



ASSESSMENT REPORT

For the Environmental Impact Statement

For the

Ceduna Keys Marina & Community

Centre Proposal





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**Planning SA
Department for Primary Industries and Resources SA (PIRSA)**

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1 INTRODUCTION

1.1 SUMMARY

This Assessment Report (AR), prepared by the Minister for Urban Development & Planning, assesses the environmental, social and economic impacts of a proposal by the Ceduna Marina Development Company to develop a multi-component marina and residential canal estate near Ceduna. The proposed development is located to the immediate north of the existing township of Ceduna on the West Coast of South Australia

The development is proposed to be undertaken in 11 stages over a ten year period. The development will include an entrance channel, breakwaters, marina basins and associated boating facilities, residential allotments and commercial and tourist uses.

This report is intended to be a “stand alone” document, but the detailed information on which it is based is contained in the proponent’s Environmental Impact Statement (EIS) dated June 2005, public comments and submissions on the EIS, and responses to these submissions in the proponent’s Response Document (RD). This report also relies on information, comments and advice provided by relevant South Australian Government agencies and additional information provided by the proponent (refer to Appendix A).

1.2 BACKGROUND

The proponent, Ceduna Marina Development Company, is a consortium of companies with experience related to marina development, town planning, surveying, engineering and earthworks, real estate, environmental management and economic management.

The proponent’s objectives for the proposed development are to:

- provide a safe haven for the fishing fleet
- encourage investment in the town and inject vitality into the growing aquaculture and fishing industry
- capitalise on and encourage further investment of tourism in the community
- foster self-determination in the areas of cultural interaction and protection
- strengthen partnerships and further develop and promote the reconciliation process within the community
- maximise employment and education opportunities for local Aboriginal people and wider community
- develop appropriate opportunities for industry development in cultural heritage interpretation and cultural tourism

These objectives have been formulated in consultation with the Ceduna District Council.

In order to achieve these objectives the proponent is seeking to establish a suitable facility for a harbour/marina and residential development.

The assessment process is detailed in the next section of this report.

1.3 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCEDURES

Environmental Impact Assessment (EIA) is a process of identifying the potential social, environmental and economic impacts of a proposal and of identifying appropriate measures that may be taken to

minimise any impacts. The main purpose of EIA is to inform decision-makers of the likely effects of a proposal before any decisions are made. EIA also allows the community to make submissions on a proposal. The specific EIA procedures for Major Developments or Projects in South Australia are outlined out in Sections 46 to Section 48 of the *Development Act 1993* (the Act).

Pursuant to Section 46(1) of the Act, the proposed Ceduna Keys Marina & Community Centre was declared to be a Major Development on 23 October 2003 by the previous Minister for Urban Development & Planning. This declaration of Major Development status resulted from the Minister forming the opinion that the proposed development was of major environmental, social or economic importance and that a declaration was appropriate or necessary for the proper assessment of the proposal.

Following the declaration, a development application was lodged by the Ceduna District Council with Planning SA on 28 October 2003. The proposed development described in the application falls within the ambit of the Minister's declaration and was therefore subject to the Major Developments and Projects assessment provisions of the Act referred to above (i.e. the EIA process).

After submitting the initial application, the Council then selected a preferred private developer and granted the rights to develop the land for a modified marina proposal (under an agreement to sell the land to the developer). The Ceduna Marina Development Company subsequently submitted a revised development application on 9 December 2003.

The proponent's development application was subsequently referred to the Major Developments Panel (Panel) to determine the level of assessment that should apply to the proposed development and to set the Guidelines for an Environmental Impact Statement (EIS), Public Environmental Report (PER) or a Development Report (DR). In order to make this determination, the Panel prepared and released an Issues Paper for public comment in April 2004. The Issues Paper formed the basis for the formulation of the Guidelines, which also considered any public or Government Agency comments on the Issues Paper.

After considering the significant issues for the proposal, the Panel determined that an EIS was the required level of assessment and set the Guidelines, which were publicly released in June 2004. Pursuant to Section 46D of the Act, the proponent must comply with the Panel's Guidelines when preparing the EIS.

The proponent prepared an EIS, which was submitted to the Minister in June 2005. The EIS was placed on public exhibition from 22 June 2005 to 2 August 2005, during which time submissions were invited from the public, and relevant Government Agencies. The Council did not put in a submission. Following the public exhibition period, the proponent lodged a Response to submissions on the EIS with the Minister on 8 November 2005, which contained some minor variations to the proposal. The proponent's Response document ('Response') has been released concurrently with this Assessment Report. Pursuant to Section 48B of the Act, the Minister may permit a proponent to vary an application and any associated documents provided the relevant proposed development remains within the ambit of the EIS. The variations are considered to be within the ambit of the EIS.

Pursuant to Section 46D(8) of the Act, the Minister in preparing this report, has taken into account the proponent's EIS, public and Government Agency submissions, the proponent's response to these submissions, and other matters that the Minister considered appropriate.

This report provides advice to the Governor, who is the final decision-maker on the proposed development. Pursuant to Section 48(5) of the Act, when making a decision on the proposed development, the Governor must have regard to:

- the provisions of the appropriate Development Plan and regulations (so far as they are relevant)
- the Building Rules (if relevant)

- the Planning Strategy
- the objects, general environmental duty and relevant environment protection policies under the *Environment Protection Act 1993* (if the development involves a prescribed activity of environmental significance)
- the proponent's EIS and Response document
- the Minister's Assessment Report
- any other matters considered relevant by the Governor.

Pursuant to Section 48(7) of the Act, the Governor may also specify any conditions that should be complied with if a development authorisation is granted.

2 THE PROPOSED DEVELOPMENT

2.1 THE SITE AND LOCALITY

The proposed site of the development lies on the north-eastern shore of Murat Bay, has an area of some 140 hectares (plus about 30 ha of sea, including tidal flats below high tide mark) and is mainly low-lying. The land is currently unused, but has been used in the past for grazing and horse keeping. The majority of works would be on a 'stranded' coastal estuary, the foredunes and beach. A channel is proposed to project into the bay and breakwaters are proposed to be built out on the tidal flats.

The site is located on the northern township boundary of Ceduna and adjoins the existing golf course and nearby sportsground and showground. An Aboriginal Homeland Settlement exists to the north-west of the site. The site is bisected by the Eyre Highway that runs along the coast. The rest of the surrounding land is used for country living and agricultural purposes.

The development site includes some degraded agricultural land and areas of native vegetation, including saltmarsh and dune communities.

2.2 THE SUBJECT LAND

A detailed description of the subject land is contained in the EIS (Section 4). The majority of the site is held under Freehold Title by the Ceduna District Council. A proportion of the land is held by the Crown as:

- Coastal strip held by the Minister for Environment & Heritage
- Coastal strip held by the Aboriginal Lands Trust
- Seabed held by the Minister for Transport.

A small proportion of the land is held under Freehold Title by the owners of the Highway One Roadhouse and Motel and would be needed for the realignment of the Eyre Highway.

The subject land also incorporates portions of public roads, as these are to be significantly affected by the proposal, including the Eyre Highway and Denial Bay Road.

2.3 NATURE OF THE PROPOSAL

The proposal for a safe boating harbour and marina, with associated residential and commercial uses, includes the following features:

- Two breakwaters (armoured peninsulas, with groynes at the end) extending approximately 300 metres out to sea at Murat Bay
- Entrance channel extending approximately 1000 metres out to sea, 50–60 metres wide and dredged to a depth of -4.0 metres AHD
- Waterways (mainly residential canals)
- Several marina basins (for recreational and commercial boat moorings)
- Recreational (public) marina berths to accommodate approximately 100 vessels
- Commercial marina berths to accommodate approximately 50 vessels
- Commercial fishing and aquaculture industry services area (for office accommodation, amenities, storage areas, cool rooms, preparation areas and minor repairs to plant/equipment)
- Fuel and waste management facilities

- Boat ramp, slip-way, wash-down and hardstand
- Commercial wharf (including loading and unloading facilities)
- Car parking areas (including trailer parking for the boat ramp)
- Commercial and retail facilities (ie services for boating, residents and tourists, such as boat chandleries, boat sales offices, sale of fresh fish products, fishing charters, cafes, restaurants, entertainment and convenience shopping)
- Residential canal estate, comprising 380 allotments (most with waterfrontage) and 250 waterfront apartment sites (ie medium density living)
- Community and Cultural Centre
- Tourist accommodation (including a hotel)
- Tourist facilities (including a convention centre)
- Fish Academy
- Day care centre
- Public open space
- Realignment of the Eyre Highway
- Landscaped acoustic protection mound (including fencing)
- Relocation of the PIRSA Quarantine Station
- Reticulated water supply
- Reticulated power supply
- Telecommunications

The EIS (Section 3) provides greater detail on the above components.

2.4 CONSTRUCTION STAGING AND OPERATION MANAGEMENT

It is proposed that the development would be constructed in 11 stages over a period of 10 years. The proposal would be developed in two phases, with phase 1 comprising stages 1 – 5. Phase 1 would include all major infrastructure, the majority of marinas, nearly half of the residential sub-division (including the majority of apartment sites) and allotments for the commercial, retail and tourist uses. Phase 2 comprises the northern half of the development site and includes stages 6 – 11, which are the remainder of the residential sub-division. Phase 2 requires major earthworks to construct the residential waterways. It is uncertain during which stage the Community/Cultural Centre would be developed.

