Lighting, Potable Water, Power and Communications

The marina berths will be supplied with water, power, lighting, and communications (telephone, internet and cable TV). These services will be available to the berths via low height (approximately 900 mm high) service pedestals. Potable water will be provided from taps integrated into the service pedestals. A typical services pedestal is shown in Photo E in **Figure 17** below.

The service pedestals will be located at the junctions between fingers and the walkway and, on the longer runs of the walkway where there are no fingers, at a spacing of about 10 m. The proposed locations are shown in the plans of proposed development in **Appendix 6**.

The various services to the pedestals will be supplied from the land-based infrastructure via pipework and conduits which will run along the jetty, down the access gangway (incorporating flexible couplings) and be fitted under the floating walkway deck, out of view but accessible for inspection and maintenance.

Fire Fighting

Fire fighting equipment will be provided in accordance with AS 3962-2001 and to the requirements of relevant authorities. Where requirements may differ, those requirements of the local relevant authority will prevail. The equipment will include fire hose reels, fire hydrants and fire extinguishers. The equipment is discussed further below. The proposed location of fire hose reels and the fire hydrants are shown in the plans of proposed development in **Appendix 6**.

- **Fire Hose Reels.** AS 3962-2001 notes a number of requirements for fire hose reels. In particular, the length of hose on any hose reel should be 36m, at least one hose reel should be located on the shoreline side of the first berth and also at the seaward end of each walkway, the maximum distance between any two reels should be 30m, and at least two reels should be accessible from each berth. These requirements have been taken into account in determining the proposed locations.

The fire hose reels will be connected to the domestic water supply, whereas the fire hydrants (see below) will be connected to a special hydrant service. An example of a fire hose reel installation is shown in Photo F in **Figure 17** below.

- **Fire Hydrant.** AS 3962-2001 notes that a fire hydrant should be located at the head of each access gangway. Accordingly, a fire hydrant is proposed on the existing jetty at the point of entry onto the floating marina via the access gangway. The fire hydrant will have its own water supply service, supplied from the existing land based infrastructure.
- **Fire Extinguishers.** AS 3962-2001 notes that fire extinguishers should be provided at 'appropriate locations'. These locations will be agreed with the relevant authorities. The extinguishers will be selected so as to be suitable for other fire hazards which are not able to be contained by water from hose reels. These are likely to be a Dry Powder type and/or a CO2 type extinguisher. The holding capacity for each extinguisher would be approximately 9 litres or equivalent. Photo G in **Figure 17** shows a view of a cabinet housing a fire extinguisher.

Sewage Pump out

Sewage is proposed to be removed from the holding tanks of vessels at the marina and disposed of to the on-land sewerage system by means of a mobile sewage pump out trolley ('Muck Truck', as supplied by Superior Jetties, or similar). The proposed mobile unit is shown in Photo H in **Figure 18**.

The operation would take place as follows:

- The trolley is wheeled to the required point adjacent to the vessel on the floating marina and the flexible discharge hose is attached to the holding tank on the vessel;
- The unit is attached to the power available on the marina at the service pedestal. The unit is also fitted with a battery in the event power is not available on the marina for any reason;
- The pump discharges the sewage from the holding tank on the vessel into the tank within the mobile unit. The tank within the unit has a capacity of 90 litres which would accommodate the majority of vessels permanently berthed at the marina. Should the holding tank on the vessel exceed the size of the tank on the mobile unit, the mobile unit can be used a number of times; and
- The mobile unit is wheeled to an on-land connection point to the local sewerage system.

The use of a mobile sewage pump out system has the benefit of taking the pump out system to the vessel rather than relying on the vessel owner to bring the vessel to a dedicated pump out facility. It enables the marina operator to be more proactive in satisfying its commitments under an Environment Protection Licence (EPL) and Operational Environmental Management Plan (OEMP).

Bilge Water Pump out

All marina berth tenants will be inducted in the use of, and supplied with, a bilge water absorbing pad as part of rules and regulations of the marina. The bilge absorbing pad will absorb any oil from the bilges. The bilge water will then be disposed of via certified collection.

The direct discharge of bilge water within the berthing area is prohibited. A floating boom would be maintained at the site to contain any surface pollutants in the event of an accidental leakage of bilge water. Signage to this effect will be displayed at the Marina.



Superior sanitation



Photo H: Images of the mobile sewage pump out trolley ('Muck Truck') as supplied by Superior Jetties.



Photo E: View of a typical services pedestal within a floating marina. A fire hose reel is also visible behind the services pedestal, with a red cover.



Photo G: View of a cabinet housing a fire extinguisher. A services pedestal is also visible behind the cabinet.



Photo F: Example of a fire hose reel within a floating marina



Photo H: Example of an access control gate (proposed at the top of the gangway at Cattle Bay Marina).

Figure 18: Views of Similar Service Equipment

(Source: Haskoning Australia)

3.2.7 Pick Up and Set Down Berths

An area for pick up and set down activities will be provided along the western side of the proposed main north-south floating walkway, close to the access gangway from the existing jetty. The length of the pick up and set down berths will be approximately 30 metres, sufficient for two to three vessels to be accommodated at any one time. Pick up and set down will also be accommodated on the western side of the existing jetty.

Vessels using the pick up and set down berths will include local commercial/tourist cruise vessels, water taxis, and visiting recreational craft.

3.2.8 Super yacht Berths

The outer (southern) section of the main north-south floating walkway will be made available for occasional berthing of Super yachts. A length of nominally 100 metres will be provided which will accommodate two to three Super yachts depending on the individual vessel size.

When there is no demand for berthing by super yachts, this section of the main walkway will provide area for additional pick up and set down or for casual berthing by smaller vessels.

3.2.9 Public Access

Improved public access was a key feature of community submissions during the exhibition of the Part 3A Concept Application between December 2007 and January 2008.

The approved concept plan for the tourist and residential development includes a strategy for improved public access as it is constructed over stages. As part of this ERH proposed that a strip of land along the foreshore be dedicated to Council to ensure public access to the waterfront in perpetuity. The dedication of the foreshore land (Lot 4) discussed in **Part 2.1.1** above was an outcome of this offer.

The proposal provides for convenient connections across Lot 4 between the jetty and the landside facilities (car park and temporary buildings). Access would primarily be by foot. It would also include use of hand carts and small service vehicles (golf cart type vehicles)

The areas allocated for casual pick up and set down noted above will be available to the Water Police and Emergency Service agencies if required. The main jetty walkway width provides good space for emergency evacuation. Cattle Bay is conveniently access to ambulance and local health services.

The relevant access guidelines that will be used to develop the detailed designs include:

- Australian Standard AS1428.1 – 2001, Design for Access and Mobility, Part 1 General requirements for access – New Building Work;
- Australian Standard AS1428.2 – 1992, Design for Access and Mobility, Part 2 Enhanced and additional requirements – Buildings and Facilities;
- Commonwealth Government 2002 – Disability Standards for Accessible Public Transport Guidelines; and relevant RMS (Maritime) Guidelines.

The proposed development maintains public access along and within Lot 4 at all times and there is no reduction in publicly accessible land.

With regard to the jetty, the current informal use of it by the public is not legal or endorsed by ERH. ERH currently leases the Cattle Bay Jetty from Crown Lands. It is proposed that public access to the jetty be formalised, due to its new role, particularly with regard to potential tourism activity. However, such access will be managed in the interests of safety and security. ERH, as leaseholder will reserve the right to close public access to the jetty at times as required, and as provided for by the Lease.

It is proposed that the marina will be made available to the public during marina opening hours (summer, Daylight saving 7am – 6pm, winter, Non-daylight saving 7am – 5pm). An access control gate will be located at the head of the access gangway leading to the floating marina berths which will be locked at night so as to provide a level of security particularly against vandalism, property damage and theft. An example of an access control gate is shown in Photo H in Figure 17 above.

A key card system would operate the security gates at night, available to boat owners and marina staff.

3.2.10 Relocation of Existing Swing Moorings Access

There are some 40 swing moorings located in the Cattle Bay/Snug Cove area based on information supplied by RMS (Maritime). Approximately 24 of these swing moorings will require relocation in order to accommodate the proposed Cattle Bay Marina. The locations of the moorings are indicated in Figure 19 below.

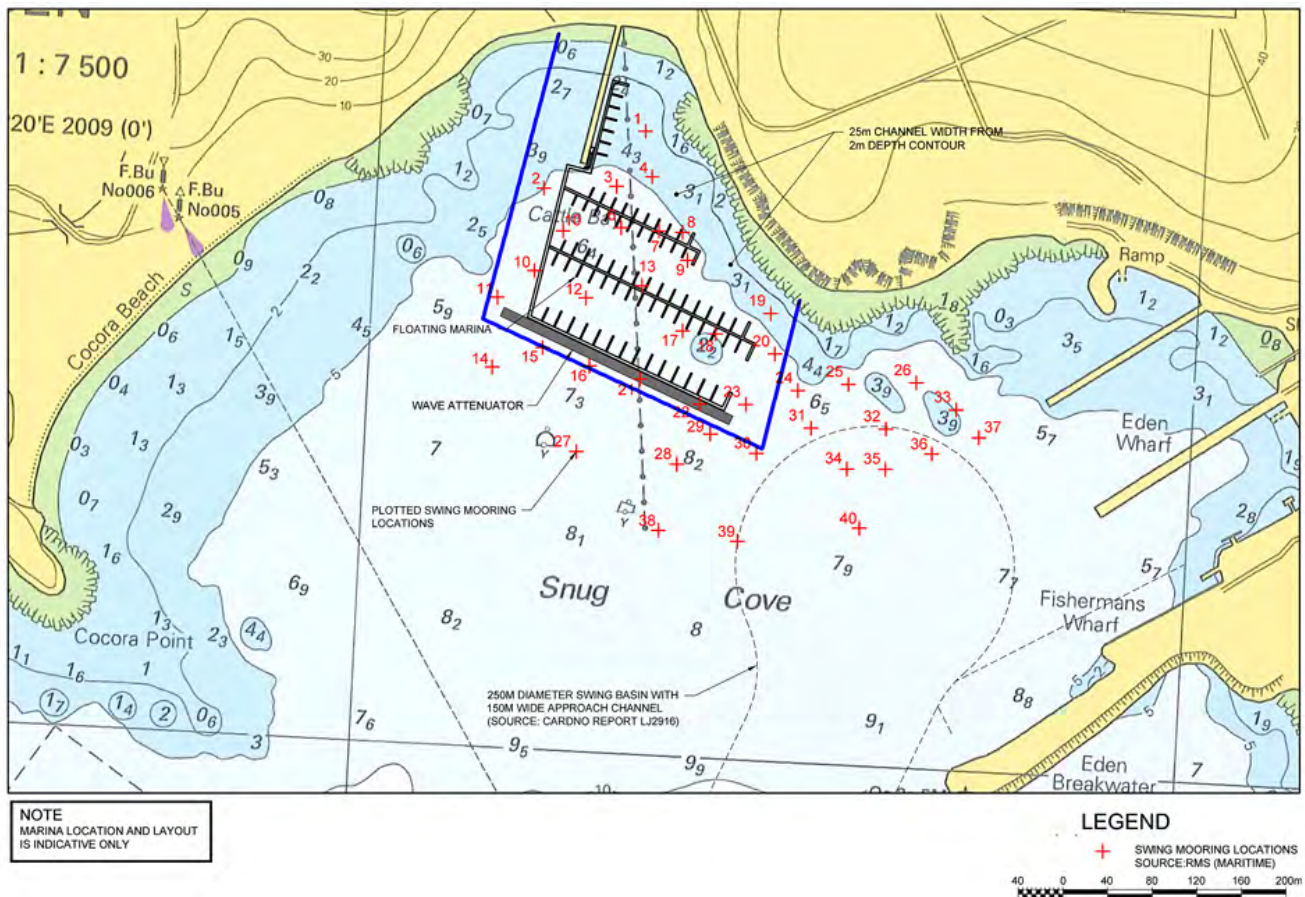


Figure 19: Location of Swing Moorings within and Close to Site.

(Note: wave attenuator final design will differ as it has evolved through the EIS process as sketched in Section 6.9; refer Figure 29).

(Source: RMS and Haskoning Australia)

3.3 Site Preparation and Construction

3.3.1 Overview

Construction activities will involve a variety of different types of construction methods and equipment. The principle activities will comprise establishment of temporary buildings, refurbishment of the jetty, removal and relocation of swing moorings, installation of piling, installation of the pontoon units, and installation of services and access gangways.

3.3.2 Preliminary Construction Program

A preliminary construction program has been prepared that envisages an overall construction period of approximately 16 weeks with piling taking place over a period of 8 weeks.

3.3.3 Construction Hours

Construction would be restricted to the following hours:

- Monday to Friday 7.30 am to 5.00 pm
- Saturday 7.30 am to 1.00 pm
- No work on Sundays or Public Holidays.

3.3.4 Construction Approach

Refurbishment of Jetty

The extent of work required to refurbish the jetty will be made apparent following detailed structural investigation. Should any existing timber piles be required to be removed they would be extracted (pulled) in a controlled manner. A turbidity curtain would be installed and maintained around the works areas until removal is complete. Further sedimentation controls would be adopted if necessary.

All removal work would be carried out by a contractor appropriately licensed by WorkCover NSW.

Where materials may be suitable for recycling off site, for example, timber piles and decking, consideration would be given to selling this material. All other unsuitable material would be removed from site to an approved disposal facility. Removal of material off site would most likely be by barge rather than by road as the type of plant involved in removal works would include barge mounted cranes, transport barges, work boats and hand held power tools.

Removal and Relocation of Swing Moorings

In order for the installation of piling and pontoon units to proceed, it would be necessary to remove/relocate the existing swing moorings affected by the works. These comprise approximately 24 moorings. Removal and relocation of moorings is discussed further in **Part 6.5**

The removal and relocation of swing moorings would be undertaken by a commercial mooring contractor licensed by the RMS (Maritime). All works would be undertaken in consultation with the RMS.

Pile Installation

All piles will be delivered to the site by barge and installed from the water using a piling barge.

Installation of Pontoon Units

The pontoon units are essentially an 'off-the-shelf' product. They will be manufactured off site at the manufacturer's premises and delivered to the site by road. They will be launched into the water by crane at the foreshore edge and towed into their correct location, guided by GPS, for interconnection.

Installation of Services and Access Ramp

Access ramps would be delivered to site by barge as one unit and installed by barge mounted crane. Installation of services pedestals, fire fighting equipment and power and water, including service cables and pipework, will be undertaken on site by licensed contractor.

Wave Attenuator

The construction of the wave attenuator will comprise a series of vertical and raked piles (or possibly two vertical piles) with an insitu or precast concrete cap, supporting precast concrete panels that span between the pile caps

The precast panels will be manufactured off site and delivered to the site by barge. They will be lifted into place by a barge mounted crane.

Sediment Control

A range of well accepted sediment control measures will be introduced during the construction works to control the dispersion of silt / sediment in the water column. Such measures are described in standard guideline documents such as the Soils and Construction Handbook, prepared by Landcom. The measures would include the use of a turbidity barrier to prevent migration of any fine sediments disturbed by removal of structures

3.4 Infrastructure Provision

The temporary building will be connected to the existing potable water, sewerage and power services present in the area that served the previous cannery use. The 'muck truck' will discharge waste water into the building's sewerage connection.

Due to the minor use of the existing services that is proposed (and far less than the previous cannery use), subject to further discussions with Council, no major upgrade to the existing services is envisaged as required at this time.

3.5 Other Marinas in the Locality

Currently there are no other marinas existing within Eden or Twofold Bay. However, two marinas are proposed:

- The Boydtown Marina proposal, eight kilometres to the south west of the site on the shores of Boydtown; and
- The POEM (Port of Eden Marina) proposal adjoining the site to the east.

The proposed location of these facilities is illustrated in **Figure 20** below.



Figure 20: Location of Boydtown Marina and POEM Proposal

(Source of aerial: NSW Department of Lands)

3.5.1 Boydton Marina

In November 1990, the Minister for Planning granted development consent (DA 89/1440) to a boat harbour and marina at the mouth of Boydton Creek. The approval was issued following a Commission of Inquiry. The marina is proposed to be constructed in three stages and includes the following:

- Three separate breakwaters;
- A timber jetty to assist in embarkation, enhance water exchange;
- A mooring area in the outer harbour for up to 40 craft;
- 250 wet berths;
- Two fuelling berths;
- Sewerage and oily bilge pump out facilities;
- Repair and maintenance facilities;
- Dry storage facilities for up to 70 power craft in a building, and 30 yachts;
- Fire fighting facilities;
- Marine village, including general store, shops (1250m²) and offices; and
- Boat launching facilities and parking area.

Stage 1 of the development has commenced and therefore the consent is valid in perpetuity. The proponent, Boydton Pty Ltd, has advised that it is awaiting a rezoning of its lands surrounding the marina site to establish favourable commercial conditions before it continues with the viable construction of the marina.

3.5.2 Port of Eden Marina

The Port of Eden Marina (POEM) has been proposed by a consortium of local business and community interests, Eden Chamber of Commerce, Government Agencies and other stakeholders within Eden in order to secure Government funding for additional marina facilities to serve visitors and residents of Eden and provide broader economic benefits to the region.