2.5 INFRASTRUCTURE REQUIREMENTS AND AVAILABILITY

Information on infrastructure requirements is provided in Sections 3.9 and 8.5 of the EIS. The proponent has indicated that the proposed development will require a significant investment on infrastructure, including roads, electricity supply, water supply and sewage treatment. The proponent has expressed the view that both State and Local Governments should contribute to the cost of providing this infrastructure as it would otherwise be a significant burden on the proponent. Discussions were held with relevant government agencies to assess the likely costs.

Development of the marina will require the relocation of the Eyre Highway. The proponent has indicated in the EIS that Transport SA has expressed no fundamental objections to the re-alignment and that the design will be resolved as part of detailed design if the development is approved by the Governor.

Ceduna and Thevenard are serviced by a septic tank effluent disposal scheme (STEDS) operated by Council. The system is currently at its maximum operating capacity. The proposed development will incorporate a gravity sewer main system supplemented by pumping stations as required. The wastewater would be pumped to the existing Council treatment area. The proponent has indicated in section 6.25 of the EIS that Council would establish a new activated sludge treatment plant adjacent to its existing

lagoons. There will be a requirement to provide an additional 90ML winter balancing storage. This is intended to be achieved by deepening the existing effluent lagoons from 1.0m to 2.0m.

In its submission on the EIS, SA Water indicated that subject to appropriate augmentation and extension charges, mains water may be supplied to the proposed development. The following was indicated as being required:

- The construction of a booster pumping station between Knots Hill and the existing Lock pumping station
- The construction of an additional 9 ML storage at the Bonython Tank site
- The laying of 11 kilometres of 250 mm water main between the Tod Trunk main and the Bonython Tank
- Installation of a pressure sustaining valve on the Ceduna water supply main

The EIS indicated that the required demand for water of the proposed development should enable SA Water to justify a capital expenditure of \$30 million to provide a 5ML/day water supply to Ceduna. The EIS also indicated that additional water could be provided through on-site stormwater collection and re-use and other water sensitive urban design measures.

Additional advice from SA Water was provided to the proponent on 14 November 2005. This indicated that a water supply is available to the proposed development subject to the following:

- Timing of commissioning of an additional water resource on Eyre Peninsula
- Re-alignment of the existing 200AC main along the Eyre Highway where the highway is re-located (approximate length of 3.2 km)
- Works associated with abandoning approximately 1.6 km of 200 AC MAIN
- Installation of 3.3 km of 150 mm diameter main on the country lands main branches off the Tod - Ceduna main upstream of the township
- Installation of 750 m of 250 mm diameter main on the branch to Smoky Bay
- Possible duplication of existing mains in the township

The above works were to be considered as indicative. The supply to the allotments would be restricted to 300 kilolitres per allotment per annum and 200 kilolitres per community title allotment per annum.

ETSA Utilities advised the proponent that additional infrastructure would be required for the proposed development at an estimated cost of \$1.2 to 1.25 million, and there may be additional costs to relocate existing infrastructure.

The Telstra main optical fibre cable route is located on the eastern side of the Eyre Highway and other cables are located along the northern side of Denial Bay Road. Telstra has advised the proponent that sufficient capacity is present within the existing infrastructure to accommodate the demand of the proposed development.

There is no reticulated gas supply within Ceduna.

2.6 TRAFFIC

The EIS (Section 7.8) states that traffic impacts could arise during the construction period. This will predominantly be based on the site as it would involve the movement of fill material generated by the excavation of the channel and waterways. The proponent has indicated that these activities are well buffered from the residential areas in Ceduna and on the basis that appropriate site management measures would be implemented, significant impacts are unlikely to occur. It is also stated that noise generated by the on-site construction traffic would be consistent with existing heavy transport passing through the site.

Should the project obtain approval there will be a need to re-route the Eyre Highway and Denial Bay Road. The proponent indicated in section 7.9 of the EIS that “agreement in principle has been obtained with Council and Transport SA”. The design of the roads would be finalised to the satisfaction of Transport SA. The proponent has also indicated that the relocation of the Eyre Highway is not anticipated to have a negative impact on existing businesses adjoining the site and have a minimal impact on access to and from Ceduna and Denial Bay. In addition the proponent has indicated that noise is not anticipated to have an impact on amenity, and impacts would be attenuated by the establishment of a 3m high earth mound.

A traffic assessment has been undertaken and is presented in the Response (refer to Section 6.6 of this report).

3 EXISTING ENVIRONMENT

3.1 PHYSICAL SETTING

The physical setting of the project is outlined in the EIS (Section 4.1). Essentially the proposed development is located immediately north of the Ceduna township at the north eastern end of Murat Bay. This part of the bay experiences large tidal fluctuations (generally up to 2 metres), resulting in a broad intertidal zone that is regularly exposed.

Topographically the proposed development site includes an off-shore area, the adjacent tidal flat, beach and fore-dune and the adjacent low-lying coastal land that has little relief. Only a portion of the proposed development extends into Murat Bay (ie the entrance channel, breakwaters, parts of the commercial marina and some of the medium density residential and commercial tourist sites), with the majority of the site being located on a 'stranded' coastal estuary that has been affected by establishment of the Eyre Highway.

Ceduna is the last major service town before the SA-WA border and is a popular tourist destination. The town is also important for local and remote Aboriginal communities. The nearby Port of Thevenard is an important commercial harbour for the fishing industry and for the shipping of local cereal crops, salt and gypsum. The railway line from the gypsum mine to the wharf runs along the eastern boundary of the site.

The site is currently unused, except for off road vehicle use.

3.2 SOCIAL DEMOGRAPHICS

The proponent has not provided an adequate assessment of the social demographic breakdown of the existing community at Ceduna, nor has an estimate of the composition of the incoming residents to the marina been provided in any of the documentation. This was required by the Guidelines and has repeatedly been requested.

The EIS (Working Paper 4 of the Appendices) states that there is a resident population of 3,500 people and that approximately 22% of the population are of Aboriginal descent. This would equate to approximately 770 individuals. There is no information on the age profiles of the indigenous or non-indigenous community. It is known that the community is also very multi-cultural but there is no information on the country of origin of the residents. There is no break down of the occupations of the residents, nor their educational backgrounds.

There is also no information provided about the residents of the homelands settlement to the west of the site or any other Aboriginal communities further afield such as Yalata or Oak Valley. It is not known how many people live in these areas or the level of fluctuation of the population, as the indigenous community is quite mobile. In addition, Ceduna also has a large transitory Aboriginal population.

The provision of demographic information is essential for assessing the suitability of the existing residents for employment either in construction or operation of the marina. This is pertinent, given that a key benefit of the proposal is claimed to be significant employment opportunities for the Aboriginal and local community. This impact needs to be quantified. A profile of the existing population would also provide an insight into the likely population that might be attracted to reside in the marina and hence allow a realistic assessment of the impact of the development on this remote community.

It is estimated that the population increase as a result of the marina development could be between 1500-2500 people. This is based upon the number of estimated housing units multiplied by the South Australian average housing occupancy rate of 2.2 people per household. There are many variables attached to this estimate including the actual final housing types and their numbers provided in the

development. This is a substantial increase to the Ceduna population, although it would be staged over a number of years. It is also not known how many of the households will be permanent residents or holiday home occupants. This will have an important impact on the demand for public services, as discussed elsewhere in this report.

3.3 GEOLOGY AND HYDROGEOLOGY

The geological and hydrogeological setting of the proposed development is discussed in Section 4.1 of the EIS.

3.3.1 Geology

The geology of the region is characterised by the Bridgewater Formation, the Glanville Formation and Wiabuna Formation. The investigations undertaken by the proponent included the excavation of 8 test pits as part of the EIS and 5 additional test pits in support of the Response. The investigations indicated that the soils located on the proposed marina site comprise fine, medium and coarse grained quartz and calcareous sandy soils. The soils are variably cemented, contain mollusc shells and shell grit. Calcrete is present in the soil profile and occurs as poorly graded silty gravel, rubbly layers of cobbles and boulders or as massive continuous sheets. Low plasticity sandy clay with a soft to firm consistency was intersected in one test pit.

Fill material of variable content was intersected to a depth of 0.7 m at a number of locations. The proponent has indicated that the loose sandy soil may be prone to liquefaction during an earthquake, but there was a low risk of earthquakes in the Ceduna area that could impact the development.

3.3.2 Hydrogeology

Groundwater was intersected in six of the eight test pits and at depths ranging from 0.55 m to 1.9 m below surface and, on the basis of limited sampling from the test pit groundwater, has a salinity ranging from 59,000 mg/L to 190,000 mg/L.

Three groundwater samples were collected from the test pits (TP1/GW1, TP2/GW2 and TP3/GW3) and analysed for a range of chemical parameters. To assess the current water quality below the site the proponent compared the results with the EPA *Environment Protection (Water Quality) Policy 1994* criteria for protection of aquatic ecosystems. The following locations and chemicals exceed the guideline levels, however their reliability is questionable as the samples were not filtered, as is required by National and State standards:

- Antimony (0.04 mg/l) at TP1/GW1
- Copper (0.014-0.025 mg/L) at TP1/GW1, TP2/GW2 and TP3/GW3
- Mercury (0.0002 mg/L) at TP3/GW3
- Selenium (0.06-0.12 mg/L) at TP1/GW1, TP2/GW2 and TP3/GW3

The proponent also referred to groundwater testing results from boreholes established by Council east of the site. Traces of arsenic, chromium, lead and diesel were reported in the test results, although the details were not provided in the EIS. The initial Council results are not reliable as the samples were not filtered (Response, Appendix C - Groundwater Assessment Report).

The proponent undertook additional sampling of the Council bores in October 2005 (Response, Appendix C). The results of re-analyses from the two Council bores indicated that concentrations of copper, manganese, selenium and zinc slightly exceeded the EPA criteria for aquatic ecosystems:

- Copper (0.019 and 0.017 mg/L) at BH1 and BH2 respectively
- Manganese (0.16 and 0.11 mg/L) at BH1 and BH2 respectively
- Selenium (0.21 mg/L) at BH1 and BH2
- Zinc (0.008 and 0.012 mg/l) at BH1 and BH2 respectively

The sampling and analysis of the Council bores appear to have been undertaken in accordance with current standards. The bores are located in close proximity to each other and therefore do not provide a detailed overview of potential impacts from the adjacent landfill and Council sewage treatment ponds.

3.3.3 Groundwater Use

The EIS (Volume 2) indicates that the nearest groundwater wells to the proposed marina site are located 500 m to the south (in Ceduna, with salinity of 4,455 mg/L), 900 m to the southwest (at Thevenard, with salinities ranging from 4,455 mg/L to 8,410 mg/L) and 600 m to the northwest (salinity of 56,106 mg/L). On the basis of salinity, the water from wells at Ceduna and Thevenard could be marginally suitable for stock use and industrial uses. The proponent has indicated there are no groundwater wells located on the proposed site.

3.3.4 Land Contamination

As part of the EIS (Section 4.4) the proponent undertook a preliminary site contamination assessment which included a review of the site history. The site history review indicated a range of potential sources of contamination:

- Temporary storage of insecticides at the quarantine station
- Diesel fuel storage to power the incinerator at the quarantine station
- General dumping of rubbish

The proponent indicated that potential contaminants associated with the above sources include organochlorine pesticides, hydrocarbons and heavy metals. In the EIS it was recommended that additional investigations be undertaken to determine the presence or otherwise of contamination and any need to undertake remediation. The proponent also indicated that these investigations plus review and sign off by an Environmental Auditor should be undertaken following development approval due to the lengthy time frame associated with the EIS and assessment process.

3.4 WAVES & TIDES

Murat Bay has a low energy coastal environment, protected by reefs and islands at the bay entrance, with extensive shallow tidal flats extending out from the beach that are exposed at low tide. Waves are expected to be generated by winds from the west and southwest. Winds of 30km/hr from the west and south-west generate a significant wave height of 0.52m.

The 100 year storm tide of 2.32m above mean sea level at Thevenard was part of the calculation used to set the minimum general fill level of 3.2m AHD for the development.

Tidal flushing is important for the replacement of existing marina water with cleaner seawater from coastal waters. On average the marina waters will be replaced by tidal flows every 3.5 days. Marina water quality will need to be monitored. However, as no modelling has been done at this stage, it is possible that the predicted replacement of waters may not be achieved in all parts of the marina.

3.5 COASTAL PROFILE AND COASTAL PROCESSES

The low energy nature of this part of the coast has resulted in low levels of sand movement and erosion within the bay. A limited technical assessment, involving inspection of navigation charts and local information and observation, was undertaken as part of the EIS to determine the potential for sand movement. The EIS (Working Paper 5) indicates that there are small movements of sand around the bay and that modest quantities of dead seagrass accumulate on most beaches. The EIS also states that, on the basis of small currents on the breakwater site associated with an incoming tide and a southerly wind, it was unlikely to produce transverse sand movement.

3.6 WATER QUALITY IN MURAT BAY AND WATERWAYS

A qualitative assessment only of water quality in Murat Bay was undertaken as part of the EIS. The proponent was of the opinion that the water quality of the bay would be of a high standard because, there was no effluent outfall, the low number of stormwater outlets and the lack of major industrial activities. The proponent has also indicated that a sampling program was to commence in April 2005. The results were not available for inclusion in the EIS but were provided in the Response (Section 3.1). The sampling program was in accordance with that detailed in the EIS and analysis of nutrients (nitrogen and phosphorus), heavy metals (cadmium, copper, lead and zinc) and faecal coliforms. The proponent provided a summary table which indicated that all heavy metals and nutrients were below ANZECC (2000) guidelines and no faecal coliforms were detected.

The proponent has indicated that the design of the marina was based on the premise that tidal movements would be sufficient to flush the waterways. The proponent is also of the opinion that there would be unrestricted exchange of water between Murat Bay and the waterways with an estimated average exchange of 3.5 days, ignoring any lag effects. The EIS also indicates that the exchange period would increase to 4.5 days with a sea level rise of 1 metre.

3.7 TERRESTRIAL ECOLOGY

The Biodiversity Plan for Eyre Peninsula, South Australia (2002) recognises that the coasts of Eyre Peninsula are significant because the low human population density throughout most of the region has meant that the coastal ecosystems have generally been affected to a much lower degree than more heavily populated areas of the State. The marina waters of the region are part of a highly significant stretch of temperate water that supports some of the richest species diversity in the world. The opportunity exists to maintain some of the more remote coastal areas in a pristine condition.

The Ceduna locality is included in the Far West Threatened Habitat Area, which supports significant semi-arid plant communities and areas of the coast that are extremely important for their biodiversity. Whilst the site does not support such communities, the narrow coastal strip south of the Eyre Highway has been extensively cleared and highly developed, resulting in any remaining vegetation having high conservation values. In addition, mangroves and saltmarshes provide significant habitat for wading birds. Habitat fragmentation, salinity and problem plants and animals have been identified as major threats to biodiversity.

The proposed site is within the Ceduna Environmental Association (Laut et al, 1977), which is described as an undulating calccrete plain with overlying dunes, and low cliffs, lagoons and mangrove flats along the coast. Most of the plain has been cleared to an open parkland or grassland used for rotation cereal cultivation and livestock grazing, with small remnants of low Mallee Woodland or Open Scrub. The dunes retain a native heath cover.

3.8 MARINE ECOLOGY

The Eyre coast is the largest coastal geomorphological region in South Australia and contains some of the most remote, uninhabited and rugged coastline in the State. The proposed site is on Murat Bay, which is within the Great Australian Bight Biotone and the Murat Bioregion (Edyvane, 1999). The Murat Bioregion extends from Cape Adieu to Cape Bauer and is characterised by waters that are transition warm to cold temperate, which are under the seasonal influence of the Leeuwin Current (ie during summer). It has a moderate to low wave energy coastline, with a tidal range of 0.8 to 1.2 metres (microtidal). It has a rocky crenulate coastline, with a shallow offshore gradient, comprising numerous shallow sheltered embayments dominated by seagrass. There are numerous offshore island and seamounts. Reef communities in the lee of the islands contain a higher floral diversity, due to protection from the full force of the south-westerly swell conditions. The high abundance of reef fish around the St Francis Isles and Nuyts Archipelago is partly due to high local reef productivity. Marine flora and fauna are typically warm temperate (ie Flindersian), with a distinct tropical element due to the Leeuwin Current. Warm water masses influence the seasonal presence of migratory species, such as marine turtles. Nutrient rich coastal upwellings also occur off western Eyre Peninsula, including the St Francis Isles, and have a link with populations of pilchards and an abundance of seabirds, sea lions and seals in the region.

Murat Bay is within the Streaky Biunit, which encompassed the inshore embayments from Point James to Cape Bauer. The Nuyts Biunit lies offshore and encompasses the Nuyts Archipelago and the Isles of St Francis, which have significant conservation values. In addition, the adjacent Tourville Bay, which is a wetland of national significance and has been rated as one of only three estuarine areas in SA to be rated as near pristine.

The warmer waters and protected bays along the upper West Coast, may be important factors in the presence of whales in the region, such as around Ceduna and Streaky Bay. There are seasonal sightings of migratory Southern Right Whales, particularly during winter, en route to the Great Australian Bight. In addition, there are regular sightings of Killer Whales, Blue Whales, Sperm Whales, Humpback Whales, Minke Whales and Rorquals. Migratory Leatherback Turtles (internationally listed as critically endangered) are also seasonally observed in the area.

Bottlenose Dolphins are regularly observed around the islands and in the shallow waters of the bays and may breed around the Davenport Creek area. There are also regular seasonal sightings of Great White Sharks, especially in the Ceduna and Streaky Bay areas, which may be abundant in the western Bight region due to food sources such as pinnepeds.