It is comprised of two stages:

- Stage 1: Reclamation of a portion of the northern foreshore of Snug Cove to establish a 98 berth marina incorporating a wave attenuator of 150 metres, floating structures, piling and services, marina amenities/administration block, pump-out facility and 85 car park spaces; and
- Stage 2: Additional 95 floating berths and the remaining onshore car park spaces.

The proposal has an estimated cost of approximately \$8 million and is, at this time, unfunded. However, Government grants have been made available to commence environmental and economic feasibility investigations.

BVSC has appointed GHD to prepare a Snug Cove Master Plan and progress investigations. At a meeting at Council on 20th February 2013 with ERH, Council and representatives of GHD and POEM, it was agreed that both marinas are complimentary.

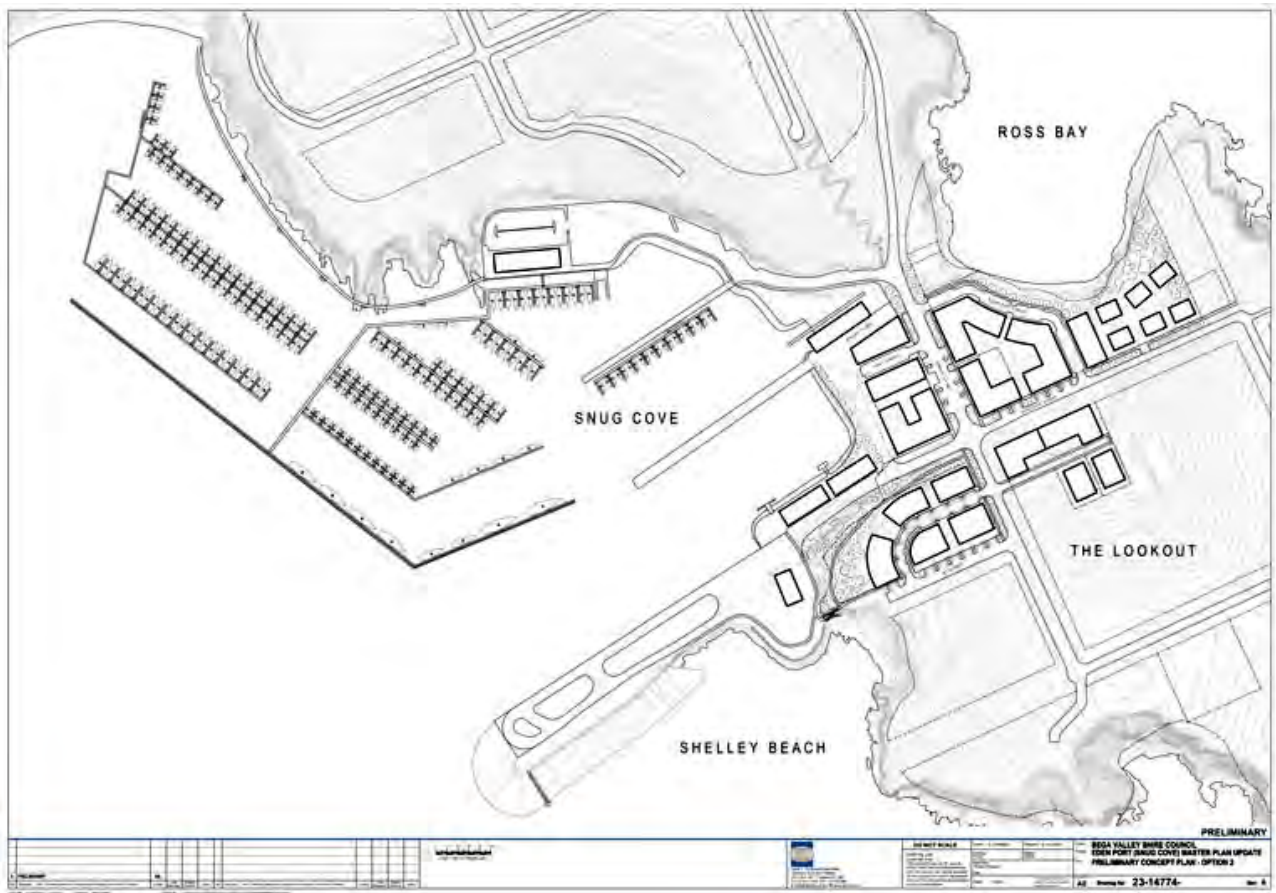


Figure 21: GHD Sketch Plan of POEM and Cattle Bay Proposals

(Source: BVSC. Note that the concept plan for the ERH marina in the sketch differs from the proposed layout that is the subject of this development application)

A sketch plan, showing the relationship between the ERH tourist resort and marina that is the subject of this development application, and the POEM proposal, prepared by GHD is presented in **Figure 21** above.

As the Cattle Bay Marina proposal is comparatively advanced and sources of funding are not dependent on the public purse, it has been recognised that it can represent Stage 1 of a comprehensive marina development proposal that can bring significant economic benefits for Eden (with the POEM proposal forming a Stage 2 extension in due course).

The POEM proposal, however, can also represent a standalone, independent development, should the Cattle Bay proposal not proceed in a timely manner for any reason.

3.6 Consideration of Alternatives and Justification

3.6.1 Location of Marina

It is clear the proposed marina must be located as close as practicable to the adjacent freehold land owned by Eden Resort Hotel Pty Ltd and be connected to the shore at this point.

Within this context, **Part 3.2.5** has set out the further factors that have influenced the proposed final position of the marina; namely, available water depths, incident wave climate, existing navigation constraints, location of the POEM proposal and conformance with the Australian Standard AS3962-2001, "Guidelines for the Design of Marinas". There is no other reasonable location for the proposed marina.

3.6.2 Berth Demand

Coriolis Marine Pty Ltd was engaged by Eden Resort Hotel Pty Ltd to provide a report to assist building a business case for a potential marina development at Cattle Bay Eden. Its report is contained in **Appendix 7** that accompanies this Statement. It investigates demand and commercial viability.

It notes that the South Coast has experienced the second largest growth in boat registrations behind the North Coast in the period 1999 – 2009. A total of 556 boats are identified as possible marina users on the South Coast.

There is a limited boating facility south of Sydney with most boats being stored on land, swing moorings or limited fixed jetties. A number of marina redevelopments have been proposed on the south coast including;

- Shell Harbour (Approved 1993);
- Jarvis Bay (Early Planning);
- Ulladulla (Unsuccessfully tendered by LPMA in 2008);
- Batemans Bay (Development Application being lodged); and
- Bermagui (Planning).

If completed, these new marina facilities will open up the South Coast and encourage boating as it will provide safe harbours along the coast at key strategic locations. This being said, it is unlikely that any will be completed within the next 2 years with only Shell Harbour and Batemans Bay being most likely to be constructed within 5 years.

A survey of the existing berthing facilities shows a capacity for 369 boats on the South Coast. This equates to 66% of the potential market of 556 boats of a suitable size in the region. It should also be noted that all existing marina infrastructure on the South Coast is aged and 'subpar' in comparison to most marina facilities throughout Australia.

A survey of recreational boats moored in the local area found a total of 58 boats in the area (10% of South Coast market). It is estimated that approximately 23 (40%) of existing vessels could take up occupancy in the marina. However there is significant evidence that new facilities attract new investment in boating and the 'built it they will come' rationale is demonstrably true with regard to new marina berths.

Additional custom will be derived from the mixed use tourism and residential development proposed by ERH in Cattle Bay.

This together with potential demand from inland regional centres and Canberra suggests that a marina design capacity of 148 berths in a normalised market. The design should also allow for further expansion past 148 to allow for long term growth in the boating market.

3.6.3 Type of Wave Attenuator

The fundamental choices for a wave attenuator in this situation were a fixed panel wave attenuator (wave screen) or a floating wave attenuator.

As outlined in **Part 3.2.4**, the required wave attenuation performance for the attenuator is a transmission coefficient of either 0.68 for $T_p = 3.8$ seconds (50 year average recurrence interval condition) or 0.51 for $T_p = 3.1$ seconds (1 year average recurrence interval condition), whichever condition controls.

Based on the relationships that exist in the literature between transmission coefficients and wave period, it is evident that for the wave periods in question, which are greater than 3 seconds, commercially available floating wave attenuators were approaching the limits of their performance. Accordingly, the decision was taken to adopt a fixed panel wave attenuator (wave screen). Should advances be achieved in floating attenuator technology in the near future reconsideration of the use of a floating attenuator could be given during the detailed design phase of the project.

3.6.4 Layout of the Marina Berths

Having determined the general area for the marina based on available natural water depths, navigational constraints and location of the POEM proposal, the prime consideration for the layout/configuration of the individual marina berths is the incident wave climate.

The incident wave climate comprises refracted/diffracted ocean swell and the local wind generated wave climate (seas) from the south/south-south-west. The local seas are the most critical for the layout/configuration of the marina berths since these shorter period waves create the greatest rolling and pitching movement in marina craft. Accordingly, the marina berths have been aligned 'head-to' the local seas. The exceptions are the inner-most berths that lie alongside the existing jetty, however these berths have the benefit of multiple protection afforded by the fixed panel wave attenuator plus the outer floating walkway structures which are also effective to a degree in attenuating the shorter period seas.

The refracted/diffracted swell would arrive at the marina oblique to the alignment of the marina berths. Some limited attenuation of the longer period swell by the wave attenuator would occur (estimated wave transmission coefficient for swell around 0.85 to 0.90). In any case, the marina craft would be expected to largely 'ride over' the swell waves.

3.6.5 Floating Versus Fixed Marina Berths

Two principal alternatives exist for the structure of marina berths; floating structure (as proposed) and fixed structure, i.e. walkways and fingers that are at a fixed level supported by piles.

A floating system has been adopted for a combination of reasons:

- it provides safer and more convenient access to and from craft, accordingly there are amenity and occupational health and safety benefits;
- it enables better tying up of craft (the craft and the deck of the marina remain at the same relative level at all states of the tide);
- the floating system has less visual impact compared to a fixed system particularly at low tide; and
- it provides additional aquatic habitat (floating pontoon surfaces permanently immersed in the water).

3.6.6 Consequences of Not Carrying Out the Proposed Redevelopment

Should the proposed redevelopment not proceed, a number of social, economic and environmental benefits would not be achieved:

- provision of marina berths in a modern facility, for which there is a demonstrable demand both regionally and within the local area;
- provision of additional sewage pump out facilities for use by marina customers and the public;
- New public access for craft to pick-up / drop-off passengers and supporting facilities including parking;
- New facilities for marine tourism operators and the accompanying employment, investment and expenditure economic benefits that could be realised by the town of Eden;
- Opportunity for the removal of swing moorings from seagrass beds and creating of more secure and protected berths;
- Improved management of the boating environment in Twofold Bay and regulation of boating activities
- Provision of new facilities to the community including improved disabled access to boating activities; and
- Development of an economic catalyst to expedite the first stage of the mixed use tourism and residential development proposed by ERH and approved by government.

4. DEVELOPMENT CONTEXT

4.1 Strategic Context

There are a number of State Government and Council Strategies and Policies that provide the strategic context for the development of the site. They comprise:

- The NSW State Plan 2021;
- Twofold Bay and Hinterlands Strategy (DIPNR 2004);
- The South Coast Regional Strategy;
- NSW Coastal Policy 1997;
- Snug Cove and Environs Master Plan 2005;
- The Eden Structure Plan Report 2006; and
- Bega Valley Shire Land Use Planning Strategy 2008.

4.1.1 The NSW State Plan 2021

The NSW State Plan 2021 replaces the previous Plan of 2010 as “the NSW Government’s strategic business plan, setting priorities for action and guiding resource allocation” (p.2). The development of the site is consistent with many of the 32 goals in the five strategies of the Plan. This is detailed in Appendix 8.

4.1.2 Twofold Bay and Hinterlands Strategy DIPNR 2004

The Twofold Bay and Hinterland Strategy, prepared by the then Department of Infrastructure, Planning and Natural Resources (DIPNR) identifies a series of actions for implementation. Bega Valley Shire Council’s preparation of the Eden Structure Report addresses these actions.

The Strategy includes an action to ‘*Investigate construction of boating facilities at Quarantine Bay, Cattle Bay, Ross Bay and Boydtown*’ (p23).

4.1.3 South Coast Regional Strategy

The South Coast Regional Strategy has been prepared by the NSW Department of Planning to guide future development, infrastructure and natural resource protection requirements for the south coast region to 2031. It includes the Shoalhaven, Eurobodalla and Bega Valley Council areas.

The primary purpose of the strategy is to ensure that adequate land is available and appropriately located to accommodate the projected housing and employment needs of the region over the next 25 years. Key considerations for the document are the protection of the natural environment, identification of natural hazards, housing and settlement, economic development and employment growth, rural landscapes and rural communities, water, energy and waste resources and cultural heritage; the integration of which is required to ensure a balanced approach to sustainable growth.

The plan notes the following challenges (pp.5-9):

- *"Improved protection and enhancement of natural environments, including biodiversity, coastal lakes and estuaries and landscape values;*
- *Increase the proportion of young families within the region and reduce out-migration by providing vibrant town centres with increased job, training and education opportunities;*
- *Prioritise and manage the release of vacant urban land to maximise development land around well serviced centres and minimise development in sensitive locations;*
- *Ensure quality urban design and amenity that is sensitive to and compliments the character and lifestyle of the region's towns;*
- *Ensure sufficient employment lands are available in appropriate locations to accommodate growth in existing and emerging industries and businesses;*
- *Support and strengthen tourism opportunities by identifying key tourism sites and precincts";*

The Strategy establishes the role of, and framework for, the Eden Structure Plan to guide development (discussed below).

4.1.4 NSW Coastal Policy 1997

The NSW Coastal Policy co-ordinates *"the management of the coast by identifying, in a single document, the State's various management policies, programs and standards as they apply to a defined coastal zone. These policies, programs and standards frequently obtain their legitimacy from other legislation or programs ... The Coastal Policy is therefore in fact many individual policies and programs in one"* (p.8).

Relevant policies and programmes are discussed elsewhere in this Statement and comprise:

- The South Coast Regional Strategy (encompassing the Twofold Bay and Hinterlands Strategy 2004 and the Eden Structure Plan 2006); and
- State Environmental Planning Policy No. 71 — Coastal Protection (SEPP 71).

The principles of Ecologically Sustainable Development (ESD) provide a guiding and an integrating role to the Policy. ESD provides a framework for reconciling and, where necessary, making choices between competing demands for access to the resources of the coastal zone. The 1997 Coastal Policy is based on the four principles of ESD contained in the Intergovernmental Agreement on the Environment (IGAE) signed in 1992. These principles are:

1. Conservation of biological diversity and ecological integrity. This refers to the need to conserve the variety of all life forms, especially the variety of species, and to ensure that the productivity, stability and resilience of ecosystems are maintained.
2. Inter-generational equity. This requires that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. Social equity considerations, in terms of equal access opportunities to resources, are inherent in the concept of inter-generational equity.
3. Improved valuation, pricing and incentive mechanisms. This requires environmental factors, such as the value of ecosystems, polluter pays principles etc., to be incorporated into the valuation of assets and services and considered in decision-making processes.

4. The precautionary principle. Requires a risk averse approach to decision making. Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty is not to be used as a reason for postponing measures to prevent environmental degradation.

The Coastal Policy contains a large number of strategic actions relating to coastal planning and management. Comment on these principles and strategic actions is provided in **Appendix 9**.

4.1.5 Snug Cove and Environs Master Plan 2005

The area addressed in the 2005 Master Plan does not include the Cattle Bay site and it recognises that the site was to be the subject of its own master plan at the time. However, it addresses the site in the context of Snug Cove's environs. It provides a future character statement for Cattle Bay as follows:

"The protection and management of vegetation, water quality and coastal processes require particular consideration as part of future development of the site at Cattle Bay. Visual impacts associated with developing the Cattle Bay site also require consideration due to its prominence when viewed from Twofold Bay.

The former cannery site is potentially suitable for a range of future uses, including tourism, residential, commercial and marine-related industrial development. Due to its proximity to Eden's commercial centre, Snug Cove and Imlay Street a principal outcome of future development at this site should be that it promotes employment generation. When the site is developed, a new public park adjacent to Cattle Bay beach should be established to allow enjoyment of and access to the foreshores. Informal pathways between beaches and streets may be developed but only where they do not require significant vegetation clearance or land forming, otherwise pathways should be located adjacent to existing streets. A new pathway between Imlay Street and Cattle Bay will provide easy pedestrian access to the site and foreshore park." (p.35).

Relevant Principles present in the Plan comprise:

- Improve access and use of the foreshore and the Cattle Bay Jetty by:
 - > Providing a public area adjacent to the Jetty to accommodate marine related activities.
 - > Ensuring the Jetty is publicly accessible 24 hours per day.
- Uses on the site are to be compatible with the working port, existing long-term users and the surrounding neighbourhood

The proposed marina places an emphasis on public access and proposes a compatible use that fits the desired future character statement for Cattle Bay and achieves the stated principles for development.

4.1.6 The Eden Structure Plan Report 2006

The Structure Plan report for Eden is an extension of the work undertaken by the then Department of Infrastructure, Planning and Natural Resources (DIPNR) as part of its preparation of the 'Twofold Bay and Hinterland' and 'South Coast Regional' Strategies (discussed above).

The Strategies identify a series of objectives and strategies and each strategy has a list of specific actions to achieve those strategies. The Eden Structure Report is Bega Valley Shire Council's response to those key strategies where they impact on land use planning in Eden.