The embayments and islands of the region contain a high level of fish species diversity due to the large variety of marine habitat types. A number of reef fish species known in the area have been recognised during the past two decades as being potentially vulnerable to decline, and therefore of conservation concern. Examples include Western Blue Groper, Western Blue Devil, Harlequin Fish, Blue-Throated Wrasse, Rosy Wrasse, other wrasse species and several other species. The islands of the Nuyts Archipelago are relatively lightly fished compared with coastal locations and therefore may constitute an important refuge for some of these species compared with the more heavily fished reefs near the mainland. Some of the reef fish species are of Western Flindersian affinity, being more common in W.A., and not usually observed in most parts of South Australia. Reefs also provide habitat for Leafy and Weedy Seadragons.

Deeper waters have an abundance of some shark species, including species of conservation concern (e.g. Bronze Whaler), Pilchards, Jack Mackerel and Blue Mackerel and Southern Blue-fin Tuna.

3.8.1 Murat Bay (Ceduna)

The mudflats close to Ceduna are important for both resident and migratory wading birds and other coastal birds, which use the exposed sand and mud habitats for feeding on small crustaceans, molluscs, and other invertebrates. The Ceduna region provides habitat for at least 17 species of migratory shorebirds, listed under international treaties CAMBA and JAMBA. Migratory waders found in the area, include Sharp-tailed Sandpiper, Common Sandpiper, Curlew Sandpiper, Wood Sandpiper, Terek Sandpiper, Red-necked Stint, Greenshank, Ruddy Turnstone, Grey-tailed Tattler, Grey Plover, Lesser Golden Plover, Great Knot and Red Knot, Sanderling, Whimbrel, Bar-tailed Godwit and Mongolian Plover. The area also provides habitat for the migratory Caspian Tern. Some of these species visit for short periods, arriving around October each year, and others stay over summer, moving on around April / May. Non-migratory birds that use the area as habitat include the Red-capped Dotterel and Red-kneed Dotterel, Pied and Sooty Oystercatcher, Masked Plover, Banded Stilt and Black-winged Stilt, Black Swan, White-faced Heron, Chestnut Teal and Grey Teal, Crested Tern, Pacific Gull, Silver Gull and Australian Pelican. Birds classified as rare that use the area as habitat, include the Eastern Reef Egret, Musk Duck, and Osprey. Vulnerable birds include the Hooded Plover, Fairy Tern and White-Bellied Sea Eagle.

The tidal flats, seagrass meadows and reefs in the bay provide habitat for a wide range of commercial and recreational fish and shark species, including King George Whiting, Snapper, West Australian Salmon, Tommy Ruff (Australian Herring), Yellow-eye Mullet, Southern Sea Garfish, Mulloway, Trevally, Yellow-tail Kingfish, Leatherjacket species, Western Blue Groper and other Wrasse species, Snook, Sea Sweep, Silver Drummer, Gummy Shark and Whaler Shark, flathead species, flounder species Snapper, Red “Mullet” and Yellow-tail Kingfish. Blue Swimmer Crab, Western King Prawn, Razorfish, Southern Calamari, Native Oysters, King Scallops and Queen Scallops are also abundant. There is also a diverse array of marine invertebrates found around reefs, including Southern Rock Lobster, Southern Calamari, Giant Cuttlefish, Maori Octopus, Greenlip and Blacklip Abalone, and Purple Sea Urchin.

The Ceduna area is one of the few locations in South Australia where the sub-tropical Western Australian species the Twospot Fringed-fin Goby has been recorded

3.8.2 Offshore Islands

The Nuyts Archipelago and St Francis Isles are located offshore from Ceduna and contain numerous collections of islands of varying sizes. St Peter Island is the largest (and closest to Ceduna), being the second largest South Australian island after Kangaroo Island, and provides a wide variety of marine and coastal habitats, especially reefs, seagrass, macroalgae, extensive sandbanks, mangroves and samphire swamps. The extensive intertidal flats around St Peter Island provide a variety of coastal habitats for a number of seabirds and wading birds, including migratory waders. It is also a breeding area for Little Penguin. Rare species of shellfish have purportedly been recorded, including Cowries, which are mainly tropical and some of the few species to occur in southern Australia. The fish fauna of the St Francis Isles may represent an example of what reef fish composition may have been like in some other parts of the South Australian coast, prior to heavy fishing pressure during the past decades.

Nuyts Archipelago and St Francis Isles contain significant breeding colonies of Australian Sea Lions found in the region, including Small South Franklin Island (ranked 4th most important area for sea lion pup production in SA), Purdie Rocks (ranked 5th) and Lounds Island (ranked 10th). There are also a significant number of important haul out sites for Australian Sea Lions and New Zealand Fur Seals.

Coastal bird and sea bird species listed as rare include Osprey (nesting area at St Peter Island), Rock Parrot, Peregrine Falcon, Eastern Reef Egret and Cape Barren Goose (second rarest goose species in the world). The Buff-banded Rail (an uncommon or rarely seen species) also breeds on the St Francis Isles. Species listed as vulnerable, include Fairy Tern; Eastern Curlew; White-bellied Sea Eagle (nesting areas at St Peter Island) and Hooded Plover. The islands also provide habitat for migratory bird species, such as Greenshank, Lesser Golden Plover, Whimbrel, Eastern Curlew, Bar-tailed Godwit, Caspian Tern, Great Knot, Red-necked Stint, Sanderling, Sharp-tailed Sandpiper and Ruddy Turnstone. Coastal and seabird species, include Crested Tern, Pied Cormorant, Great Black Cormorant, Black-faced Cormorant, Australian Pelican, White-faced Storm Petrel, Australasian Gannet, Pacific Gull, Silver Gull, Masked Plover, Pied Oystercatcher, Sooty Oystercatcher, Buff-banded Rail, Little Penguin, Banded Stilt, Red-capped Plover, Double-banded Plover, White-faced Heron and Great Egret.

The islands also support large breeding colonies of Short-tailed Shearwater colonies during the summer months, with St Peter Island having the largest breeding population in South Australia (St Francis has the second largest). The St Francis Isles also support a significant breeding population of White-faced Storm Petrel and small breeding populations of Little Penguins (less than 50 birds).

The Biodiversity Plan for Eyre Peninsula, South Australia (2002) states that the Greater Stick-nest Rat (Endangered) occurs on the Franklin Islands and has been reintroduced on St Peter Island. The Brush-tailed Bettong (Rare in SA) has also been reintroduced on St Peter Island. The Southern Brown Bandicoot (Endangered) occurs on St Francis Island, whilst the Nuyts Southern Brown Bandicoot (Vulnerable) is confined to the Franklin Islands. Most of these species are extinct on the mainland and rely upon offshore islands to be free from threats posed by predators and human disturbance.

In recognition of these values, the Department for Environment & Heritage recently recommended that the area, the Nuyts Archipelago, St Francis Isles & Coastal Embayments (Murat Bioregion), be considered as one of 19 potential Representative Marine Protected Areas (Baker, 2004).

4 CONFORMITY WITH LEGISLATION AND POLICIES

Section 48(5) of the *Development Act, 1993*, requires that before the Governor considers a proposal that has been declared a Major Development, the Governor must have regard to, amongst other things, the provisions of the appropriate Development Plan and the regulations (so far as they are relevant) and the Planning Strategy. Other matters considered relevant by the Governor can also be taken into account.

The Crown Solicitor has advised that in respect of applications being assessed as Major Developments under the Act, the appropriate Development Plan and Planning Strategy are those current at the time of the decision, as Section 53 of the Act does not apply to the Major Development provisions of the Act.

4.1 DEVELOPMENT PLAN

4.1.1 Development Plan Provisions

The relevant Development Plans for the proposal are *The Ceduna DC Development Plan, Consolidated 21 August 2003* and *The Land Not Within a Council Area (Coastal Waters) Development Plan, Consolidated 24 July 2003*.

In regard to the Ceduna Development Plan, the subject land is located partly within each of the following Zones:

- Coastal Zone: the marina, facilities for the commercial fishing/aquaculture industry and residential development are proposed in this Zone.
- Rural Living Zone– (Policy Area 17) both waterfront and dryland residential allotments are proposed in this Zone.
- Recreation Zone – (Policy Area 21-Tourist Use): the Coastal Community Centre and recreational lake/wetland to support tourist accommodation/facilities (including hotel, serviced apartments, restaurants, retail and conference facilities) and residential development are proposed for this Zone.

Council Wide objectives and principles of development control in the Ceduna DC Development Plan encourage a number of broad principles which include the following:

- orderly and sustainable development
- protection of the coastal environment, native vegetation and offshore islands
- provision and maintenance of employment opportunities
- rational distribution of land uses to avoid incompatible development
- provision of a range of housing and
- retail and business development in suitable areas

The Development Plan also indicates that marinas should only be in environmentally acceptable areas and that they should be developed in an orderly and economic manner which realistically meets future demand.

The site boundary also extends into the Murat Bay where policies for the The Land Not Within a Council Area (Coastal Waters) Development Plan apply. This area of the subject land would encompass the breakwater structure, entrance channel (ie. potentially to a distance of several hundred metres), marina facility and waterfront residential development. This Development Plan states that tourist development and marinas should only be undertaken in Zones designated for such development. The Plan contains objectives and development control measures for environmental protection of coastal and marine areas

which aim to maintain public access and protect sites of cultural, heritage or scientific significance. Development should only be undertaken on land that is not subject to coastal hazards and does not require public expenditure on protection of the development or the environment. Adequate financial guarantees for construction, operation, management and maintenance are also prescribed.