The Eden Structure Plan report was adopted by Council in 2006 and in Part 2 of the report it is recognised that the Plan is intended to inform the preparation of the new Bega Valley LEP 2010.

The aim of the Structure plan is to "*develop a 20 year land use vision for private and vacant crown lands within the study area*" (p.2).

To arrive at the adopted Structure Plan, Council conducted a Charette process in 2004 with major land owners and key government departments. The Structure Plan notes "*the outcomes of the Charette process were the recognition of key precincts within the study area and identification of the target issues and actions associated with each precinct. The identification of these precincts included consideration of the desired future land use that may be appropriate in each settlement*" (p.14).

Of relevance, the outcome of the Charette process identified the following target issues and actions for Cattle Bay:

- *Employment generation from future uses critical;*
- *Desire for reasonable provision of tourist based development;*
- *Residential/tourist development balance critical; and*
- *Explore option of marine based business as an alternative;*

The proposed marina satisfies the actions raised during the Charette and contained in the Structure Plan as it provides an additional source of employment within Eden. More importantly, however, it has the potential to be an important catalyst for additional 'multiplier' economic benefits for the town via increased construction, tourism visitation and associated marine business investment.

4.1.7 Bega Valley Shire Land Use Planning Strategy 2008.

The Strategy was prepared as a summary of the planning research and background that has led to the preparation and public exhibition of the Draft Bega Valley Local Environmental Plan 2009/2009 (never proceeded).

The Strategy notes the emerging tourist focus of Eden as well as its Port, harbour and aquaculture related industries. It recognises that Eden has economic challenges in replacing lost unskilled and semi-skilled employment

The marina proposal supports the Strategy in a number of specific areas including:

- Seeking to ensure that major new development is located only within or around existing settlements. Such development will minimise effects to the natural environment and must be fully supported by the necessary service and community infrastructure (p.5);
- Ensuring that protection of biodiversity is a key consideration in the development planning process;
- Ensure that soil and water management is contemporary best practice;

- Assist the long-term viability of retail, maritime, agricultural and timber industries;
- Ensure an adequate supply of commercial and industrial land; and
- Value and respect our Aboriginal cultural heritage.

4.2 Statutory Planning and Assessment Context

4.2.1 Legislative Framework

The legislative framework for the site and scope of each relevant piece of legislation in relation to the proposed marina is presented in **Table 12** below.

Legislation	Comment
Environmental Planning & Assessment Act, 1979 (NSW)	
Development consent	Development consent is achieved under Part 4 or Part 5 of the EP&A Act and pursuant to the provisions of Lower South Coast REPs and Bega Valley LEP 2002. This is discussed in Part 3.2.2 below.
Environmental impact assessment	Requires a consent authority to have regard to the environmental impacts of development and assess development in accordance with relevant environmental planning instruments, development control plans, policies etc. (s.79C (1)). This Statement addresses these requirements.
Integrated development	Classes development as 'integrated development' where an approval, license is required from certain identified authorities. The proposed development is 'integrated development' requiring approvals under the Protection of Environment Operations Act, Fisheries Management Act and Water Management Act.
Designated Development	Designated development under Schedule 3 of the EP&A Regulation as it is a marina that would have an intended capacity of 15 or more vessels having a length of 20 metres or more.
Construction Certificate (CC)	A CC will required for all works associated with the proposed development.
Protection of Environment Operations Act 1997	The PoEO Act presents provisions for the management and prevention of environmental harm (air, land, water, noise etc) from pollution. It requires licenses to be obtained to authorise the carrying out of 'scheduled' activities or development work. The proposed marina, having more than 80 berths is a scheduled activity and requires a license.
Threatened Species Conservation Act, 1995	The TSC Act identifies and protects threatened, endangered, species, populations and ecological communities and critical habitat. It presents the requirements for the preparation of a Species Impact Statement (SIS) where development is likely to have a significant effect on any of the above. It requires a license to be obtained to harm threatened species, populations or ecological communities unless authorised via a development consent granted under Part 4 of the EP&A Act.
Fisheries Management Act 1994	The Fisheries Management Act 1994 aims to conserve, develop and share the fishery resources of the State for the benefit of present and future generations.
Water Management Act 2000	The objective of the Act is the sustainable and integrated management of the state's water for the benefit of both present and future generations. It is based on the concept of ecologically sustainable development. In the assessment of the Mixed Use Tourism and Residential Part 3A Concept Application (DA 05-0032) none of the drainage corridors that pass through the site were assessed by the (then) Department of Natural Resources as comprising 'rivers.'
Commonwealth Environment Protection and Biodiversity Act, 1999	The Commonwealth Environmental and Biodiversity Conservation Act 1999 provides an assessment and approvals system for actions that have significant impact on matters of national environmental significance, on the environment of Commonwealth land and actions carried out by the Commonwealth Government.

Table 12: Legislative Framework

4.2.2 Consent Authority and Assessment Pathway

During the preparation of the DGRs there was some legal conjecture as to whether the proposed development should be assessed under Part 4 of the EP&A Act by virtue of Section 205 of the Local Government Act 1993; or whether it should be assessed under Part 5 of the EP&A Act as the location of the proposed marina within Twofold Bay may be outside the Bega Valley Local Government Area, (which does not extend beyond the Mean High Water Mark).

Section 205(b) of the LG Act relates to land within a local government area and provides that:

(b) The land and water enclosed by:

(i) a straight line drawn between the low-water marks of consecutive headlands to any body of water on the foreshores of an area, and

(ii) those foreshores,

is taken to be in the area.

Satisfaction of this Clause relies on confirmation that the headlands within the vicinity of Cattle Bay provide the geographical distinction and meet the definition of 'consecutive headlands' to enable identification of the LGA boundary for the purposes of the Clause. The outcome of the LGA boundary will then provide direction to whether the proposed marina is assessed under Part 4 or Part 5 of the EP&A Act.

The term 'headland' is not defined in the Local Government Act. However it is defined in State Environmental Planning Policy No. 71 as "*includes a promontory extending from the general line of the coastline into a large body of water, such as a sea, coastal lake or bay.*" This definition is consistent with the Collins Dictionary that defines a headland as "*a narrow area of land jutting out into a sea, lake, etc.*"

The characteristics of a headland in a geographical sense therefore can be identified as a strip of land visibility projecting out into a body of water. Where there are two consecutive headlands, the line drawn between them identifies the LGA boundary pursuant to Section 205(b) of the LG Act.

Provided in **Figure 22** below is an extract of the LPI's Topographic map and aerial photograph (sourced from www.maps.six.nsw.gov.au) showing the headlands and points in the vicinity of Cattle Bay; and a context map prepared for Eden Resort Hotel Pty Ltd showing the siting of the marina in its context with surrounding foreshore topographical features.

Both Lookout Point and Cocora Point best satisfy the definition of 'consecutive headlands'. Mirare Point does not 'extend' or 'jut out' into Twofold Bay. Consequently it does not share the same topographical character and prominence, and hence significance, within the waters of the Bay. Therefore the site of the proposed development is located within the boundary of the Bega Valley Shire LGA and Part 4 of the EP&A Act applies.



4.2.3 Policy Framework

The State Policy framework for the site and scope of each relevant piece of policy in relation to the proposed marina is presented in **Table 13** below.

Policy	Comment
Lower South Coast REP No. 1 – High Rise Buildings	The plan seeks to conserve the scenic and environmental character of the Region, maintain the scale and character of the built environment, preserve views to and from public places, protect public places from overshadowing, encourage development sympathetic to the natural landform, and enable flexibility in building design by setting height limits of 14 metres on most buildings. The proposal complies with the REP.
Lower South Coast REP No. 2	The Plan provides a framework for local planning and development decision making, and government and private investment. It provides councils with regionally relevant guidelines for preparing local plans, in place of the S.117 Ministerial Directions. The REP also lists matters for council to consider when assessing DAs, incorporating the policies and guidelines of the NSW Coastal Policy. The proposal is consistent with the provisions of the REP as demonstrated in Part 4.1.4 of this Statement.
SEPP No. 33 – Hazardous and Offensive Development	The policy identifies potentially hazardous and offensive development and provides for risk threshold screening and preliminary hazard analysis to determine site suitability and potential impacts. No hazardous development or activities are proposed within the marina.
SEPP No. 55 – Remediation of Land	The policy requires consideration of whether the land is contaminated, so, it is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and if the land requires remediation to be made suitable for the use proposed. The investigations undertaken for the the Mixed Use Tourism and Residential Part 3A Concept Application (DA 05-0032) addressed contamination. No residential use is included in this proposal and minimal disturbance of the existing ground and remaining building foundations are proposed.
SEPP No. 71 Coastal Protection	<p>The policy applies to the 'coastal zone' along the NSW coast and seeks to ensure that development in the zone is appropriate and suitably located and there is a consistent and strategic approach to coastal planning and management. Clause 8 requires a list of matters to be considered.</p> <p>The site is located within the coastal zone. An assessment of the proposed rezoning against the matters for consideration is contained in Appendix 10 It notes that the proposal zones achieves compliance with the Clause 8 Matters for Consideration.</p>
SEPP (Infrastructure) 2007	The relevant matters for consideration in the policy include the requirement to address traffic impact and acoustic impact. Assessment presented in this Statement indicates that there will be minimal and not unreasonable impacts generated by traffic and noise associated with the marina activity.

Table 13: Policy Framework

4.2.4 Bega Valley Shire Council

Bega LEP 2013 Zoning and Permissibility

The pattern of zones applying to and surrounding the site is illustrated in **Figure 24**.

The land side part of the site is zoned SP3 'Tourism' zone and the beach is zoned E2 'Environmental Conservation.' The water is not zoned.

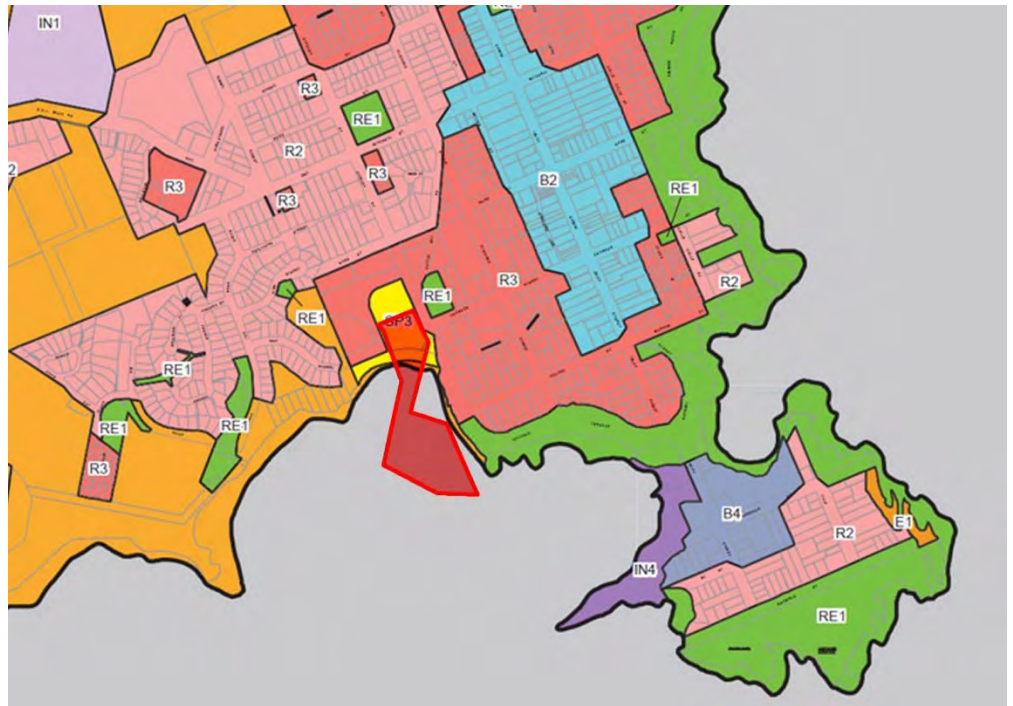


Figure 23: LEP 2013 Zoning Map : Broad



Figure 24: LEP 2013 Zoning Map : Close

The range of permissible uses in the proposed SP3 zone extends to marina development; while 'jetties' and 'water recreation structures' are permissible uses in the E2 zone.

The LEP introduces other relevant clauses:

- **Clause 5.5 Coastal Zone.** The provisions implement the principles in the NSW Coastal Policy. This is addressed in **Part 4.1.4** of this Statement.
- **Clause 5.7 Development below mean high water mark.** Development consent is required to carry out development on any land below the mean high water mark of any body of water subject to tidal influence (including the bed of any such water).
- **Clause 6.3 Riparian land and Waterways.** This clause applies to land that is mapped as a watercourse or situated within 40 metres of the top of the bank of a watercourse. A water course is mapped immediately to the east and west of the site. Council must take into consideration the impacts on water quality within the watercourse, aquatic and riparian habitats and ecosystems and bank stability. In the assessment of the Mixed Use Tourism and Residential Part 3A Concept Application (DA 05-0032) none of the drainage corridors that pass through the site were assessed by the (then) Department of Natural Resources as comprising 'rivers.' That said, the proposed development includes construction of a Gross Pollutant trap where the existing site drainage leaves the site to trap waste before it enters the Bay. A comprehensive water quality actions are proposed as part of the approval of DA 05-0032.

Bega Valley Development Control Plan

Bega Valley DCP 2012 presents the following relevant controls:

- It requires setbacks from nominated waterways. Cattle Bay is not listed as nominated waterways.
- There are no car parking standard for marinas. The proposed development adopts the standard in the RTA Guide to Traffic Generating Developments October 2002 of 0.6 spaces per wet berth and 0.5 spaces per marina employee. The proposed car park comprises 97 spaces being (154 x 0.6) 93 spaces for the berths and 4 car parking spaces for marina employees. Allowance has also been made floor space for unloading /loading close to the wharf.

4.3 Approved Concept Plan

The Concept Plan approval for a mixed tourist and residential development over 6 precincts (DA 05-0032) was granted on 22 August 2008. ERH has advised that the consent has 'Physical commencement' for the purposes of S. 95(4) of the EP&A Act. The approved concept plan comprises:

- A tourist facility comprising building zones for a 60 room hotel (4 storeys); 74 serviced apartments (4 storeys) and a conference building (including restaurant and function room) (2 storeys);

- 8 x 3 storey townhouses;
- 11 x 2 storey dwelling houses;
- 15 x 3 storey residential flat buildings comprising 41 units;
- Total residential floor space of 13,400 sqm;
- Total tourist floor space of 18,400sqm;
- A total floor space ratio of 0.39:1 for the site;
- 297 car parking spaces;
- Access via extension to existing roads and new private, internal roads;
- A landscape and open space concept comprising a total of 58,576 sqm of private and public open space;
- Foreshore access; and
- A stormwater management concept and utilities services strategy.

A copy of the approved plans are enclosed in **Appendix 11** and an extract of the approved site plan is presented in **Figure 25** below.



Figure 25: Approved Concept Site Plan (Drawing B.2.01/A Rev A 13/05/08)

5. CONSULTATION AND IDENTIFICATION OF ISSUES

5.1 Background and Methodology

This section of the EIS provides a detailed description of the relevant issues that emerged during the consultant team investigations and that were raised during the consultation events with state agencies, BVSC, the Eden community and other potentially affected stakeholders.

Consideration of the proposal for a marina at the site has the benefit of a long history of consultation that has taken place over the years regarding the future use of the former cannery site involving ERH, local Eden residents and business groups, Council and Government agencies, following ERH's purchase of the site in 2000. This is a legacy of ERH's long term commitment and involvement in the development of the site. A strong association has thus developed with all stakeholders.

While substantial consultation with all stakeholders took place with the assessment and approval of the original mixed use tourism and residential proposal (DA 05-0032) in 2007 and 2008, ERH elected to embark on a comprehensive consultation exercise to identify potential issues in recognition of the difference between the marina proposal and the proposal considered in 2007/2008.

The methodology comprised:

- Review of the outcomes of the previous consultation undertaken as part of the preparation and assessment of the Mixed Use Tourism and Residential proposal in 2007 and 2008 (DA 005-0032);
- Ongoing consultation with agencies and Council, from 2000 when ERH acquired the site to the present time involving a formal pre DA meeting with Council and discussions with key agency representatives and elected representatives. Since 2000 this has also included regular liaison with and / or formal involvement in key studies / projects such as the Snug Cove Master Plan 2005, the Eden Structure Plan Charette in 2006 and the POEM proposal.
- Formal and informal consultation with Eden residents, business and community groups and other stakeholders, that culminated in a series of workshops between 30th October and 1st November 2012 in Eden.

5.2 Document Review

Three sources of documents have been reviewed:

1. Submissions, responses to submissions and assessment reports associated with the proposal for the mixed use Tourism and Residential Report (DA 05-0032). The following documents have been reviewed.
 - JBA Planning Consultants, April 2008, Part 3A Concept Plan (MP 05_0032) Response to Submissions;
 - NSW Department of Planning Director-General, August 2008, Environmental Assessment Report *Mixed Use Residential & Tourist Development, DA 05 - 0032*

Relevant extracts from these reports that summarise the key issues raised at the time with that proposal are enclosed in **Appendix 12**.

2. Consultant reports commissioned by ERH to address potential issues that may emerge in consideration of the proposed marina. In addition to the material contained in this EIS prepared by Inspire Urban Design and Planning Pty Ltd and Haskoning Australia Pty Ltd (as joint authors of the EIS), ERH also commissioned Marine Pollution Research Pty Ltd to undertake an Aquatic Ecology Assessment. This is presented in **Appendix 5**; and
3. Consultant reports prepared for other marina proposals in NSW that exhibit similar characteristics to this proposal in order to provide for consideration of, and responses to, the experiences that emerged and the issues that were raised in those projects:

5.3 Consultation with Eden Authorities, Community and Stakeholders

Between 30th October and 1st November 2012 ERH with Inspire Urban Design and Planning Pty Ltd and Haskoning Australia Pty Ltd (joint authors of the EIS) undertook an intensive 3 day consultation programme with authorities, community representatives, residents and recognised stakeholders. Based in Eden at the Eden Fishermen's Club and Eden Country Club ERH, the consultant team undertook a series of six focus group meetings / workshops with invited stakeholders.

The list of stakeholders invited to participate is enclosed in **Appendix 12**. The consultation undertaken at this time was considered a success. There was a high response rate from invitees, with some attending a number of focus group meetings. The Consultant team also accepted invitations from stakeholders to visit businesses and operations.

Photographs from the workshops are presented in **Figure 26**.



Figure 26: Consultation Workshops October and November 2012

5.4 Consultation with Bega Valley Shire Council

ERH and the Consultant team met with officers of Bega Valley Shire Council's Development Advisory Panel for a Pre DA meeting on 1st November, 2012. Notes from the meeting, prepared by Council, are reproduced in **Appendix 12**.

5.5 Issues identified

A number of issues became apparent during the consultation and review of the documentation associated with the development application and assessment of DA 05 – 0032 in 2008. These comprise (in no particular order):

- Impact of additional traffic (safety, noise, movement, congestion) on Cattle Bay Road and particularly due to the comparatively steep gradient of the road;
- Impact of coastal processes and coastal hazards on development and vice versa, particularly storms in Twofold Bay;
- Impact on mussel farms;
- impact on swing moorings;
- Impact on whales;
- Justification on the size / number of berths;
- keeping the "Eden experience";
- Maintain a balanced mix of commercial & recreational access;
- Navigation impacts due to proximity to Snug Cove;
- Need for economic benefits and employment for Eden;
- Noise from boating activities;
- Protection of route of Bundian Way;
- Protection of seagrasses and fish;
- Quarantine facilities for overseas boats;
- Recreational use of foreshore and public access generally;
- Relationship with POEM proposal; and
- Scouring of the Bay & beach, including Cocora Beach.

Generally however, the feedback received by ERH was supportive. The plans were viewed positively by attendees at the workshops and no issue or concern gained any particular significance. The comments received by ERH suggest that the local community, businesses and Government authorities and agencies are positively disposed to the potential development of the marina at Cattle Bay.

It is appropriate to note that the public exhibition process in 2008 of DA 05 – 0032 only received four public submissions. In the experiences of the EIS authors, this is a significantly low response rate based on the scale of that development proposed and suggests no inherent significant concerns within the Eden community to development at Cattle Bay.

6. ENVIRONMENTAL ASSESSMENT OF KEY ISSUES

6.1 Strategic Planning

The DGRs seek a justification of the proposal with reference to relevant local, regional and state planning strategies including any justification for any inconsistencies with these planning strategies.

6.1.1 Strategies Consulted

Consideration of the proposal against State, regional and BVSC planning strategies is provided in Part 4.1 of this EIS. Of note the proposed development:

- Achieves many of the goals and strategies of the NSW State Plan 20221 (refer to **Appendix 8**);
- Supports many of the objectives and actions of the NSW Coastal Policy 1997, and does not hinder the achievement of other objectives and actions (refer to **Appendix 9**)
- Responds to the action in the Twofold Bay and Hinterland Strategy to '*Investigate construction of boating facilities at Quarantine Bay, Cattle Bay, Ross Bay and Boydtown*' (p23);
- Satisfies the actions contained in the Eden Structure Plan (which is BVSC's response to the South Coast Regional Strategy) as it provides an additional source of employment within Eden. More importantly, however, it has the potential to be an important catalyst for additional 'multiplier' economic benefits for the town via increased construction, tourism visitation and associated marine based business investment; and
- Supports (or can support) many of the objectives and strategies of the Bega Valley Shire Land Use Planning Strategy, and does not hinder the achievement of other objectives and strategies.

6.1.2 Conclusion and Recommendations

The applicable strategies are not averse to the proposed marina. Rather the marina will support many of their economic, social and recreational objectives. There are no apparent inconsistencies with any of these planning strategies.

6.2 Justification

The DGRs seek a justification of the proposal with reference to need, impact on foreshore amenity, the design of the marina and impacts on foreshore infrastructure. Questions have also been raised by authorities as to the capacity of the marina to accommodate super yachts.

6.2.1 Matters Addressed

The matters raised by the DGRs are addressed in the EIS as follows:

- Need is assessed in the Coriolis Report in **Appendix 7** and Parts 3.6 and 3.7.2;
- Marina design is discussed in Part 3.2;
- Foreshore amenity is preserved by maintaining public access, locating development away from the foreshore reserve and minimising visual and acoustic impact as described and assessed in this EIS;
- Demand on foreshore infrastructure (water, sewer and power) is envisaged to be manageable as described in Parts 2.3.4 and 3.5 and will be the subject of further discussions with Council and service providers during the assessment process; and
- A total berth length for Super yachts of approximately 100 metres is proposed, which can accommodate 2 to 3 vessels at any one time and can receive vessels larger than 28m.

6.2.2 Conclusion and Recommendations

It is considered that there are sufficient grounds to justify the development of the proposed marina at Cattle Bay.

6.3 Visual Amenity

The DGRs seek an assessment of the visual impact of the proposal (in terms of (height, scale, density and lighting)) on the local and regional area, particularly:

- impacts on the amenity of the foreshore;
- Water users of Snug Cove;
- Loss of views from public places; and
- Cumulative impacts.

The design and visual appearance of the proposed marina are presented in the drawings that form part of the application (refer to **Appendix 6**). The marina is proposed to comprise conventional floating pontoons and piles. Accordingly, its appearance is readily apparent by comparison with similar marinas elsewhere.

The only lighting proposed is low-level bollard style lighting. In terms of the car parking area lighting will be provided for safety by a small number of floodlights located on the facilities building and directed to the car park area.

In order to assess the likely visual impacts of the proposal the principle views into the subject area have been identified and are presented in **Figure 6** in **Part 2.6**.

In assessing visual impacts it is important to understand the character and nature of the land and water area to be affected by the proposed development.

A comprehensive visual impact assessment of the proposed marina and wave attenuator is presented in **Appendix 18**.

6.3.1 Views to and From Land

These views are local views and comprise:

- Bay Street
- Cattle Bay Road; and
- Cocora Street.

Views from neighbouring dwellings and roads will be predominantly elevated and will extend over the site to distant landscapes and natural features beyond. With increasing relative elevation, as properties enjoy views over the top of the car park, the marina and moored boats, the impact on views by the proposal is correspondingly minimised.

Given that the level of the car park and building is generally below the level of surrounding roads and dwellings, it is considered that the car park and building structure will have little or no visual impact when viewed from neighbouring properties, from the adjacent roadways and footpaths, or from principle viewpoints.

Any negative visual impact generated by the land and water based facilities from locally based viewing points will therefore be minimal.

6.3.2 Views to and From Water

More distant views are available from:

- By Street and across Fisherman's Wharf;
- The Waters of Snug Cove; and
- Cocora Beach and Cocora Point.

The marina pontoons and wave attenuator will be visible from the water and visually prominent from public places at Cocora Beach and Point.

Water based marine facilities are common within the Eden locality and therefore, although visible, are not necessarily unusual or visually intrusive. Frequently Eden's waterfront scenes including wharves and various types of moored vessels are often the subject of paintings and photographs and feature prominently in the region's tourism marketing material. Generally, people are not offended by the presence of boats and their facilities where they are located on or adjacent to waterways if they are in an appropriate water and marine context.

Views from Cocora Beach and Point will, to a certain degree, be absorbed by the visual prominence of surrounding natural features and the presence of Snug Cove. Any visual appreciation of the car park and temporary building will be minimal, if apparent at all, to the casual observer.

At Cattle Bay the change to the appearance of the site that the proposed marina will generate needs to be viewed in the following context:

- The previous use of Cattle Bay as an industrial cannery complex which involved significant boat traffic and use of the existing wharf;
- The location of the proposed car park and temporary building, which is setback from the foreshore edge as required by BVSC DCP controls. Thus it will be partially visible from the water and visibility will be limited because of the presence of boats berthed at the Marina;
- The visual backdrop offered by the elevated vegetation of the shoreline to the east and west of the site, which will continue to visually dominate the landscape; and
- The water area in Cattle Bay already contains a number of swing moorings that already present a vista of moored boats when viewed from principle viewing areas (refer to views in **Figure 6**).

The latter point is significant in terms of cumulative impact. The proposed marina is not the only visual intrusion in the waters of Twofold Bay in this locality. In particular the presence of the port immediately to the south of the site has a prominent and significant visual impact, which is generally accepted by the Eden Community. It commonly features prominently in tourism material and is rarely objected to.

Generally views to the water from properties or from the adjacent roadways and footpaths currently extend through the remains of the cannery and across the existing moored boats. Importantly, views are filtered by the presence of existing trees, thereby further limiting the visibility and potential view impacts.

As a consequence, many of the views of the current open waterway adjacent to the site that will be affected by the proposal are filtered views.

The impact of the proposed marina on those views will be to reduce the area of open waterway in the foreground of the view. Notwithstanding this, a very extensive area of open water beyond the proposed marina into Twofold Bay will remain within the middle and long-distance views.

With regard to the visual impact from Snug Cove and Cocora Beach/Point, the subject site forms part of a wide expanse of the Bay. Accordingly, the extent of visual impact when viewed from the water and the Beach must have regard to the fact that most of the views from these places cover an extremely wide panorama, within which the waters of the subject site are only a small part.

6.3.3 Conclusions and Recommendations

Whilst the marina will extend prominently in a southerly direction into the waters of Twofold Bay and Snug Cove, it will present an increase in the visual density of boats and maritime activity compared to the existing situation.

With the predominance of distant, elevated and filtered views, it is considered that the impact on the appearance of the area with the presence of the marina will be minor and not significant.

Furthermore, given the existence of Snug Cove and the relatively modest nature of the proposal relative to the size of Twofold Bay and its wide effective visual catchment within which it is located, the proposal when viewed from Cocora Beach and other public domain viewing places is considered to have only a very minor effect on view composition.

Although the site is easily visible within its visual catchment, the change it would make to the intrinsic character of the area overall is considered to be minor and in many instances may be almost imperceptible to a casual observer.

6.4 Traffic and Transport

The DGRs seek an assessment of traffic and transport impacts including construction and operation, traffic and parking assessment and landside access (e.g. the impact on users of the public foreshore).

6.4.1 Previous Assessments as part of DA 05-0032

A Traffic Impact Study involving SIDRA modelling was undertaken as part of the assessment of DA 05-0032. DA 05-0032 comprises 13,400 sqm of residential floor space, 18,400 sqm of tourist floor space and 297 car parking spaces. Due to these previous studies and given the much reduced scale of activity and development in this proposal, which is a separate development application, additional studies were considered unnecessary.

With regard to the traffic impact assessment on DA 05-0032 JBA Planning Consultants, 2008, note:

'A Traffic Report prepared by Transport and Traffic Planning Associates finds that the proposed development on the site is not intense, and the resultant traffic generation will be:

- relatively minor;*
- spread over numerous access points;*
- spread over different times of the day due to the range of uses proposed (e.g. residential, hotel, restaurants etc).*

The Traffic Report has confirmed that there will not be any adverse operational performance or safety outcomes to the traffic circumstances associated with the proposed development. The proposed development will maintain a Level of Service 'A' at key intersections.

...

The existing and proposed road gradients are compliant with normal engineering design and there is no evidence of any danger or hazard. Former operation of the Cannery on the site involved a workforce of 500 hundred persons at its peak and generated traffic in the form of heavy trucks and light vehicles far in excess of the traffic generated by the proposed development.

....

The Traffic Report prepared by Transport and Traffic Planning Associates in Appendix F of the EAR finds there will not be any adverse operational performance or safety outcomes to the traffic circumstances associated with the development.

The Environmental Noise Assessment prepared by Acoustic Logic included in Appendix O of the EAR assesses traffic noise and finds that traffic flows will cause an imperceptible to barely perceptible increase in noise level, and therefore no adverse effect to the acoustic environment is expected as a result of increase in traffic volume."

A more up to date assessment incorporating new SIDRA modelling, also by Transport and Traffic Planning Associates (2014), is contained in **Appendix 15**.

It reconfirms the conclusions of the earlier study and notes that there will not be any unsatisfactory traffic implications.

6.4.2 Conclusions and Recommendations

Previous traffic impact assessments and modelling associated with DA 05 – 0032 confirm that traffic generated by this proposal will be comparatively minimal and will not adversely impact on the surrounding road network

6.5 Navigation and Safety

The DGRs seek an assessment of impacts on existing water based users at Cattle Bay and Snug Cove in the vicinity of the marina and the adequacy of the design.

6.5.1 Water Transport

A number of water transport issues can be identified:

- impact on navigation; and
- impact on swing moorings.

Impact on Navigation

The proposed wave attenuator and floating marina would not be expected to impact adversely on navigation for a number of reasons:

- The footprint of the proposed development does not impact on the approach channel and swing basin for commercial operations in Eden Harbour (refer **Figure 7**);
- The footprint of the proposed development would not restrict navigation to any future POEM development proposal located off Thompsons Point (refer to **Figure 20**);
- Access around the foreshore for small craft such as kayaks and canoes would be available, although it would be necessary for those craft to navigate under the existing jetty structure inshore of the marina as they currently have to do.

Comments provided during the focus workshops by port representatives confirmed that the location of the marina will not impact on the operation of the port.

Impact on Swing Moorings Access

There are a number of private swing moorings (approximately 24) located in the proposed footprint of the Marina. These moorings will need to be relocated by the RMS (Maritime) at the cost of ERH.

A preliminary Draft Swing Mooring Relocation Strategy prepared by Advanced Marina Management is enclosed in **Appendix 13**. It would be developed further in consultation with the RMS (Maritime), key stakeholders and the licensees of the swing moorings.

6.5.2 Marina Design

The marina layout has been developed to comply with Australian Standard AS3962-2001 "Guidelines for Design of Marinas" and the NSW Maritime Authority Guidance Note 8.3.02 (GN 8.3.02) in regard to:

- channel dimensions,
- fairway dimensions,
- berth dimensions.

6.5.3 Conclusions and Recommendations

Investigations confirm that there will be no navigation issues. The impact on Swing Moorings will need to be managed and it is recommended that the principles in the Swing Moorings Relocation Strategy contained in **Appendix 13** be developed further in consultation with the RMS, Eden Port Authority and Swing Mooring Tenants.

6.6 Infrastructure Provision

The DGRs seek an assessment of the capacity and requirements of the development to be supported by existing infrastructure services.

6.6.1 Demand Upon and Availability of Service

As part of investigations for DA 05-0032 Patterson Britton Consultants held discussions in 2007 with the various service providers (Country Energy, Telstra etc) that confirmed that the proposed development was able to be serviced with the necessary infrastructure provided local upgrades are undertaken.

The stormwater drainage system and power, sewerage and water infrastructure supplies previously associated with the cannery facility remain within the site. Patterson Britton's investigation and more recently in 2014 Royal Haskoning DHV's updated water and wastewater servicing strategy for the marina and temporary building (**Appendix 20**) note:

- The former cannery use was a considerable potable water and energy user and the site enjoys good connections to potable water, wastewater and energy supplies. The proposed development would create only small scale water demand and wastewater loadings that is far less than that created by the previous cannery use and far less than that investigated as part of DA 05 – 0032;
- Council has confirmed that the Cattle Bay site is located within Eden's sewer boundary and has been considered in the development of the sewer DSP. There is spare capacity at the sewage treatment plant for this development. A Council sewerage pumping station directly adjoins the site, PS3 and the onshore marina facilities can be readily connected to the gravity main adjoining the site via manhole DZ1.

In this proposal the temporary building will be connected to the existing potable water, sewerage and power service supplies present in the area that served the previous cannery use.

Waste will be of a conventional nature and there will be no dredging or other land clearing that could trigger the identification of other waste solutions.

6.6.2 Conclusion and Recommendations

Due to the minor demand upon the existing services that is proposed and advice as to the potential inadequacy of the current sewer and water networks, it is recommended that further discussions with Council be undertaken with a view to prepare strategies that may identify cost effective solutions to any shortfalls in the provision of sewer and water supplies to the development. Such strategies may not simply propose augmentation of existing services, they should explore opportunities for the identification of innovative solutions to address infrastructure provision.

6.7 Hazards Assessment

The DGRs seek an assessment of the potential hazards for the construction and operation of the marina including failure of the marina and potential impact on the adjoining aquaculture operations and fire.