4.1.2 Assessment Against the Development Plans

Ceduna (DC) Development Plan

Consideration of the proposed marina against the policies for each of the three Zones within the Ceduna Development Plan suggest that the types of land uses proposed are generally not envisaged. In particular:

- Intensive development (especially land division) would be considered inappropriate in the Coastal Zone, which aims to preserve and protect the coast to maintain biodiversity and scenic values.
- Small residential allotments in the Rural Living Zone are not envisaged. In this Zone, residential development on large allotments supporting hobby rural activities, is described as suitable.
- The Recreation Zone should accommodate a range of recreation experiences for residents of the district and visitors. In particular, the Zone policy area is identified for recreation and tourist accommodation uses. A system of artificial channels and passive recreation areas could potentially be appropriate in this Zone however associated housing on the scale proposed is probably not consistent with the intent of this Zone.

An assessment against the Council wide policies of the Ceduna Development Plan suggests that the proposal is generally compatible with policies that relate to economic and employment generation, which emanate from the proposed development's potential to encourage growth in the fishing industry and construction activities. In relation to the environmental policies the proposed works are likely to generate significant disturbance of the coastal environment including impacts on sand dunes, vegetation and the habitats of some migratory birds. Impact on the visual amenity of the coast will also be substantial through the introduction of breakwaters, some 2-3 storey residential dwellings and acoustic protection mounds abutting the Eyre Highway realignment. In relation to social issues, the proposal will provide a range of housing types, however there are some issues regarding the development's limited provision of open space as well as its capacity to integrate with the diverse Ceduna community.

A thorough assessment of the proposal against the Development Plan provisions relating to orderly and economic development is limited at present due to the status of a number of outstanding issues. These include the proposed realignment of the Eyre Highway, demonstration of adequate water supply, demonstration of suitable disposal arrangements for wastewater generated by the proposed development and information on how site contamination will be managed.

The Land Not Within a Council Area (Coastal Waters)

The proposal has the potential to create a number of on site and offsite impacts on a range of environmental elements in the areas covered by this Development Plan. These include impacts associated with increased recreational boating and commercial fishing and aquaculture activity, which has the potential to impact on both the immediate marine environment and the surrounding ocean environment which includes a number of offshore Islands in the vicinity of the subject site.

It is understood Council intends, should the proposal be approved, to prepare a Plan Amendment Report to rezone the land in such a way as to recognize the proposal, and manage future building developments.

It is concluded that the proposed development is, on balance, at substantial variance with the policies of the Coastal Zone, and is also generally inconsistent with many of the relevant provisions of the Rural Living and Recreation Zones in the Ceduna Development Plan.

This report also concludes that the proposal is generally consistent with economic and social policies in the Council wide provisions of the Development Plan, but at some variance with the environmental policies.

The proposal is also considered not to be in accordance with many of the policies in the Land not within a Council Area (Coastal Waters) Development Plan.

4.2 PLANNING STRATEGY

The appropriate Planning Strategy is the *Planning Strategy for Regional South Australia (Premier of South Australia, January 2003)* which provides broad strategic direction for South Australia. The subject site is subject to a range of broad strategies (Economic, Environment & Resources, People Towns & Housing and Infrastructure) and those specifically relating to the Eyre Peninsula.

It is considered that the overall development of a marina is consistent with the general objectives contained in the Planning Strategy. The objectives across the country region encourage economic development, particularly in the tourism sector, focussing on the natural and cultural assets of regions. Specific strategies relevant to coastal resources encourage the location or expansion of coastal urban settlements, including marinas, in environmentally acceptable areas. A further strategy seeks the provision of reasonable public access in new waterfront development.

The Planning Strategy for Regional South Australia (2003)-Eyre Peninsula Planning and Development Area, seeks to build on traditional industries and develop new industries in response to local, national and international market opportunities. In particular, aquaculture, commercial fishing and tourism (especially ecotourism and cultural tourism) are seen as industries that should be further developed. However, such development needs to ensure that the coastal and marine environment is suitably protected. In addition, the Strategy recognises that there are limited water resources and that the provision of adequate infrastructure is a key issue for economic development.

The 'Ceduna Keys' proposal satisfies the strategies for Eyre Peninsula through the establishment of a safe harbour to support the commercial fishing industry and to encourage the emerging aquaculture industry. The development of a 'commercial fishing/aquaculture hub' would provide improved infrastructure and services for the expansion of these industries. Regional tourism and recreation is also promoted through the establishment of the Coastal Community Centre (including recreational lake/wetland) and the provision of accommodation, facilities and attractions, with particular emphasis on cultural tourism and ecotourism. The residential component will provide a range of housing opportunities not provided elsewhere in the region, with flow-on economic benefits for local businesses, especially in Ceduna. Importantly, the proposal aims to encourage employment and training opportunities for local Aboriginal communities and promotion of their culture.

The proposed marina is generally considered to be compatible with the relevant objectives of the Planning Strategy.

4.3 BUILDING RULES

This report does not include a specific assessment of the development against the provisions of the Building Rules under the *Development Act 1993*. If the Governor grants a provisional development authorisation, pursuant to Section 48 of the Act, further assessment and certification of the proposed development against the Building Rules may be set as a reserved matter for further decision-making. However, a development authorisation (equivalent to a development approval under Part 1 of the Act) will only be made by the Governor or her delegate *after* a private certifier or the relevant council for the area in which the development has been proposed, has assessed and certified that any work that constitutes 'building work' under the Act complies with the Building Rules and has supplied this information to the Minister (as required by Regulation 64 of the *Development Regulations 1993*). The Building Rules

certification must be consistent with any provisional development authorisation and would ensure safety (including fire safety) and stability of construction.

4.4 ENVIRONMENT PROTECTION ACT

The proposed development involves activities of environmental significance (dredging and earthworks drainage, operation of marinas and boating facilities) as defined in Schedule 1 of the *Environment Protection Act 1993*, as detailed below.

- Earthworks Drainage: the conduct of earthworks operations in the course of which more than 100 kilolitres of wastewater containing suspended solids in a concentration exceeding 25 milligrams per litre is discharged directly or indirectly to marine waters or inland waters
- Marina and Boating Facilities: the conduct of
 - facilities comprising pontoons, jetties, piers or other structures (whether on water or land) designed or used to provide moorings or dry storage for 50 or more powered vessels at any one time, or
 - works for the repair or maintenance of vessels with the capacity to handle five or more vessels at any one time or vessels 12 metres or more in length
- Dredging: removing solid matter from the bed of any marine waters by any digging or suction apparatus, but excluding works carried out for the establishment of a visual aid to navigation and any lawful fishing or recreational activity

When proposals involve activities of major environmental significance the Governor, before making a decision on the proposed development, must have regard to the objects of the Act, the general environmental duty and any relevant environment protection policies.

The objects of the Act are:

- *To promote the principles of ecologically sustainable development;*
- *To ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment having regard to the principles of ecologically sustainable development, and to prevent, reduce, minimise and, where practicable, eliminate harm to the environment.*

In addition, proper weight should be given to both long and short term economic, environmental, social and equity considerations in deciding all matters relating to environmental protection, restoration and enhancement. The Environment Protection Authority is required to apply a precautionary approach to the assessment of risk of environmental harm and ensure that all aspects of environmental quality affected by pollution, and waste are considered in decisions relating to the environment.

The following Environment Protection Policies are applicable:

- *Environment Protection(Water Quality) Policy, 1994*
- *Environment Protection(Waste Management) Policy, 1994*
- *Environment Protection(Air Quality) Policy, 1994*
- *Environment Protection(Industrial Noise) Policy, 1994*

- *Environment Protection(Machine Noise) Policy, 1994*

The EPA's comments are summarised in Sections 5 and 6 of this report.

4.5 OTHER MATTERS

4.5.1 State Strategic Plan

The Governor has regard to any other matters considered relevant. In this context, an assessment has been carried out with reference to the State Strategic Plan (2005). The State Strategic Plan seeks to widen opportunities for all South Australians through the pursuit of six strategic objectives:

- Growing prosperity
- Improving well being
- Attaining sustainability
- Fostering creativity
- Building communities
- Expanding opportunities

Development of the Ceduna Marina supports a number of the objectives.

In terms of “growing prosperity” the priority of the Strategic Plan is sustained economic growth resulting in rising living standards, with all South Australians sharing in the benefits through more and better job opportunities and access to quality services. The proposal, if approved, will result in upgraded facilities, especially for recreational boating and the commercial fishing and aquaculture industries. In addition the increased resident base will have a positive impact on support industries and the general economic well-being of the region. There is likely to be increased tourism in the area as a result of the marina, the community centre (that would be a focus for cultural and nature based tourism), tourist accommodation and commercial tourism opportunities. On this basis the proposal is consistent with the Strategic Plan aim of “growing prosperity”.

The proposal could potentially be consistent with the Strategic Plan objective of ‘attaining sustainability’ if measures are implemented to protect biodiversity (especially the relatively pristine marine environment), to minimise waste and to encourage water and energy sustainability. A proposal of this scale and magnitude located in a region that has high conservation values could potentially result in detrimental off-site impacts on the local environment, primarily due to human disturbance (ie urban encroachment ‘people pressure’). A significant increase in boating activity (especially fishing pressure and recreational use of the coast and sensitive off-shore islands) and the potential expansion of the aquaculture (and possibly commercial fishing) industry could impact upon ecologically significant areas. In particular, threatened species, such as the Australian Sea Lion and Southern Wright Whale could be affected in the long-term. The Plan sets a target of creating 19 Marine Protected Area by 2010. The suitability of the Nuyts Archipelago, St Francis Isles & Coastal Embayments (Murat Bioregion), which lies offshore from Ceduna, as a potential sites for the establishment of a Marine Protected Area could be affected.

The Strategic Plan also deals with ‘building communities’ through the maintenance and development of viable regional population levels and reduction of unemployment rates. The establishment of the proposed residential sub-division, commercial marina, tourist and commercial facilities will assist in maintaining

regional population levels and increase jobs in the area. There is a risk that the proposed development may not strengthen the regional community if social integration and integration with the Ceduna township is not achieved. The establishment of the Community Centre (or Cultural Heritage Centre) will assist in addressing this risk.

The objective of ‘expanding opportunity’ would be fulfilled by the proposal if Aboriginal wellbeing is improved through employment creation and training. However, the proposal is unlikely to encourage the provision of affordable housing in the community.

It could be argued that the proposed development would have a negative impact by increasing the ecological footprint and therefore may not be a good example of the objective of having ‘sustainable settlements’. **However, on balance it is concluded that the proposed development is reasonably consistent with the thrust of the State Strategic Plan.**

4.6 OTHER RELEVANT LEGISLATION

4.6.1 Harbors and Navigation Act 1993

The *Harbors and Navigation Act 1993* applies to coastal and inland waters of the State and has relevance for the proposal in regard to the provision of boating facilities and the management of boating activities (especially navigation, safety and pollution control). The government agency responsible for administering the Act, the Department for Transport, Energy & Infrastructure, has considerable experience in design matters for marina and other boating related facilities and would be responsible for auditing certification processes for such structures on behalf of the Governor (or its delegate).

The design of the marina facility should generally be in accordance with the Australian Standard AS3962 *Guidelines for Design of Marinas* and that it is the responsibility of the design engineer to ensure the structural integrity of any structures (eg. revetments, moorings, wharves, pontoons and navigation aids) are certified to the required standard. Whilst not a statutory requirement, the public boat ramp facility should be designed in accordance with the South Australian Boating Advisory Committee’s *Guidelines for Planning, Design and Construction of Boat Launching Facilities*, which set the standard for best management practices.

The proponent will need to ensure satisfactory oil spill and fire fighting facilities and contingencies are in place prior to operation of the marina, having regard to the South Australian Marine Spill Contingency Action Plan, the *Pollution of Waters by Oil and Noxious Substances Act 1987*. In addition, the proponent will need to comply with the MARPOL (*Convention for the Prevention of Pollution from Ships*) requirements for marine toilet pump-out facilities. Consultation with the EPA would need to be undertaken to address pollution and waste management requirements.

If foreign vessels are expected to use the facility, then compliance will be required with the Australian Quarantine Inspection Service (AQIS) and Australian Customs Service.

Whilst the general design of the marina is consistent with these requirements, further consultation with the Department for Transport, Energy & Infrastructure, which administers the *Harbors and Navigation Act 1993*, should be undertaken to address these aspects at the detailed design stage.

4.6.2 Public and Environmental Health Act 1987

The proponent would need to comply with the *Public and Environmental Health Act 1987* in regard to the disposal of effluent and the maintenance of suitable water quality within the marina basin to protect public health and amenity. Minimising inputs into the basin and providing good water exchange rates are

considered the most effective measures for maintaining suitable water quality standards for human use and for reducing the likelihood of problems arising (especially elevated levels of faecal coliforms, odours, algae blooms, mosquitoes and other nuisance organisms). In particular, consultation with the Department of Health, which administers the *Public and Environmental Health Act 1987*, would be required to ensure suitable standards are adopted for effluent disposal (inc. the marine toilet pump-out facility).

4.6.3 Aboriginal Heritage Act 1988

The Department for State Aboriginal Affairs, which administers the *Aboriginal Heritage Act 1988*, requires that in the event archaeological items are uncovered during earthmoving, the Department be contacted immediately. The proponent should ensure construction contractors are aware of this requirement.

The proponent should consult with appropriate representatives of the relevant Aboriginal group in regard to any known sites of significance in the area and any Native Title Claims.

4.6.4 Native Vegetation Act 1991 (and Amended Regulations)

Under the Regulations of the *Native Vegetation Act 1991* the proponent is exempt from the requirement to obtain approval for vegetation clearance if the proposal has been the subject of an EIS and the comments of the Native Vegetation Council (NVC) on the EIS are included in the relevant Assessment Report. The NVC has been formally consulted and its comments have been considered in the preparation of this report. No statutory approval for vegetation clearance is required from the NVC.

The regulations have recently been amended and, whilst the proponent is still exempt from having to seek approval from the NVC to clear or disturb native vegetation, suitable compensation for such clearance needs to be achieved to the satisfaction of the NVC.

Under Regulation 5(1)(c) of the Native Vegetation Regulations, native vegetation may, subject to any other Act or law to the contrary, be cleared if -

- (i) *the clearance is incidental to a proposed development to which section 48 of the Development Act 1993 (the Major Developments Process) applies; and*
- (ii) *an environmental impact statement, public environmental report or development report, and an Assessment Report, relating to the development have been prepared under that Act; and*
- (iii) *the Minister responsible for the administration of the Development Act 1993 referred the environmental impact statement, public environmental report or development report to the Native Vegetation Council for comment and report and—*
 - (A) *the Council provided comments which were included (wholly or substantially) in the relevant Assessment Report; or*
 - (B) *the Council failed to provide comments within 8 weeks after receiving the Minister's invitation for comment and report; and*
- (iv) *the Governor has granted his or her consent to the proposed development under section 48 of the Development Act 1993; and*
- (v) *the clearance is undertaken in accordance with that consent; and*
- (vi) *the clearance is undertaken in accordance with a management plan that has been approved by the Council that results in a significant environmental benefit on the property where the*

development is being undertaken, or the owner of the land (or a person acting on his or her behalf) has, on application to the Council to proceed with clearing the vegetation in accordance with this provision, made a payment into the Fund of an amount considered by the Council to be sufficient to achieve a significant environmental benefit in the manner contemplated by section 21(6) of the Act.

The Act also includes within the definition of native vegetation, native plants growing “in or under waters of the sea” where the “waters of the sea” includes “any water that is subject to the ebb and flow of the tide”.

The proponent is currently negotiating with the NVC a suitable form of compensation for the clearance of native vegetation, in accordance with clause (vi) above.

4.6.5 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), came into operation on 16 July 2000. The Act establishes an environmental assessment and approval system based on matters of national environmental significance that is separate and distinct from State systems. The Act requires proponents of actions to which the Act may apply to seek a determination from the Commonwealth Environment Minister regarding whether or not their action is a ‘controlled action’ and therefore, subject generally, to Commonwealth assessment and approval processes. The proponent submitted a referral form with the relevant details on the likely impacts of the proposal to Department of the Environment & Heritage for a determination as to whether the EPBC Act applies. The proponent has been notified that the proposal is not a ‘controlled action’.

The Department of Environment & Heritage notes that the action referred to the Commonwealth under Act by the District Council of Ceduna differs to the proposal in the EIS. A referral was submitted in June 2002 and a decision was made that the proposed development was not a controlled action under the Act. However, the proposal that was submitted has been significantly amended. In particular, the previous proposal incorporated a wetland to re-establish mangroves and tidal habitats (ie to encourage migratory birds back into the area), so as to offset the impacts of the proposed development. It is also noted that the referral does not discuss the importance of the area as a habitat for migratory species.

5 CONSULTATION

5.1 COMMUNITY

The EIS was placed on exhibition from 22 June to 2 August 2005. 21 submissions were received from the public, including one non-Government organisation. The main issues raised in public submissions included:

- Realignment of the Eyre Highway (including relocation of the PIRSA Quarantine Station)
- Impact on local businesses
- Implications for community service providers
- Social integration
- Integration with the township of Ceduna
- Impact on the marine environment, especially sensitive off-shore islands and threatened species
- Impact on the coastal environment, especially migratory wader habitat
- Native vegetation clearance or disturbance (including seagrass)
- Provision of public open space
- Water quality of the marina waters and Murat Bay
- Provision of facilities for the aquaculture/fishing industry
- Provision of a water supply and effluent disposal system

5.2 COUNCIL

The Ceduna District Council did not provide a submission. It is the owner of the subject land and has an agreement to sell the land to the proponent if approval is granted.