6.7.1 Hazard Identification and Solutions

A number of potential hazards have been considered in the conceptual design of the proposed marina redevelopment. In particular the potential sources of risk associated with the development and operation of the marina include:

- fire;
- personal accidents;
- collisions;
- spillage;
- waste materials;
- Structural failure of marina

No fuel or dangerous goods storage facilities are proposed within the development; and fuel supplies will not be available from the marina. The rules and policies of the marina will prohibit the private refuelling of vessels moored at the marina.

Fire

The risk of fire will be primarily associated with berthed vessels as no refuelling facility is proposed.

Fire fighting equipment will be provided in accordance with AS 3962-2001 and to the requirements of relevant authorities. The equipment will include fire hose reels, hydrants and fire extinguishers. The fire fighting equipment provided should be capable of rapidly extinguishing any fire in its initial stages.

A safety committee will be formed and appropriate emergency procedures will be developed in consultation with the local fire brigade.

Staff will be familiar with:

- the procedures to follow in the event of a fire;
- the layout of the installation;
- the location of fire fighting equipment; and
- the principles of fire fighting, the use of extinguishers and fire fighting appliances.

These procedures would be reinforced on a regular basis.

In addition to the above it is a requirement of the RMS that appropriate fire fighting equipment (e.g. handheld extinguishers) are located on board vessels.

Personal Accidents

The risk of personal accidents, in particular drowning or injury is a hazard that can be significantly reduced by the incorporation of a number of safeguards into the design and operation of the marina and associated facilities. These safeguards include:

- implementation of regular safety awareness program;
- provision of suitable first aid kit that is readily accessible;
- provision of rescue equipment such as rescue buoys (life rings), life preservers;
- illumination of all walkways and waterfront structures and provision of non-slip surfaces where practicable on all structures to prevent accident and to facilitate rescue;
- provision of hand railing on ramps and gangways; and
- compliance with all requirements of the regulatory authorities and completion of regular on-going maintenance inspections.

Collisions

The major risk of collisions within the development would be between craft. These risks can be reduced by the incorporation of a number of safeguards. Larger vessels are also usually skippered by professional captains.

Safeguards against collisions between craft would include:

- training and induction of all Boat Owners;
- provision of suitable signs and other forms of advice to boat users regarding operating measures to be adopted to avoid interference with passing boat traffic;
- provision of weather information on an appropriate noticeboard;
- enforcement of maximum boat speed regulations within the berthing area; and
- provision of channels, fairways and berths of appropriate dimensions.

Spillage

The provision of a sewage pump out facility should mitigate the problem of wastes accidentally spilt into the waterway.

Another potential sources of oil spill includes bilge water discharged from vessels. All customers will be inducted and supplied with a complimentary bilge absorbing pad.

The marina will maintain an oil/fuel boom and associated materials ('Marine Spill Kit') to contain any accidental spillage.

The kit contains marine oil spill response products that are specifically designed to work in a marine environment for the capture and spill containment of hydrocarbons (oils, fuel, diesel etc.) spills.

Waste Materials

Waste materials and rubbish will be generated during operation of the marina. Rubbish receptacles would be strategically located and emptied at regular intervals.

A waste oil storage facility would be provided so that patrons of the marina may dispose of containers of waste oils, bilge absorbing pads etc. These drums would be serviced periodically by a commercial waste collector.

Structural Failure of Marina

The wave attenuator and the floating marina would be designed in accordance with Australian Standard AS 4997-2005 Guidelines for Design of Maritime Structures and AS 3962-2001 Guidelines for Design of Marinas. Construction materials including concrete mix design and hardwood timbers would be selected for their durability in the marine environment. A geotechnical investigation would be undertaken prior to construction of the wave attenuator and floating marina to confirm foundation conditions and enable detailed design of the piles which support the wave attenuator and which laterally restrain the floating marina.

The major design loads on the wave attenuator comprise swell waves and local wind generated waves. These conditions are well known based on the numerical modelling work undertaken to date and actual wave data recorded in Eden Harbour. Further numerical modelling of the wave climate can be undertaken during detailed design if considered necessary.

In addition to wave loading, the floating marina would also be subject to berthing and mooring loads from vessels located at the marina. Well established guidelines exist for the determination of these loads.

It follows from the above that adequate measures exist to ensure the wave attenuator and the floating marina can be designed so as not to fail structurally during the design storm event. This design storm event would be selected having regard to the risk to property and life and the design life of the structure(s), in accordance with AS 4997-2005 (Table 5.4), and would be agreed with relevant authorities.

6.7.2 Conclusions and Recommendations

Hazards are manageable when marina users behave responsibly. Each vessel moored at the marina will be moored pursuant to a Marina Occupation Agreement between the applicant/marina owner and the vessel owner.

This agreement will include a number of obligations upon the vessel owner consistent with the environmental issues raised in this EIS. These obligations will address matters including:

- flushing of heads at moorings;
- pumping of bilges at moorings;
- navigation speed and wash creation;
- waste storage, management and removal;
- dangerous substances on vessels;
- operation of sewage and fuel pumping equipment;
- creation of noise;
- work being undertaken on vessels;
- emergency procedures in respect of spills and hazardous materials; and
- attendance at an induction program.

The vessel owner will also be required to comply with a set of Marina rules and regulations. Non-compliance will be enforced by a range of fines and potential termination of the mooring occupation entitlement.

No additional recommendations are proposed.

6.8 Public Access

The DGRs seek an assessment of the potential impacts on public access, including disability access and access to the foreshore

6.8.1 Maintenance of Access

As described in **Part 5.5.1**, access around the foreshore for small craft such as kayaks and canoes will be maintained, although it would be necessary for those craft to navigate under the existing jetty structure inshore of the marina as they currently have to do.

Furthermore, the footprint of the proposed development does not impact on the approach channel and swing basin for commercial operations in Eden Harbour (refer **Figure 7**); nor would it restrict navigation to any future POEM development proposal located off Thompsons Point (refer to **Figure 20**);

Public access to the beach, foreshore and jetty is also maintained in the proposed development

6.8.2 Conclusion and Recommendations

Existing levels of public access is maintained and disability access improved. No specific recommendations are identified.

6.9 Coastal Processes

The DGRs seek an assessment of the potential impacts of coastal hazards and processes on the proposed development

6.9.1 Wave Climate

The incident wave climate at the site, specifically the local wind generated wave climate (seas) from the south / south-south-west, has dictated the need for a wave attenuator in order to achieve a wave climate that satisfies criteria in the Australian Standard AS 3962-2001, "Guidelines for Design of Marinas". The required wave attenuator performance and a description of the wave attenuator have been outlined in **Part 3.2.4**.

At the same time, the proposed wave attenuator and the floating marina would have an effect on the incident wave climate and its existing propagation to the shoreline and subsequent shoreline processes. This is best discussed separately in terms of the local seas and the swell.

Local Wind Generated Waves (Seas)

The wave attenuator has been aligned approximately perpendicular to the approach direction of the shorter period locally generated wind waves from the south / south-south-west. The predicted impact of the attenuator on these waves is as follows:

- directly in the lee or 'shadow' of the wave attenuator, i.e. within the marina, along the beach at Cattle Bay and between this beach and Thompsons Point, the local wind generated wave climate would be reduced in height (as a consequence of the attenuator, and the floating marina);

- along Cocora Beach there would not be expected to be any change in the local wind generated wave climate along the shoreline to any material degree⁶;
- eastward from Thompson's Point there would not be expected to be any change in the local wind generated wave climate along the shoreline to any material degree;
- immediately in front of the wave attenuator reflected and incident locally generated wind waves would interact; at times of very strong winds from the southerly sectors a 'confused' sea state would exist in this area⁷. This sea state may affect the suitability of the area for provision of swing moorings, over a distance from the attenuator equivalent to a number of wave lengths of the incident wind waves, e.g. over say 50 to 100m. It is recommended that any provision of swing moorings on the immediate southern side of the attenuator be subject of a trial.

Ocean Swell

Ocean swell largely determines the behaviour of the beaches in Eden Harbour, particularly the longer and more exposed Cocora Beach. This is because of the dominance of the swell wave energy compared to the energy contained in the local wind generated waves⁸. The approach direction of the ocean swell, together with the bedrock controls at the ends of the beach, strongly influences the beach alignment. It is evident Cocora Beach is aligned to the incoming swell direction.

The penetration of ocean swell into Snug Cove has been investigated by Cardno (2011) using numerical modelling techniques (refer **Part 2.3.5**). **Table 6** in **Part 2.3.5** summarises the significant wave height H_s and peak wave period T_p for 1 year and 50 year average recurrence interval conditions (ARIs) at a number of Model Output Locations (Locations 3 to 9, refer **Figure 9**) within Snug Cove for those offshore wave approach directions that lead to the highest swell conditions in Snug Cove, namely waves from the ESE and E. The results in **Table 6** indicate the relative degree of sheltering (reduction in H_s) as you move eastwards from Cocora Beach to Cattle Bay and further to Thompsons Point.

Cardno (2011) also modelled two specific severe ocean storms, both of which had a peak significant wave height H_s close to the 50 year ARI offshore significant wave height, namely:

- storm of 28 June 2007, which had the following offshore wave conditions:
 H_s 7.1m
 T_p 12.2 seconds
 Direction 165oTN (approximately SSE)
- storm of 30 May 2010, which had the following offshore wave conditions:
 H_s 7.3m
 T_p 13.5 seconds
 Direction 112.5oTN (approximately ESE)

⁶ As noted in **Part 6.9.6**, the behaviour of Cocora Beach is determined principally by the incident swell wave climate rather than local seas.

⁷ For a wave transmission coefficient K_T for the wave attenuator of 0.51 to 0.68 (refer **Part 3.2.4**) the wave reflection coefficient K_R would be in order of 0.86 to 0.73. Accordingly, the interaction of the incident and reflected waves could lead to a combined significant wave height of up to 1.9 times the incident significant wave height.

⁸ Wave energy is proportional to the square of both wave height and wave period, hence the wave energy in the swell is more than an order of magnitude (10 times) the energy in the local wind waves.

The results of the modelling of the above two storms, in terms of the inshore wave conditions of Model Output Locations 1 to 11 are summarised on **Figures 27 and 28** below. These figures also show the proposed wave attenuator and floating marina.

Based on the numerical modelling work presented by Cardno (2011), and the wave transmission and reflection characteristics of the wave attenuator and floating marina, it is possible to conclude the following in regard to the expected impact of the proposed wave attenuator and marina on the incident swell wave climate in Snug Cove.

- There will be a 'shadow zone' behind the wave attenuator and floating marina in which the swell wave climate would be reduced. This shadow zone would extend from about the rocks at the northward end of Cocora Beach to the rocky headland at the eastern end of the beach at Cattle Bay. The beach at Cattle Bay, which is already quite sheltered, would generally become more sheltered;

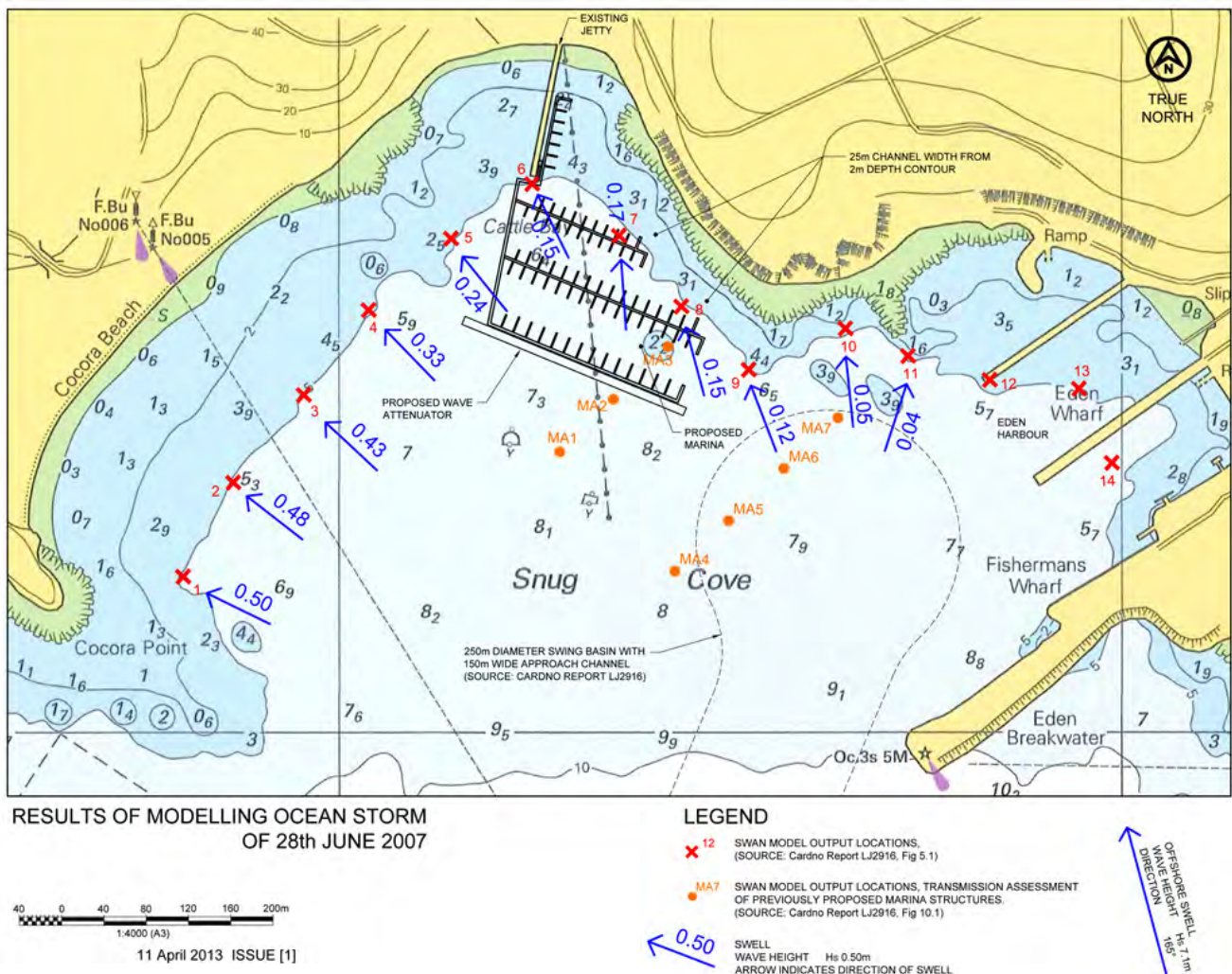


Figure 27: Results of Modelling of Ocean Storm 28 June 2007

(Source: Haskoning Australia)

- Even though the wave attenuator would allow the majority of the incident swell wave energy to pass through (under) the structure, some of the incident swell wave energy would be reflected off the structure. Based on the straight alignment of the wave attenuator, the reflected waves would be directed to the mid / southern section of Cocora Beach. The change in wave approach direction at Cocora Beach due to the influence of reflected waves would be expected to lead to some realignment of the beach. Cardno (2014) in **Appendix 16** updates wave the modelling adopting a 'cranked' alignment of the wave attenuator and finds that significant changes to Cocora Beach, with the modified attenuator alignment, are not expected (refer Section 6.9.2 below).

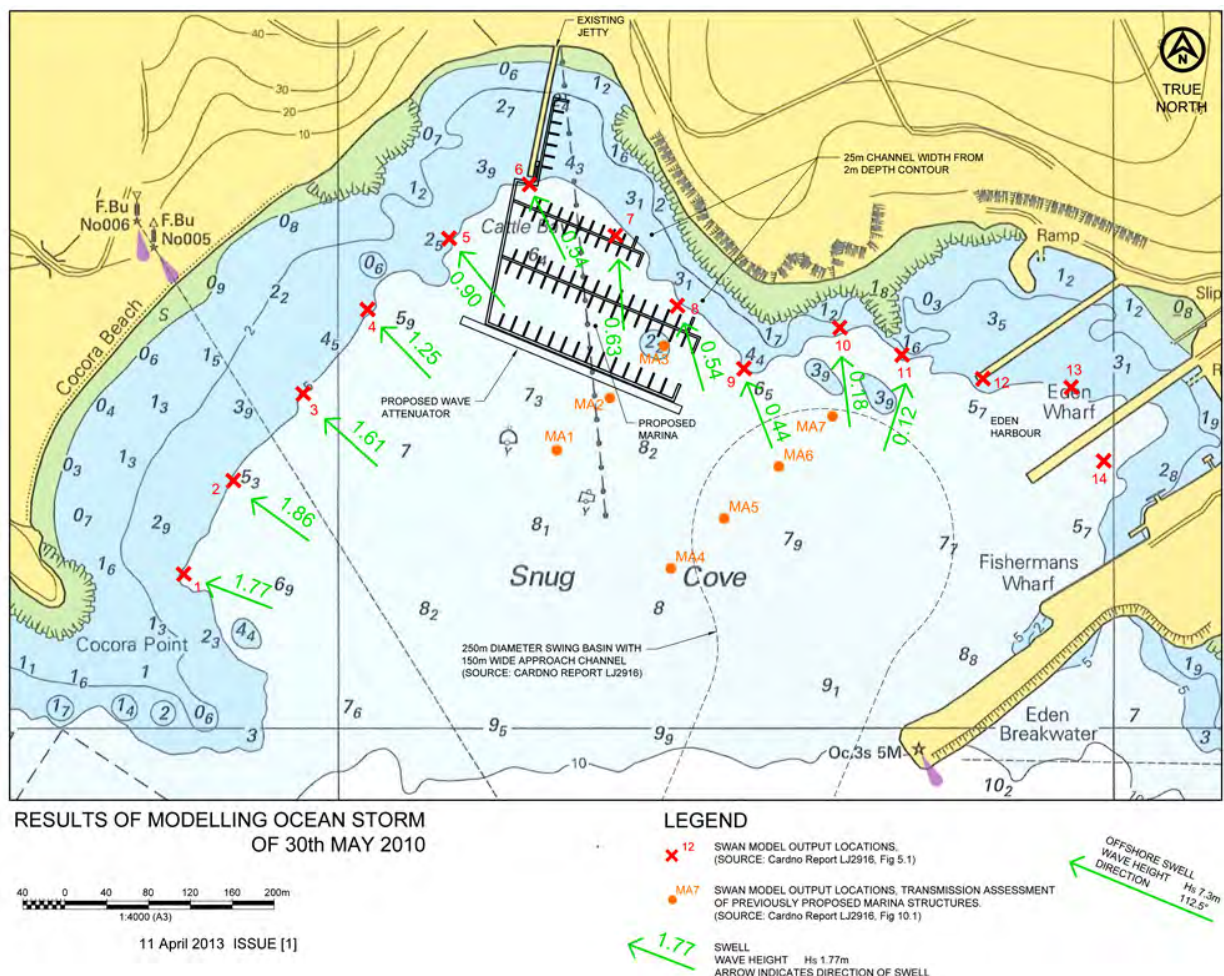


Figure 28: Results of Modelling of Ocean Storm 28 June 2007

(Source: Haskoning Australia)

6.9.2 Wave Climate Conclusions and Recommendations

Given the occurrence of reflected swell wave energy from a straight wave attenuator towards the mid to southern section of Cocora Beach, it is recommended that:

- during the detailed design of the wave attenuator the alignment of the attenuator be optimised to reduce the reflected swell wave energy towards Cocora Beach. A concept of how this may be achieved, by 'cranking' the alignment of the attenuator is provided in the sketch in **Figure 29** below; and

- any provision of swing moorings on the immediate southern side of the attenuator be subject of a trial.

More detailed wave studies for a 'cranked' alignment for the wave attenuator have been undertaken as set out in Appendix 16. These more detailed studies have demonstrated that significant changes to the alignment of Cocora Beach are not expected as a result of the proposed 'cranked' wave attenuator.

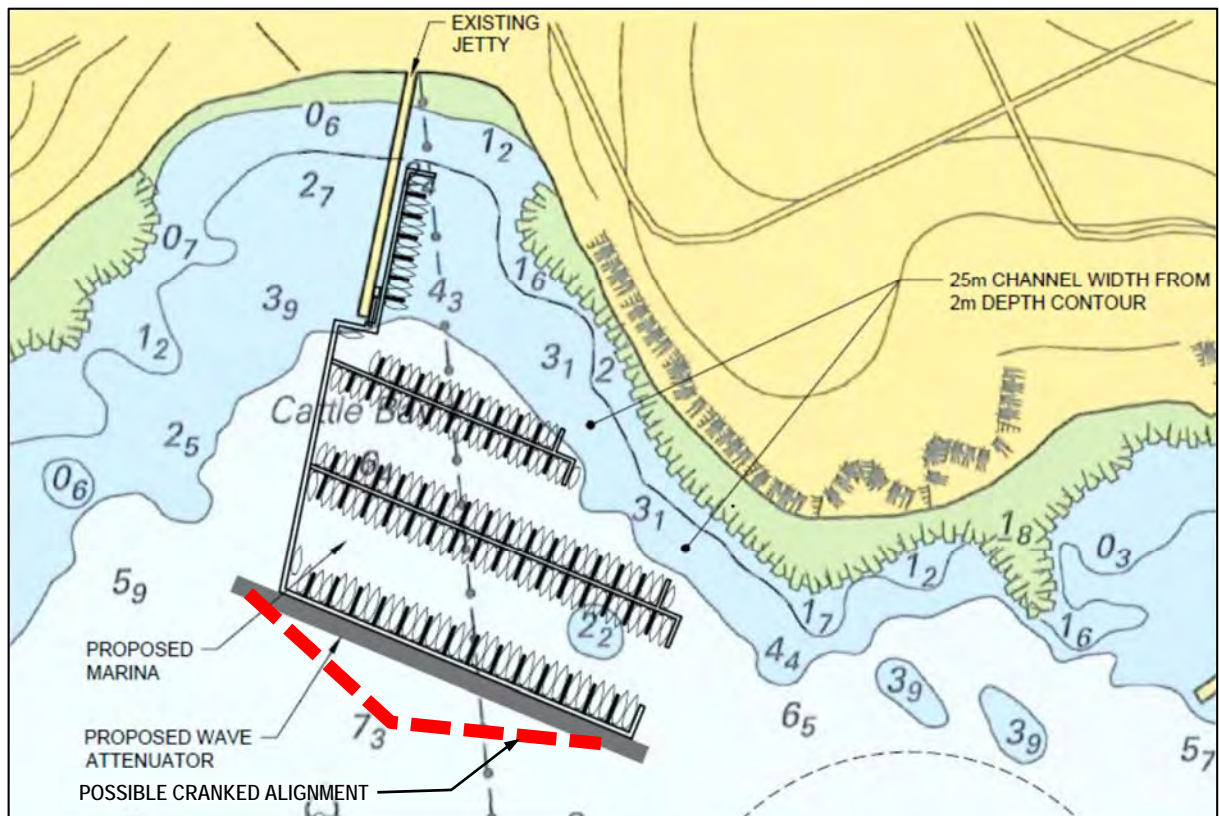


Figure 29: Sketch Showing 'Cranking' of the Alignment of the Breakwater

(Source: Haskoning Australia)

6.9.3 Elevated Water Levels (including Climate Change)

The elevated water levels which can occur at times of ocean storms and the potential for these levels to increase in the future as a result of Greenhouse sea level rise have been outlined in **Part 2.3.3**.

The proposed wave attenuator and floating marina are particularly resilient to sea level rise or can be readily adapted to sea level rise as noted below:

- the floating marina system moves vertically in response to the water surface elevation and hence with sea level rise would simply float higher above the seabed. The marina restraint piles can be initially installed with a higher cut off level to accommodate an agreed benchmark for sea level rise;

- the performance of the wave attenuator in reducing transmitted waves would improve with sea level rise since in effect a larger proportion of the screen would be immersed and therefore more effective in reducing the wave energy⁹;
- the greater risk of wave overtopping of the wave attenuator over time could be addressed by retrofitting a further vertical element to the precast panel in the future to increase the crest level.

6.9.4 Elevated Water Levels Conclusions and Recommendations

In the case of the existing jetty, it has a deck level of approximately 2m AHD or 2.9m CD and would be well protected behind the wave attenuator and floating marina; it is considered unlikely it would be necessary to raise the existing jetty deck level within the life of the floating marina.

6.9.5 Water Movement Patterns

There is generally limited information available on currents within Twofold Bay or in Snug Cove in particular. Currents can be expected to comprise mainly tidal currents, which would extend to the seabed, and wind driven surface currents. Both tidal currents and wind driven currents can be expected to be of low magnitude, typically less than 0.1 to 0.2m/sec.

Due to the small area occupied by the proposed Cattle Bay Marina relative to the waterway area of Twofold Bay, the proposed marina would have negligible impact on the large scale current patterns in the Bay.

Locally in Snug Cove, the significant gap below the wave attenuator to the seabed of 4 to 6m even at low tide (refer **Part 3.2.4**) and the similar and larger gaps below the moored vessels and floating marina, means that minimal impact on tidal current circulations and flushing of the cove would be expected.

Some localised changes to surface wind driven currents would occur due to the wave attenuator and the floating marina, but are considered minor in the context of Snug Cove and Twofold Bay. It is noted that passage for surface wind driven currents and circulations would always be available near the shoreline under Cattle Bay Jetty.

6.9.6 Sediment Movement and Shoreline Stability

Negligible sediment movement would occur on the seabed in Snug Cove other than very close to the shorelines of sandy beaches under the action of waves, mostly under swell waves due to the greater energy associated with these waves.

In **Part 6.9.1** it was noted that the beach at Cattle Bay would become more sheltered as a result of the proposed wave attenuator and floating marina. This is likely to result in some changes to the mean wave direction at Cattle Bay Beach and hence may result in a clockwise beach alignment rotation in the order of six to eight metres at the eastern and western ends respectively (refer **Appendix 16**).

⁹ Equally, the wave attenuator would become somewhat more reflective over time with sea level rise, thus adding weight to the recommendation in Part 6.9.1 to consider optimization of the alignment of the western section of the attenuator during detailed design.

In the case of Cocora Beach it was noted in **Part 6.9.1** that without a 'cranking' of the alignment of the attenuator the greater wave energy and associated shift in the mean weighted energy direction would be expected to lead to an increase in onshore/offshore sand movement and a change in the net direction of alongshore sand movement (a shift towards more southerly movement).

With the 'cranking' of the attenuator as proposed in **Figure 29** significant changes to the beach alignment of Cocora Beach are not expected (refer **Appendix 16**).

6.9.7 Conclusions and Recommendations

Having regard to the potential changes, it is recommended that:

- during detailed design of the wave attenuator the alignment of the attenuator be 'cranked' to reduce the reflected swell wave energy towards Cocora Beach (refer sketch in **Figure 29**);
- during detailed design of the wave attenuator the length of the attenuator be extended slightly along the cranked alignment to meet the, moderate wave' climate criteria in requirements of AS 3962 (as noted in **Appendix 16**).

6.10 Soil and Water

The DGRs seek an assessment of the potential impacts on water quality during construction and operation, on ground water dependant ecosystems, on drainage lines and riparian corridors, flood risk, stormwater, dredging, bed and shoreline stability and acid sulphate soils.

The majority of these issues will not be realised due to the nature of the proposed development. The temporary land facilities will have no impact on the existing drainage and riparian characteristics of the site; nor will they have any impact on groundwater dependant ecosystems. A temporary gross pollutant trap (GPT) is proposed to be installed where the existing drainage pipe exits Lot 2 to the south capture any potential pollutants that may eventuate with renewed use of the concrete slabs within the site. No works will take place on or near the shore line as the jetty will be refurbished and used to link the land with the floating marina.

6.10.1 Flooding

Flooding was investigated by Patterson and Britton in 2008 as part of the investigations and assessment of DA 05 -0032. That assessment noted that the flatter, level part of the site accommodated a confluence of three natural valleys and drainage paths across land adjoining the site.

The modelling identified an existing flood risk to the eastern part of the site. Flow from the northern and eastern drainage paths converge on the eastern boundary of the site adjacent to Cattle Bay Road near the extension of the unmade Chandos Street. Currently, all flow in excess of the culvert capacity under Cattle Bay Road would spill over the road during storm events.

Given the limited capacity of the existing culvert and the sizable upstream catchment, it is expected that this is a relatively frequent occurrence and would have occurred during the occupation of the site by the cannery. Flow could continue through the currently vacant site towards Cattle Bay.

Patterson Britton made a number of recommendations as part of DA 05-0032 to address this issue for that development including development of formalised channel to carry these significant flows safely through the proposed development including works to Cattle Bay Road and upgrading of existing outlets to Cattle Bay.

6.10.2 Flooding Conclusion and Recommendation

The proposed temporary building in this proposal would impede a potential drainage flow path through the site and the scale of works to address this is cost prohibitive for the scale and temporary nature of the marina's land facility and car park.

It is recommended that a Flooding Emergency Response Plan be prepared. It is envisaged that the Plan will recommend the regular monitoring (visual and/or electronic) of flood levels, actions for the evacuation of staff and visitors from the land based facilities to a safe location (e.g. the jetty or elevated land) and will provide recommendations for fencing, signage and securing of lighting and the temporary building to minimise risk of damage from flood water.

6.10.3 Sediment Quality

Surface sediment samples were collected within the general proposed marina area at five locations as part of the diver inspection conducted for the marine ecology survey. Tests were conducted for a range of organic and inorganic substances. The results are included in **Appendix 5**.

6.10.4 Sediment Quality Conclusions and Recommendations

The results show that all concentrations of substances are below the ANZECC sediment quality guidelines. Accordingly, any minor disturbance of the sediments which might occur during construction activities such as piling would not be an issue.

6.10.5 Acid Sulphate Soils

While it is possible the sediments in the area of the proposed marina, which generally comprise fine to medium grained sand with less than 10 to 15% by weight mud (silts and clays), could exhibit acid sulphate soil potential, the proposed development does not involve the physical removal of any sediment and its placement in an environment where oxidation could occur, e.g. dredging of sediments is not proposed.

6.10.6 Acid Sulphate Soils Conclusions and Recommendations

The occurrence of acid sulphate soils is not considered to be an issue.

6.11 Geotechnical

The DGRs seek an assessment of the geotechnical limitations of the site and potential responses.

6.11.1 Conditions.

Geotechnical conditions are described in **Part 2.3.6**. While no detailed geotechnical investigation has been undertaken at the site of the proposed marina to date, the seabed conditions, based on available geotechnical /geophysical information and recent (July 2014) seabed mapping, are expected to comprise sandy sediments overlying clay and rock (refer **Appendix 19**). It is evident from the existence of nearby piled structures such as Cattle Bay Jetty and the commercial maritime facilities in Eden Harbour that conditions would be suitable for installation of piles for the wave attenuator and for restraint of the floating marina. As rock may be near the seabed surface in places, some piles may need to be potted into rock, which is a well proven technique.

The geotechnical conditions would not influence the alignment of the wave attenuator, this alignment is driven by the need to ensure the wave attenuator does not lead to any significant changes to the alignment of Cocora Beach.

The geotechnical condition that raises a potential environmental issue is the existence of the isolated rock pinnacle within the proposed marina footprint between Arms 'B' and 'C'. The pinnacle is shown on the navigation chart to have a minimum depth of -2.2 m CD. The rock pinnacle is likely to take the form of the pinnacle photographed during the diver inspection conducted for the marine ecology survey (refer to photograph in **Figure 8**).

6.11.2 Conclusions and Recommendations

Lowering of the rock pinnacle to a minimum depth of -4 m CD would be required for safe berthing and navigation. In the first instance the proposed method of lowering the rock pinnacle would comprise use of 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. In this case the procedure for lowering the pinnacle would comprise:

- drilling of holes into the pinnacle for subsequent insertion of a non-explosive rock splitting expansive agent. Individual holes would be around 30 to 50 mm in diameter and spaced at approximately 300 mm centres;
- placement of the non-explosive rock splitting expansive agent into the drill holes and allow to set and expand (4 to 6 hours or greater);
- remove broken / split rock using a barge mounted excavator;
- confirm minimum surface level of the pinnacle is at or below -4 m CD;
- repeat above procedure if required.

Disposal of the broken rock would either be to land or onto the immediate surrounding seabed (below -4m CD) for habitat creation, subject to consultation with relevant authorities.

6.12 Environmental Management Plan

The DGRs seek the provision of an Environmental Management Plan.

6.12.1 Response

A draft Environmental Management Plan prepared by Advanced Marina Management Pty Ltd is enclosed in **Appendix 14**.

6.13 Heritage and Archaeology

The DGRs seek investigations to identify whether the site has aboriginal cultural heritage, or contains any items of non-indigenous heritage and presentation of recommendations whether such values and items are found.

6.13.1 Previous Investigations and Recent Comment

South East Archaeology, ERH's consultant in 2008, identified one Aboriginal heritage site located in the south western part of the site adjacent to Bay and Bimmell Streets, approximately 5 – 25 metres northwest of two water tanks. The site comprises a lithic artefact scatter, and was assessed as low scientific significance within a local context.

Investigations revealed a moderate to high potential for further heritage evidence to occur in the form of shallow sub-surface deposits of stone artefacts across those portions of the study area not entirely affected by recent land use.

South East Archaeology recommended the formulation of an Aboriginal Heritage Management Plan specifying policies, strategies and actions to mitigate and manage potential impacts on the Aboriginal heritage, in consultation with the Eden Local Aboriginal Land Council. This was addressed in the Statement of Commitments and conditions of approval.

Subsequent comments received from representatives of the Eden LALC as part of the consultation in this proposal have raised the presence of the Bundian Way. It passes the development via the beachfront as indicated in the map in **Figure 30** below.

The Cocora Beach / Cattle Bay precinct holds special values for the Aboriginal people. It is expected that the Bundian Way walking route around Twofold Bay between Eden, Nullica and Bilgalera will be extremely popular, not only for its beauty but also for its shared history connections. The Eden LALC will be asking property owners along its route to help maintain and manage relevant parts of the old walking route.

No items of non-indigenous heritage have been identified within the site.

6.13.2 Conclusions and Recommendations

The location of the known artefact lies outside the subject site of this proposal. This proposal will not obstruct the formulation of the Aboriginal Heritage Management Plan; nor the creation and promotion of the Bundian Way. No recommendations are made



Figure 30: Route of Bundian Way Through Site

(Source: Eden LALC, 19 March 2013)

6.14 Flora and Fauna

The DGRs seek assessment of the potential impacts of development on flora and fauna.