5.3 GOVERNMENT

The key comments provided by Government Agencies on the EIS are included below:

Environment Protection Authority (EPA)

- Concern that there had not been any sampling of sediments in the proposed channel area
- Lack of information on volumes of dredged material and disposal management
- Contingency plan should be developed to address the potential significant increase in turbidity
- Additional testing required to assess the extent of potential acid sulphate soils
- Concerns relating to the seagrass clearing due to channel excavations and breakwater construction. Further monitoring required for a period of 5 years
- Monitoring results of water quality testing ion Murat Bay should be provided in the Response Document
- The proponent should use WHO and ANZECC Guidelines in terms of safe recreational water environments and *E-coli* impacts on shell fish, in addition to the SASQAP monitoring guidelines
- Additional details on current tidal speeds in Murat Bay and direction of discharge plumes
- Clarification on the nature of wastewater from boats

- Concern with the proximity of parts of the residential component of the development to the Eyre Highway and rail freight line in terms of potential noise impacts, the adequacy of the proposed noise attenuation mound and the need for specific design measures for buildings to mitigate noise impacts
- Refuelling and marine pump out facilities to be designed and constructed in accordance with EPA Guidelines
- Additional investigations required to assess the nature of soil and groundwater contamination throughout the proposed development and these should be reported in the RD
- The appointment of an Environmental Auditor (Contaminated Land) and the completion of a Site Audit report was recommended and preparation of appropriate environmental management plans to the satisfaction of the EPA.

Department for Environment and Heritage (DEH)

- Recommended minimum site levels of 2.7 m AHD and floor levels of 2.95 m AHD for development that is not exposed to wave run-up and 3.0 m AHD and 3.25 m respectively for development that is exposed to wave run-up
- The proposed heights of the breakwaters are satisfactory
- Any works should comply with the Coast Protection Board policies on coastal acid sulphate soils and management measures included in a Construction Environmental Management Plan
- The location of the breakwaters is expected to have a profound effect on the manner in which seagrass wrack is naturally managed. Modelling should be undertaken to confirm the proponent's expectations. Clarification of the responsibility for management of seagrass wrack required
- The proposal will restrict public access from east to west. Recommends that appropriate and unrestricted public access to the coast is maintained to car parks, breakwaters and boat ramp facilities
- Lack of modelling to adequately demonstrate the level of flushing that will occur of the waterways
- Concerns expressed as to the adequacy of monitoring of the marine waterways and structures to determine colonisation of pest invasive species
- Adequate monitoring and contingency plans required to counteract any adverse outcomes on flora and fauna as a result of dredging activities
- DEH should be consulted in relation to the proposed Construction Environmental Management Plan

Department for Water, Land and Biodiversity Conservation (DWLBC)

- Concerns expressed at the availability of a water supply, given that the existing public water supply is stressed, and who is responsible for providing, and funding the water supply for the proposed development
- Clarification sought on whether the proposed wastewater treatment system will cater for wastewater from the fish processing facilities

Native Vegetation Group of DWLBC (on behalf of the Native Vegetation Council)

- The land affected by the proposed marina at Ceduna contains significant areas of native vegetation whose significance is under-rated by the preliminary environmental assessment document. Although parts of the land are highly disturbed and dominated by introduced species, some of the area is relatively undisturbed and supports a high diversity of native plants. The samphire communities east of the Eyre Highway also warrant further investigation as a habitat for waterbirds and other fauna.
- Evidence suggests that the proposal would also impact on a large area of tidal mudflats of national significance that provide a feeding habitat for a significant number of migratory waterbirds.
- In recognition of the above the Native Vegetation Council advises the Minister for Urban Development and Planning that it does not support the proposed Ceduna Keys Marina and Community Centre Development because:
 - the proposed development would result in clearance of a substantial area (about 90 ha) of native terrestrial vegetation.
 - clearance as proposed is considered to be seriously at variance with the principles of clearance contained in the Native Vegetation Act, 1991.
 - no offset has been proposed that would result in a significant environmental benefit associated with the development to compensate for clearance of native vegetation that is likely to occur as a result of the proposed development.
 - the proposal would impact on a large area of tidal mudflats of national significance that provide a feeding habitat for a significant number of migratory waterbirds, due to its location adjacent a shallow tidal embayment.
- Further, the Council is concerned that:
 - the EIS has not adequately assessed the value of the site (both Lot 20 and the tidal mudflats) as a habitat for waterbirds.
 - the EIS has not adequately assessed the likely impacts on waterbirds, particularly those migratory species that use Murat Bay.
 - an appropriate monitoring and management program is required to limit damage of sea grass habitat should scarping and erosion occur on either side of the dredged channel.

Department of Primary Industries and Resources

- Concerns expressed on the impacts of sediment discharge and disturbance of potential acid sulphate soils
- The removal and disposal of seagrass wrack has to be in accordance with PIRSA requirements
- Stabilisation of the excavated channel area should be undertaken to prevent additional damage to the sea grass. Any clearance of seagrass will require approval from the Native Vegetation Council
- PIRSA has no objection to the relocation of the Quarantine Station subject to a suitable facility being provided at the proponent's cost and to PIRSA satisfaction and DTEI access requirements

Department of Health

- The proposal would result in expansion of the fishing and aquaculture industries in the area and contribute to increased employment opportunities
- Clarification required on the proposed wastewater treatment options
- Additional investigations of the extent of soil and groundwater contamination required
- Lack of information on noise issues, particularly as they relate to sources, predictive levels, background levels. A quantitative risk assessment should be undertaken to determine the potential as noise exposure could have serious adverse health effects
- The proposal will significantly increase the population of Ceduna and this will place considerable demand on health services
- Potential for increased social divisions, reduced housing affordability
- Important to ensure marina is integrated with existing town
- Important that there is planning for an ageing community

Department for Trade and Economic Development

- Economic and social benefits of the proposal in the region
- Increased employment opportunities during construction and operation
- Benefits to the tourism industry and potential for growth in the fishing and aquaculture industries (including possible value adding, expansion and diversification)
- Support of future mining industry through offering more diverse housing opportunities
- Potential for conflict between the proposed residential and commercial areas will need to be appropriately mitigated
- Potential for zoning of land adjacent to the commercial area/community centre to be zoned for appropriate industrial development

Department of Transport, Energy and Infrastructure (DTEI)

- Suitability of the proposed Eyre Highway re-alignment to be assessed in terms of standard alignment and the impact of heavy vehicle movements
- Adequacy of the proposed acoustic protection mound to mitigate noise impacts
- Investigations should be undertaken into an alternative option of relocating the Eyre Highway to the opposite side of the railway line
- DTEI reserves it's agreement to the proposed alignment until plans are developed and agreed with the proponent. Approval is also required from the Commonwealth Department of Transport and Regional Services
- A traffic study should be undertaken to identify impacts on the Eyre Highway, including a traffic impact statement for works during and after construction

- Identify impacts of additional commercial traffic movements, especially heavy vehicle movements associated with the proposed development through the town centre and adjacent residential zones
- No development should be undertaken until all issues surrounding the Eyre Highway re-alignment and the lands adjacent the foreshore have been resolved
- Further consideration of bird impacts, extraneous lighting and the presence of structures that could impact aircraft
- The Department should be consulted in relation to the design of the marina and associated breakwaters and channels

Department of Education and Children's Services

- The Department had no comment

South Australian Police

- Consideration should be given to establishment of an Emergency Services berth at the marina

South Australian Tourism Commission

- The proposal's tourism success will be dependent on the region achieving a critical mass
- Tourism will not be the driver for the proposed development but an important component that could benefit from the development
- It is important for the proposed development to be a benefit to the town and not be seen as an enclave
- The main visitor information service should remain in the existing Ceduna CBD. A proposed regional visitor centre on the southern boundary of the site would not be at odds if a focus on cultural and interpretive themes is maintained
- The economic assessment may be dated but likely to be conservative

6 ASSESSMENT OF THE MAIN ISSUES

6.1 NEED FOR THE PROPOSAL

The proposal was initially instigated by the Ceduna District Council in order to stimulate economic development, provide employment opportunities and to increase the population of Ceduna.

In terms of needs and benefits arising from the proposal, the proponent's EIS considers that the development will:

- assist in correcting the historical decline in population in Ceduna and the surrounding district over past years (some 500 persons)
- create a population base that may provide a 'critical mass' or suitable threshold for the provision of a wider range of goods and services to the community enhancing choice and quality of life
- offer choice in housing type and setting responding to the demands and preferences identified in particular market segments within the district and beyond
- assist in capturing economic activity and investment within the district and surrounding region including that associated with the mining and exploration industries as a staging and respite location that is time efficient and of a desirable amenity;
- better facilitate the fishing and aquaculture industries in a manner that may best assist in achieving their respective economic potential that would have generally positive flow-on effects for the local, the district & regional, State and Australian economy
- assist in providing a hub and focus for the tourism industry within the district as a 'gate way' to the Great Australian Bight and Western Australia, providing for a range of facilities including accommodation, interpretation and touring activities
- enable the provision of cultural and community facilities, including a community centre that may serve a range of functions including as a means by which to further promote reconciliation within the local community
- assist in supplementing, extending and enhancing community based recreational and sporting facilities including the golf course in a spatial sense with the provision of land opportunities and via an increased population base or user base
- extend and augment a range of infrastructure services including water, electrical power and telecommunications, together with community services including health and education by virtue of the greater population base
- generate significant rate revenue which may not only be directed back to the ongoing management and maintenance of the development, but also assist in the long term viability of providing a range of local government-based services to the wider community