6.14.1 Results of Marine Pollution Research Investigation

Marine Pollution Research Pty Ltd (MPR) has prepared a comprehensive aquatic ecology assessment of the site comprising review of previous studies and site inspection. This report is enclosed in **Appendix 5**. It is supplemented by additional research by Ocean Environmental Engineering (**Appendix 17**)

This reports provide an assessment of the potential impacts associated with the construction and operation of the marina in Cattle Bay. They note that Twofold Bay provides a range of wharf facilities for wood chip industries, The Royal Australian Navy, general cargo and smaller commercial vessels (fishing vessels, tourist vessels and general trade in Snug Cove).

There are swing moorings for recreational and commercial vessels in Snug Cove including Cattle Bay. There are other swing moorings and a public boat ramp in Quarantine Bay.

Twofold Bay supports a mixed commercial fishery including purse seining and beach hauling and there are two mussel aquaculture facilities, one located south of Cocora Point.

Given the oceanic nature of Twofold Bay it provides coastal and near oceanic habitat for some 63 listed species including 26 threatened species under the various Commonwealth and State Protected Species legislation. In particular, Twofold Bay and the immediate coastal waters offshore over the relatively narrow continental shelf provide migration corridors and staging plus feeding resources for whales and dolphins, particularly Humpback and Southern Right whales. As a consequence Twofold Bay supported a large whaling industry in the past and now supports a tourist industry around whale and dolphin watching. Common and bottlenose dolphins are regularly reported in Twofold Bay and there may be a resident population of indo-pacific bottlenose dolphins in Twofold Bay.

Due to the long association with port usage, particularly with shipping links to Asia, Twofold Bay also hosts numerous introduced marine species (IMS) including several priority-listed species such as the Mediterranean fanworm *Sabella spallanzanii*.

Cattle Bay aquatic habitats include a narrow intertidal rocky shore with a broader rock boulder sub-tidal fringe and a predominantly sandy seabed that supports a dense *Posidonia* based seagrass bed along the eastern shore, scattered *Zostera* seagrass amongst the boulder reef along the western shore and sparse plus patchy *Heterozostera* seagrass cover in deeper waters to about 8 metres depth. The *Heterozostera* distribution is thought to be part of a much larger distribution around the sandy perimeter of Twofold Bay. Analysis of seabed sediment samples indicates that the sediments are not contaminated in respect to the protection of aquatic life.

The combined aquatic habitats support a biota typical of southern coastal rocky bays and, due to depth plus specific habitat restrictions, Cattle Bay does not support permanent populations or individuals of fish and shark species listed as threatened under the Acts or threatened marine mammals, reptiles, shore and wading birds listed under Acts, although individuals of threatened species populations could be expected to utilise the resources of the Bay from time to time. Protected species such as syngnathid fish (seashorses and pipe fish) are expected to reside in the aquatic habitats of Cattle Bay and dolphins, little penguins plus a variety of sea and fishing birds utilise the bay for feeding, with fishing birds roosting on shores and structures.

Construction Impact Assessment

Piling works associated with the construction of the marina would be into sand habitat, part of which supports *Heterozostera* seagrass. Given the wide but sparse and patchy distribution of this species, direct loss of individual seagrass shoots to piling works is not considered significant. There is a potential risk of damage to *Heterozostera* and other near-shore seagrass and rocky reef habitats from vessel operations associated with construction (particularly anchoring, dragging of cables through habitats and possible propeller wash or scouring). This risk can be addressed by the implementation of a specific Aquatic Construction Environmental Management Plan (Aquatic CEMP).

Removal or relocation of moorings and maintenance works for the cannery wharf could disturb and redistribute introduced marine species. This potential impact can be mitigated by specific disposal measures that would be set out in the Aquatic CEMP.

The cables required to moor Floating plant may generate impacts on marine mammals in terms of noise, vessel or cable strike.

Pollution (via spilling of construction materials) may also have an impact.

Noise from construction activities, particularly impulse noise from piling operations can be disruptive for marine mammals particularly whales, with the level of risk depending on when construction works are undertaken in relation to whale migration and calving seasons. This risk can be managed by a marine mammal protection plan (MMPP) which would be developed as part of the Aquatic CEMP.

Operational Impact Assessment

In terms of potential operational impacts there are impacts associated with the marine structure in place, and there are potential impacts associated with marina operation and with vessel operations outside of the marina:

- The risk of total or significant loss of the *Heterozostera* to shading impacts from the marina structure and moored vessels is low, whilst the potential for some measurable loss is possible. Incremental loss of *Heterozostera* under the marina footprint would not be significant for overall *Heterozostera* habitat in Twofold Bay and for the animals that utilise that habitat in Twofold Bay;
- The design of the marina ensures that there are no significant risks to the shallow and shore-based aquatic habitats in Cattle Bay, specifically the shallow *Posidonia* and *Zostera* seagrass plus rock rubble algae beds round the shores;
- The possibility of residual risks to deeper water barrens habitat on pinnacles in the marina fairway that could present navigation hazards will be confirmed as part of the recommended detailed hydrographic survey;
- The design of the marina ensures that there are no significant risks to water circulation in Cattle Bay or Snug Cove generally and detailed breakwater design will ensure that there is no significant residual risk for aquatic biota associated with wave refraction and associated potential Cocora Beach realignment;
- Risks for water pollution are avoided by the marina design including not providing fuel or slipway services, and the marina will be operated on a zero bilge, sewage and ships liquid waste discharge policy. Residual risks associated with sewage and bilge pump-out are minimised by use of a supervised portable pump-out facility;
- Copper ablation to the waters of Cattle Bay from vessel antifoul paint coatings has been assessed against relevant detailed studies for other east-coast coastal marinas and it is concluded that the water quality of the proposed Cattle Bay marina would meet the ANZECC/ARMCANZ (2000) requirements for the protection of aquatic ecosystems and aquaculture activities in Twofold Bay;
- The shelter afforded to the waters inside the marina and the proximity to human users could result in proportionally more rubbish accumulating in the bay. Marine debris can cause harm to marine vertebrates via entanglement or ingestion and this is listed as a Key Threatening Process (KTP) under both the TSC and EPBC Acts. This risk can be mitigated to insignificance by inclusion of regular beach, surface water and seabed inspections plus collections to be detailed in the Marina Operational Environment Management Plan (OEMP);
- There is a low risk of trapping or stranding of marine mammals;

- The marina will be providing a large increase in the wetted surface area of hard substratum available for colonisation by aquatic biota. On balance this can be an overall beneficial impact for juvenile reef fish that would utilise the fouling assemblages that grow on the wetted surfaces areas of the marina infrastructure. However, these surfaces may also benefit IMS, which is listed as a KTP under the FMA (*Introduction of non-indigenous fish and marine vegetation to coastal waters*) and under the EPBC Act (*Novel biota and their impact on biodiversity*) listed on 26 February 2013. This risk can be partially offset by clearing up the accumulated hard substratum rubbish under the existing cannery wharf, and the residual risk would be mitigated by periodic inspections for IMS, which will be detailed in the OEMP;
- Risks of marina noise to marine mammals from the marina are avoided by excluding marine workshop activities in the marina, and residual risk outside the marine is minimised by baffling of noise via the fixed wave attenuation infrastructure and by imposing idle speed limits within the marina and fairway. Potential light pollution from marina lighting attracting sea birds will be mitigated by installing downwards directed lighting with most light fall onto pontoon hard surfaces to minimise light spill into the water, plus efficient light management via, e.g., dimmers or on-demand timed lighting;
- Risks of accidents, collisions and catastrophic marina breakup have been considered and will be managed by marina structural and systems design (e.g., inclusion of appropriate fire fighting and spill containment kits), by marina use protocols (for marina patrons) and marina operational protocols (set out in the OEMP);
- With regard to protection of the commercial fishing and aquaculture activities in Twofold Bay, it is concluded that the proposed location and construction of the marina would not impede these activities in any way and management of the operations of the marina would ensure that there is no significant residual risk to these operations arising from any potential water quality, coastal process or introduced marine species impacts associated with the marina;
- Existing recreational fishing uses of the Cattle Bay shoreline and of the cannery wharf will be affected by vessel movements in and out of the marina and restricted by the placement of a floating marina arm alongside the eastern outer portion of the wharf but will still be possible as the wharf will remain open to the public;
- The cumulative aquatic ecology impacts of the use of the Cattle Bay Marina in conjunction with the approved future Boydtown marina, the proposed POEM marina and the possible increase in commercial and tourism related port activities as espoused by BVSC in its 2006 Snug Cove Master Plan and its 2010 Port of Difference submissions have been considered, and it is concluded that the incremental risk to marine mammals from disturbance including the risk of collision will increase as the number of vessels transiting through and around Twofold Bay increases. This risk can be managed by a combination of education and specific risk management via the MMPP;
- Whilst the MMPP should be a considered and produced as a combined government and industry document and protocol, there will still be a need to provide a MMPP for the present Cattle Bay marina to meet the marina's obligations under both the Aquatic CEMP and the OEMP. This will require additional research of available marine mammal sightings at least over the last three years to provide an up-to-date assessment of marine mammal usage of Twofold Bay and immediate environs; and

- To this end it is recommended that a cooperative arrangement be made with the owners of the Cat Balou whale watching operation to access their marine mammal observations logs from which up-to-date risk profiles for vessel strike and disturbance for marine mammals of concern can be developed and used to develop an information pack that can be supplied to marina and other Twofold Bay boaters.

6.14.2 Conclusions and Recommendations

It is concluded that protection of the aquatic ecology of Cattle Bay and of Twofold Bay during construction and operation of the proposed Cattle Bay marina can be achieved provided the recommendations for additional studies and the aquatic ecology protection measures recommended for the Construction and Operational Environmental Management Plans are implemented.

The additional recommended studies are as follows:

- Hydrographic survey of Cattle Bay to include the accurate delineation of identified aquatic habitats, including the in-shore and off-shore limits of *Heterozotera* seagrass. (Note, this work has been completed; refer **Appendix 17**);
- Modelling and design of the wave attenuator to ensure that any beach realignment of Cocora Beach would not impact offshore seagrass beds (Note, this work has been completed. Realignment of Cocora Beach is not expected; refer **Appendix 16**); and
- Development of up-to-date risk profiles for marine mammal usage of Twofold Bay, Snug Cove and the immediate coastal environments of Twofold Bay (Note, this work has been completed; refer **Appendix 17**).

The recommendation for the Aquatic CEMP and the OEMP include:

- A construction vessel mooring, anchoring and vessel wake minimisation plan;
- An IMS protocol for relocation and removal of swing moorings;
- A construction marine mammal protection plan (MMPP);
- A construction marine debris clearance plan to remove and dispose of the accumulated hard substratum rubbish under the cannery wharf;
- An operational water, beach and seabed rubbish collection and disposal plan;
- An operational IMS inspection and removal plan for the marina infrastructure;
- An operational MMPP developed from the risk profile study above and incorporating protocols for assessing likely daily marine mammal encounters via a network of marina, tourist and agency stakeholders;
- A marina user Environmental Harm Minimisation Publication to be provided to marina patron during their inductions and to be available on all vessels leaving the marina; and
- Development of appropriate Environmental Harm Minimisation signage for the marina.

6.15 Air and Noise and Vibration

The DGRs seek assessment of the potential impacts on noise, air quality and potential vibration during construction and operation.

6.15.1 Air

The potential for impact on air quality may arise from construction waste that could generate odour impacts that may affect nearby residents. No special studies were considered necessary given the scope of works which does not involve any dredging, any excavation or any significant or unusual construction waste.

Construction and operation of the marina is not considered likely to have any significant impacts on air quality or microclimate conditions in the locality.

All operational waste will be regularly removed from the site to prevent any potential odour impacts. That said, any potential impacts can be addressed by requiring compliance with the Protection of the Environment Operations Act (1997).

6.15.2 Noise

An Environmental Noise Assessment was prepared by Acoustic Logic in 2007 as part of the assessment of the mixed use tourism and residential development (DA 05-0032). It noted existing ambient noise levels are dominated by transportation noise from vehicles using the Cattle Bay Road. The Assessment did not address noise from existing boat activity.

The nearest potentially affected residential receivers are identified as:

- Receiver 1 – Residence north of the subject site approximately 90m away
- Receiver 2 – Residence east of Cattle Bay Rd, approximately 45m away from subject site
- Receiver 3 – Residence west of the subject site approximately 120m away

There are three sources of noise:

- Construction noise
- Operational noise (boats); and
- Operation noise (traffic)

Goals for assessment of the noise from construction sites are recommended in the former DEC's Environmental Noise Control Manual (1994, Chapter 171) and operational design criteria developed in accordance with the NSW DECCW's Industrial Noise Policy (INP), Interim Construction Noise Guideline and Environmental Criteria for Road Traffic Noise.

Construction Noise

In setting the construction noise goals, the DEC recognised that there is limited opportunity to reduce noise from construction plant and activities, and that the goals are not always satisfied. The main source of noise envisaged during the construction program is from piling activities.

It is noted that actual pile 'driving' takes place over a relatively short period of time and consists of a number of short duration high level noise events. A larger proportion of time is required for barge manoeuvring, to accurately locate each pile and set up the piling equipment prior to driving.

The remaining construction activities during installation of floating berths and the wave attenuator, provision of services, fit out and commissioning use cranes and small plant and equipment. These sources are expected to be 5 – 20 dB(A) lower than predicted for piling activities.

Investigations and noise modelling of pile driving activity at other marina development projects show that noise levels from piling activities generally satisfy the medium term construction goals.

To avoid potential annoyance from noise impact it is recommended that piling be restricted from 8.00 am to 12.00 midday and 2.00pm to 5.00pm Monday to Friday. The impact of piling operations can be further reduced by implementing an information program to inform Council and local residents of the construction program and time periods when noise and vibration levels could exceed the recommended assessment goals.

Operational Noise (Boats)

Operational noise from boating activity comprises that generated from minor (light) maintenance activities and boat use.

Noise from maintenance activities only occurs during daytime hours Monday to Friday and occasionally on weekends as required. Typical maintenance activities include:

- hull and stainless steel polishing using electric buffs;
- stern gear and leg maintenance using small hand tools; and
- minor repairs involving small hand tools.

The noise that is generated by maintenance activities is non-continuous and loud periods of work are inter-dispersed with quiet periods. The noisiest operation is the use of the high pressure water cleaner. The noise from this cleaner is generated from the machine vibrating on the ground as it operates as well as from the rotary head, as it generates a pulsating water jet, resulting in regenerated noise from the vessel's hull.

Operational noise from boat use will be typical of that found in other marinas. Boats may leave and return at any time, although this usually occurs during daylight hours. The underlying "long term" ambient noise associated with the Marina will consist of wave noise against boat hulls but primarily the wave attenuator which will be a breakwater, providing calmer conditions for berthed vessels.

The "on water" operation of the Marina is passive, with the primary noise source being boat engine noise as boats arrive and leave.

Patrons "shouting" on boats moored in closest proximity to the eastern residence at night have the potential for sleep disturbance, along with the disposal of bottles. However this can be managed and controlled via training and induction of all boat owners. Each vessel moored at the marina will be moored pursuant to a Marina Occupation Agreement between the applicant/marina owner and the vessel owner. Such agreements are common in marinas in densely developed areas, such as Sydney Harbour and have been shown to be effective in enforcing noise abatement.

Operational Noise (Traffic)

With regard to traffic the Environmental Noise Assessment prepared by Acoustic Logic (2007) assessed the predicted traffic noise of that proposal and found that traffic flows would cause an imperceptible to barely perceptible increase in noise level, and therefore no adverse effect to the acoustic environment was expected as a result of increase in traffic volume. As traffic noise generated by that proposal would be greater than that expected in this proposal due to the lower scale car park size in this proposal, similarly noise from traffic is considered to be acceptable

6.15.3 Vibration

German Standard DIN4150 Part 3 (1986) provides guidelines for evaluating the effects of vibration on structures (there is no equivalent Australian Standard for structural damage). A safety limit of 5mm/s is recommended for structural damage to dwellings further than 20 metres from the construction activities.

The main sources of ground vibration from the envisaged construction activities are associated with pile driving. Vibration levels generated by these plant are unlikely to exceed the "safe limit" of 5 mm/s for structural damage to residential buildings or 20 mm/s for structural damage to commercial buildings further than 20 metres from the construction activities. In terms of sensitive structures the limit of 3 mm/s is expected to be satisfied at 30 metres from the piling activity. The minimum distance between piling for the proposed floating marinas and residential structures is greater than 30 metres.

6.15.4 Conclusions and Recommendations

The main findings of the air, noise and vibration investigations for construction activities and operation associated with the proposed development are that:

- Construction noise can be managed to minimise potential noise impacts on residential premises;
- Traffic noise is negligible and operational noise from boat use and boat users can be managed by conditions contained in a Marina Occupation Agreement between the applicant/marina owner and the vessel owner that should be prepared to minimise noise impacts.
- Construction vibration achieves goals established for vibration exposure and building damage.

6.16 Socio Economic Impacts

The DGRs seek assessment of the potential social and economic impacts.

6.16.1 Qualitative Impacts

The social impacts arising from the proposed development of the marina can be both positive and negative. They result from the relationship between the development and people in the Eden community. The people in the community potentially affected include:

- people who use Cattle Bay for recreational activities e.g. fishing, kayaking, walking etc
- the recreational boating community, particularly those who are tenants on the swing moorings that will be required to be relocated / removed;
- foreshores users; and
- local residents and workers in Eden.

These people may be potentially affected in a different way. The community and users of Cattle Bay are not an easily defined group. Different people use the bay and foreshore for different activities, and have differing values and attitudes to development in general.

Key stakeholders and stakeholder representatives were invited to attend the focus group workshops in October and November 2012 as described in **Part 5.3** above.

The matters to be addressed include:

- the reduced number of swing moorings and how swing moorings customers will be accommodated in the future;
- equity of access facilities in Cattle Bay;
- recreational use of Cattle Bay and foreshore; and
- amenity.

The qualitative social and economic impacts of the development of the proposed marina are as follows:

- an increase in the supply of locally based employment opportunities within Eden to meet the needs of existing and new residents, enhancing income, prosperity and quality of life;
- access to short term employment opportunities and the provision and injection of additional wages and investment / expenditure within the community and local economy through construction;
- effective use of a large underutilised parcel of land adjoining Eden with good access to complementary and support activities within Eden and all necessary infrastructure;
- maintenance of public access to the beach, foreshore and jetty in Cattle Bay;
- disruption caused by relocation of swing mooring tenants;
- provision of new tourist facilities within Eden, enhancing the attractiveness of the town and region to tourist visitation with corresponding economic benefits, and resulting social benefits; and
- minimal and manageable environmental impacts as demonstrated in this EIS.

6.16.2 Conclusions and Recommendations

The proposal represents a cost effective development that can deliver new boating facilities to Eden to attract additional expenditure and investment in tourism and marine related industries as well as provide additional facilities and services for existing residents of Eden.

The social and economic impacts of the development of the proposed marina are generally beneficial and no recommendations are presented.

6.17 Aquaculture and Fishing

The DGRs seek assessment of the potential impacts of the development on aquaculture operations.

6.17.1 Findings of Aquatic Ecology Assessment

MPR, as part of its aquatic ecology assessment of the site discussed in **Part 6.14** above (enclosed in **Appendix 5**), addresses potential impacts in neighbouring aquaculture operations. In Part 6.14 it notes:

- Risks for water pollution are avoided by the marina design including not providing fuel or slipway services, and the marina will be operated on a zero bilge, sewage and ships liquid waste discharge policy. Residual risks associated with sewage and bilge pump-out are minimised by use of a supervised portable pump-out facility;
- Copper ablation to the waters of Cattle Bay from vessel antifoul paint coatings has been assessed against relevant detailed studies for other east-coast coastal marinas and it is concluded that the water quality of the proposed Cattle Bay marina would meet the ANZECC/ARMCANZ (2000) requirements for the protection of aquatic ecosystems and aquaculture activities in Twofold Bay; and
- With regard to protection of the commercial fishing and aquaculture activities in Twofold Bay, it is concluded that the proposed location and construction of the marina would not impede these activities in any way and management of the operations of the marina would ensure that there is no significant residual risk to these operations arising from any potential water quality, coastal process or introduced marine species impacts associated with the marina.

6.17.2 Conclusions and Recommendations

MPR's Aquatic Ecology Assessment of the site discussed in **Part 6.14** above makes a number of recommendations.

6.18 Waste Management

The DGRs seek details on the type of waste and how it will be managed.

6.18.1 Constructional and Operational Waste

Construction of the marina will be by conventional means using conventional methodologies and construction materials. There will be no dredging or land modification. As such there is no potential waste to be generated by these actions. The floating pontoons and wave attenuator will be prefabricated constructed off site. There will be minimal assembly on site, with most construction activities limited to transportation to the site, unloading by crane, placed into position and fixed. Final pontoon furnishings and services will be installed which will include services such as water, electricity and fire. These activities will generate minimal, conventional waste.

The operation of the marina will be generally low key. There will be no boat servicing or slipping. The activities within the marina building will be limited to possibly chandlery, office administration and café uses.

6.18.2 Conclusions and Recommendations

A very limited volume of waste is expected to be produced during construction. The waste that will be produced will largely be from construction workers and would likely to consist of general domestic waste. The generation of waste during the construction will be the responsibility of the construction contractor. It is recommended that the provision of a skip bin would be adequate for the management of waste during construction.

Waste from the operation of the marina will be conventional and similar in many respects to any other commercial operation. A wastewater servicing strategy is included in **Appendix 20**.

Rubbish receptacles should be strategically located and emptied at regular intervals.

A waste oil storage facility should be provided so that patrons of the marina may dispose of containers of waste oils, bilge absorbing pads etc. These drums should be serviced periodically by a commercial waste collector.

6.19 Ecologically Sustainable Development

The DGRs seek details on how the development will incorporate ESD principles.

6.19.1 Approach

There are limited opportunities to adopt measures to incorporate ESD principles in the design, construction and ongoing operation of the marina, due to the limited scope of works and activities.

That said, the ongoing operation of the marina can adopt a number of measures that reduce consumption of resources and production of greenhouse gases via initiatives such as recycling and reducing water and energy use.

6.19.2 Conclusions and Recommendations

The implementation of ecologically sustainable design (ESD) in the development can be assisted by the availability of technical information and rating tools. Its success, however, will be underwritten by the commitment to, and awareness by the marina users and business of, ESD.

It is recommended that a Water, Waste and Energy Plan be prepared that promotes the use of water and energy saving devices, and the recycling of marina waste.

6.20 Original Concept Plan

The DGRs seek details on how the development will be consistent with the Concept Approval of DA 05-0032.

6.20.1 The Concept Approval

The Concept Plan approval for a mixed tourist and residential development over 6 precincts (DA 05-0032) is described in **Part 3.3**.

A copy of the approved plans are enclosed in **Appendix 11** and an extract of the approved site plan is presented in **Figure 24**.

Condition A5 of the approval requires the determination of future development applications by Council to be generally consistent with the terms of the approval as modified by the conditions of approval. Furthermore, Condition C13 (2) notes that 'No approval is given in this concept plan to use of the existing jetty for commercial purposes associated with the concept plan, thus no water based access is implied.'

6.20.2 Conclusions and Recommendations

The proposed development subject to this development application, while a separate development proposal pursued through Part 4 of the EP & A Act, is consistent with the Concept Plan Approval, and will not fetter that approval, as:

- The facilities building is temporary and transportable and will be removed once development commences. Its uses will be absorbed into the non-residential floor space within the development.
- The temporary car parking space demand generated by the marina patrons will be incorporated into a modifications to the Concept Approval at the time of the detailed design of the Stage 1 works (which are located in the footprint area of the marina car park) if necessary. A modification to that approval is not feasible at this time (and may not be necessary in Stage 1) as:
 - > Opportunities to relocate the temporary car park within the site during Stage 1 construction are not known. Relocation of the temporary car park may involve the inclusion of the relocated car park in the detailed development application at that time;

- > Opportunities for reciprocal use of car parking facilities by the different uses within the development cannot be determined at this time due to the difficulties in identifying such opportunities until detailed design of the development and use is confirmed;
- > Car parking requirements will vary greatly depending on whether the berths are occupied by the owners of the associated residential dwellings or if the berths are to be used by other parties; and
- > This is a separate development application to DA 05-0032, and the procedure to progress development in accordance with DA05-0032 must address any changes in circumstances that influence the preparation of the subsequent development applications, pursuant to Condition A5 (noted above) at that time.

7. LIST OF APPROVALS AND LICENCES

The marina redevelopment 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 as it is a marina that would have an intended capacity of 80 or more vessels of any size.
- 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 redevelopment requires the following approvals and licences from Bega Valley Shire Council:

- Land owners consent from Council for access across Lot 4 (foreshore reserve).
- Development consent for the development of the Marina as described in this EIS.

The redevelopment requires the following approvals and licences from the Crown Lands Division of the Department of Primary Industries:

- Land Owners consent.

The development requires the following licence from the Environment Protection Authority:

- The Marina would be a 'scheduled activity' within the meaning of Schedule 1 of the *Protection of the Environment Operations Act*.

8. COMPILATION OF MITIGATION MEASURES

A compilation of the recommended measures raised in this Statement to mitigate any adverse effects of the development is presented below.

8.1 Construction

1. Formal long term access to be secured across Lot 4 via an easement for access to connect the landside marina facilities in Lot 2 with the jetty pontoons and berths.
2. Survey to be undertaken to confirm location of redundant pipeline during detailed engineering design for the proposed marina and wave attenuator.
3. Geotechnical investigation to be undertaken prior to construction of the wave attenuator and floating marina to confirm pile foundation conditions.
4. New Gross Pollutant Trap to be provided where existing drainage pipe exits Lot 2 (before passing through Lot 4).
5. Design of the marina to comply with Australian Standard AS 3962-2001 'Guidelines for Design of Marinas' and the NSW Maritime Authority Guidance Note 8.3.02 (GN 8.3.02);
6. No dredging to be undertaken (Lowering of an isolated rock pinnacle, which would otherwise be a navigation hazard, will be required).
7. Design of wave attenuator to comply with Australian Standard AS4997-2005 'Guidelines for the Design of Maritime Structures'.
8. The following relevant access guidelines to be used to develop detailed design:
 - Australian Standard AS1428.1 – 2001, Design for Access and Mobility, Part 1 General requirements for access – New Building Work;
 - Australian Standard AS1428.2 – 1992, Design for Access and Mobility, Part 2 Enhanced and additional requirements – Buildings and Facilities; and
 - Commonwealth Government 2002 – Disability Standards for Accessible Public Transport Guidelines; and relevant RMS (Maritime) Guidelines.
9. Construction to be restricted to the following hours:
 - Monday to Friday 7.30 am to 5.00 pm
 - Saturday 7.30 am to 1.00 pm
 - No work on Sundays or Public Holidays.
10. Piling to be restricted to 8.00 am to 12.00 midday and 2.00pm to 5.00pm Monday to Friday and include an information strategy to inform Council and local residents of the construction program.
11. Refurbishment of jetty to take place following detailed structural investigation, and installation of turbidity curtain around the works areas until work is complete. Further sedimentation controls to be adopted if necessary. All removal work to be carried out by a contractor appropriately licensed by WorkCover NSW.

12. All piles will be delivered to the site by barge and installed from the water using a piling barge.
13. All wave attenuator precast panels to be manufactured off site and delivered to the site by barge.
14. Detailed design of the wave attenuator to include 'cranking' of the alignment of the attenuator;
15. Preparation of a Flooding Emergency Response Plan for the temporary building. The Plan will recommend the regular monitoring (visual and/or electronic) of flood levels, actions for the evacuation of staff and visitors from the land based facilities to a safe location (e.g. the jetty or elevated land) and will provide recommendations for fencing, signage and securing of lighting and the temporary building to minimise risk of damage from flood water.
16. Preparation and adoption of an Aquatic CEMP and the OEMP including:
 - A construction vessel mooring, anchoring and vessel wake minimisation plan;
 - Minimisation of risk of damage to *Heterozostera* and other near-shore seagrass and rocky reef habitats from vessel operations associated with construction (particularly anchoring, dragging of cables through habitats and possible propeller wash or scouring);
 - An IMS protocol for relocation and removal of swing moorings;
 - A construction marine mammal protection plan (MMPP);
 - A construction marine debris clearance plan to remove and dispose of the accumulated hard substratum rubbish under the cannery wharf;
 - An operational water, beach and seabed rubbish collection and disposal plan;
 - An operational IMS inspection and removal plan for the marina infrastructure;
 - An operational MMPP developed from the risk profile study above and incorporating protocols for assessing likely daily marine mammal encounters via a network of marina, tourist and agency stakeholders;
 - A marina user Environmental Harm Minimisation Publication to be provided to marina patron during their inductions and to be available on all vessels leaving the marina; and
 - Development of appropriate Environmental Harm Minimisation signage for the marina.
17. Sediment control measures to be implemented in accordance with the Soils and Construction Handbook, prepared by Landcom and include use of a turbidity barrier to prevent migration of any fine sediments disturbed by removal of structures and erection of new works.
18. Lighting to be low-level bollard style lighting and car parking area lighting to comprise a small number of floodlights located on the facilities building and directed to the car park area.
19. Relocation of swing moorings to be managed in accordance with the principles in the Swing Moorings Relocation Strategy and be developed further in consultation with the RMS, Eden Port Authority and Swing Mooring Tenants. Strategy to include:
 - Relocation of moorings at ERH cost; and
 - Any provision of swing moorings on the immediate southern side of the attenuator be subject of a trial period;
20. A sewerage and water supply servicing strategy to be finalised in consultation with Council.

8.2 Operation

1. Provision 'muck truck' trolley (for mobile sewage pump out).
2. Preparation and compliance with the requirements of the Operational Environmental Management Plan (OEMP).
3. Preparation and adoption of a Marina Occupation Agreement between the applicant/marina owner and the vessel owner. The agreement to include a number of obligations upon the vessel owner consistent with the environmental issues raised in this EIS. These obligations will address matters including:
 - flushing of heads at moorings;
 - pumping of bilges at moorings;
 - navigation speed and wash creation;
 - waste storage, management and removal;
 - dangerous substances on vessels;
 - operation of sewage and fuel pumping equipment;
 - creation of noise;
 - work being undertaken on vessels;
 - emergency procedures in respect of spills and hazardous materials; and
 - attendance at an induction program.
4. Provision of bilge water absorbing pad and certified collection including signage instructing of requirement for use. The waste oil storage facility to provide for disposal of containers of waste oils, bilge absorbing pads etc. These drums to be serviced periodically by a commercial waste collector.
5. Marina to maintain an oil/fuel boom and associated materials ('Marine Spill Kit') to contain any accidental spillage.
6. Public access to beach and foreshore to be retained at all times. Public access to jetty to be maintained as provided for by the lease;

9. JUSTIFICATION OF THE PROPOSAL

The reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development are described below.

9.1 Biophysical

The proposed marina development has demonstrated:

- The proposal would not have any significant effect on threatened species, populations or ecological communities or their habitats arising from the construction or use of the proposed development. The proposal will not have an impact on any matters of national environmental significance under the EPBC Act.
- The removal of some swing moorings is considered to have positive benefits with respect to aquatic ecology;
- The proposal will not result in any adverse impacts on air quality, wave climate, sediments, noise, waste or water quality. The provision of modern new facilities reduce the risks of any hazardous events. Potential sources of risk associated with the development and operation of the marina including collisions; spillage; and waste can be managed with the appropriate safeguard;
- The marina will have minimal visual impact given its location and intended use.

9.2 Economic

The proposed marina development has demonstrated that it:

- Addresses the demand for floating marina berths by providing facilities that cater for a variety of vessel sizes including larger vessels consistent with environmental and other site constraints;
- Will provide direct employment during the construction phase and maintain permanent employment during the operational phase; and
- Will provide new marina facilities that will service local and visitor boating communities' needs.

9.3 Social

The proposed marina development has demonstrated that it:

- Maintains access to the foreshore, beach and jetty of Cattle Bay;
- Provides berthing facilities that are modern, low profile and in keeping with the character of the area;

- Manages the impacts of the development by providing a Relocation Strategy for affected swing mooring tenants; and
- Will have minimal noise and visual impact on surrounding residents.

9.4 Ecologically Sustainable Development

The EP&A Regulation lists 4 principles of ecologically sustainable development to be considered in assessing a project. They are:

- The precautionary principle.
- Intergenerational equity.
- Conservation of biological diversity and ecological integrity.
- Improved valuation and pricing of environmental resources.

An analysis of these principles is presented below

Precautionary Principle

The precautionary principle means “if there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.”

The environmental impacts associated with the marina development can be identified and quantified to an adequate degree of certainty and impacts can be mitigated. Potential impacts are reversible. The development of the site will have a beneficial outcome and there are no significant risks arising to community or environmental health.

The potential environmental impacts of the development have been carefully evaluated and, where considered necessary, mitigating measures have been proposed.

Intergenerational Equity

Intergenerational Equity requires that the “present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for benefit of future generations.”

The requirement for equity between generations binds or integrates the other principles of ecologically sustainable development. Intergenerational equity implies that the present generation should ensure that its local environment is maintained or enhanced for the benefit of future generations.

The marina development, which aims to provide boat storage facilities and services to meet demand and incorporate best practice environmental controls, is consistent with the objective of social equity including intergenerational equity.

In particular the development aims to ensure that the environment of Cattle Bay is managed for the benefit of future generations.

Conservation of Biological Diversity and Maintenance of Ecological Integrity

Biological diversity refers to the diversity of genes, species, populations, communities and ecosystems and the linkages between them. Biological resources provide food, many medicines, fibres and industrial products. Maintenance of biological diversity will ensure life support functions and can be considered a 'minimal' requirement for intergenerational equity.

Impacts of the proposal on flora and fauna on the site and in the area were found to be minimal and, in some cases, positive in terms of removal of swing moorings on seagrasses and in terms of floating pontoon structures creating additional fish habitat.

The impact of the proposal on flora and fauna species and communities was addressed in detail in this EIS. The proposed development would not have any adverse impacts on biological diversity and ecological integrity, indeed the proposed development should enhance these factors through provision of additional habitat, and reducing damage to seagrass beds through the opportunity to relocate existing swing moorings.

Improved Valuation and Pricing of Environmental Resources

This principle is a component of "intergenerational equity" and establishes the need to determine economic values for services provided by the natural environment, such as the atmosphere's ability to receive emissions, cultural values and visual amenity.

The value of the environmental resources affected by the proposal has been acknowledged and provided for through the examination of environmental consequences of the proposal and identification of mitigation measures to address potential impacts, including any short term construction impacts.