6.2 ENVIRONMENTAL ISSUES

A multi-component marina has the potential to cause a number of impacts on the marine and terrestrial environment, including:

- effects from construction activities, especially landscape disturbance from earthworks, disturbance of contaminated groundwater or soils (including Acid Sulphate Soils), soil erosion, dewatering, dust, noise and increased heavy vehicle traffic. Elevated turbidity can also be a problem for marine water quality and ecosystems
- loss of native vegetation cover and habitat (both permanent and temporary)
- mortalities and disturbance of fauna communities, especially endangered species

- introduction of and/or increased magnitude of pollutant sources, especially toxic chemicals from recreational/commercial boating activities and roads, sediment from exposed soils and nutrients from residential gardens and reserves
- increased pedestrian, vehicular and boating traffic, including off-site impacts on the marine environment and adjoining beaches
- effects from human habitation and activities, especially greater 'people pressure', cats/dogs, garden escapees, illegal dumping, off-road vehicle use
- litter and waste sources, including effluent from residences and boats
- discharges to the marine environment, especially pollutants or fresh water
- pest plant and animal species, especially marine pests

The proposal has the potential to increase the magnitude of human disturbance impacts and to introduce new environmental problems and threatening processes that may not be adequately compensated for by the mitigation measures proposed. In particular, off-site impacts such as significant increases in boating activity, recreational fishing, increased use of adjoining beaches and the expansion of aquaculture/commercial fishing are likely to have greater implications for the marine and coastal environment than direct impacts on the site itself.

6.2.1 Native Vegetation Communities (including Sea grasses)

Terrestrial Vegetation

The proposal has the potential to detrimentally affect terrestrial native vegetation communities through direct clearance, competition from weed species and physical disturbance (ie by human and vehicle traffic). These effects can be minimised and mitigated by incorporating remnant stands into the design, protection and improved environmental management of existing stands and by revegetation/landscaping.

Native vegetation covers much of the 140 ha development site, with the exception of about 12 ha of introduced grassland in the north-west and about 40 ha of natural bare areas (ie claypans and beaches). Most of the native vegetation will be cleared by the development, including the excavation of waterways, land reclamation (ie tidal flats) and the placement of fill to form allotments. In addition, sea-grasses will be cleared through the construction of 1km long entrance channel into Murat Bay.

Native vegetation on the subject land has experienced a varied disturbance history, being used as a former abattoir, rubble quarry and horse paddock to, more recently, the stockpiling of road-building materials and use by trail bikes. Construction of the Eyre Highway prior to 1950 prevented flooding by high tides of saltmarsh communities associated with the coastal estuary. Otherwise, the site is relatively undisturbed but contains a network of tracks. The south-eastern corner of the site was cleared for farming many years ago. The former has regenerated with extensive native grasses (*Stipa* and *Danthonia*) and introduced plant species. Introduced plant species predominate in some areas, particularly those areas previously cleared for cropping.

The EIS (Section 6.6 and Working Papers 2 & 3) provides a detailed description of the type, extent and conservation value of the native vegetation on the site. Baseline data was sourced from existing databases, site inspections (May 2003 and September 2004) and anecdotal evidence. However, the EIS provides conflicting assessments of the amount and condition of vegetation on the site (eg the Environmental Assessment in Working Paper 2 states that only a limited amount of clearance would be required, which is not supported by the Biodiversity Survey in Working Paper 3, or by subsequent government field inspection).

The proposed site still supports significant amounts of native vegetation comprising the following communities:

- Grey mangrove *Avicennia marina* tall shrubland – small area on intertidal mudflats
- Beaded samphire *Sarcocornia quinqueflora* low shrubland - on intertidal mudflats, interspersed with bare sand and mud
- Nitre-bush (*Nitraria billardierei*) shrubland - on coastal foredunes
- Dryland tea-tree (*Melaleuca lanceolata*) and Sheepbush (*Geijera linearifolia*) shrubland
- Waxy samphire (*Halosarcia pruinosa*) and Beaded samphire (*H. halocnemoides*) low shrubland – widespread on saline flats interspersed with bare clay flats
- Marsh saltbush (*Atriplex paludosa*) low shrubland – on saline sandy flats and low rises
- Yorrell (*Eucalyptus gracilis*) open scrub – limited areas on low dunes (now excluded from the site)
- Angled wattle (*Acacia anceps*) tall shrubland – limited area on low dunes
- Spear-grass (*Stipa* sp.) and Wallaby-grass (*Danthonia* sp.) grassland – on previously cleared land
- About 10 ha of cleared land predominated by introduced grasses

The subject land supports a relatively high diversity of native plants, with the greatest diversity found within the coastal shrublands south of the Eyre Highway (that has now been excluded from the development and will be protected as part of the ‘Restricted Access Area’). Small populations of *Templetonia battii* (rare in SA) and *Ixiolaena pluriseta* (rare in SA) occur in this area.

The proposed clearance comprises the majority of vegetation communities on the site, except for a patch of remnant coastal scrub (ie formerly proposed for residential allotments as Stage 12). A total of around 47 native plant species would need to be cleared. *Kippistia suaedifolia* (which is rare on Eyre Peninsula and is usually associated with gypseous soils) has been recorded in the vicinity of a sand pit on site and is probably associated with spillage of gypsum from the nearby railway. One other species of significance on Eyre Peninsula was also recorded – the uncommon *Halosarcia halocnemoides* (Grey Samphire).

Parts of the site also contain a number of hollow bearing eucalypts that would be used by breeding birds and bats. An area of *Avicennia marina* (Grey Mangrove) scrub and samphire shrubland also occurs along the coast, which are known to be significant as nursery areas for a variety of marine life.

The subject land is located within the Ceduna Environmental Association and the Hundred of Bonython that are estimated to retain 36% and 2% native vegetation respectively. These figures indicate that the district has been extensively cleared for agricultural and urban purposes, and that much of the remaining native vegetation is located along the coast. Although the value of the native vegetation has been reduced by past disturbances, given the small amount of native vegetation left in the Hundred and the lack of a history of grazing impacts, the subject land is considered to have high value as a remnant.

Marine Vegetation

The EIS (Sections 6.11.1 & 6.11.3 and Working Papers 2 & 3) provided detailed descriptions of the intertidal and subtidal flora of the subject part of Murat Bay. The EIS states that the marine survey was undertaken in April 2000 and that this data should be supplemented with by a more recent underwater survey to establish a suitable baseline. However, the proposal has changed (breakwaters and entrance channel now extend further seaward) and no additional subtidal assessments have been undertaken.

A small area of benthic communities, mainly comprising seagrass, would need to be removed for the construction of the entrance channel. The Response (Section 3.3) states that about 2.5 hectares of seagrass (*Posidonia* and *Zostera* species) would be sought for clearance (from the Native Vegetation Council), although the actual area that would be disturbed is 1.25 hectares. It is assumed that the amount proposed to be cleared is a conservative estimate and may allow for unforeseen clearance, such as from erosion or scarping. The proponent has not indicated how the proposed seagrass loss would be adequately compensated for.

The results of the seagrass surveys indicate significant amounts of epiphytic algae on the seagrass in Murat Bay. Given the lack of discharges, this would indicate either nutrient rich groundwater intrusion, or more likely, that the water flow in Murat bay is extremely slow. This would have implications for mixing with the marina and how the nutrients from the marina development will be taken up by the seagrass. A more recent seagrass survey is needed to determine whether the high amounts of epiphytic algae are still present (or even if the seagrass is still present) and whether the algae is having an adverse impact on the seagrass present.

The dredging of the channel (external to the marina) through existing sea grass colonies may undermine the stability of the sea bed floor, thereby leading to increased scarping and erosion of sea grass habitat along either side of the channel. An adequate monitoring program would need to be implemented in conjunction with an appropriate contingency plan to mitigate any adverse outcomes as a result of dredging activities. The monitoring program would need to reveal any changes external to the channel and to ensure that scarping and erosion of sea grass habitat is identified to trigger such contingencies.

Compensation for Vegetation Clearance

The majority of the site would be cleared of native vegetation for construction of the proposed development. However, the proposal has been modified to retain a significant stand of coastal dune vegetation on the western most part of the site, due to the deletion of Stage 12 (ie coastal residential allotments).

In order to compensate for the loss of native vegetation (as required under the *Native Vegetation Act 1991*), the Response (Section 3.3) states that the proponent intends to either:

- a) prepare a management plan (approved by the Native Vegetation Council) that results in a 'significant environmental benefit'; or
- b) make a financial payment to the Native Vegetation Fund.

The required clearance comprises:

- disturbance to approximately 90 hectares of terrestrial vegetation (comprising 80 hectares of sapphire and 10 hectares of sand dunes)

- about 2.5ha of seagrass (*Posidonia/Zostera*) sought for clearance, although the actual area that will be disturbed is 1.25ha;

The area of terrestrial vegetation to be cleared is mostly in a disturbed condition with weeds prominent in many areas and the seagrass community to be cleared is in a good condition.

In accordance with Native Vegetation Council policy, it has been acknowledged that given the condition of the terrestrial vegetation, (mostly intact vegetation but with considerable weed infestation) the standard set aside ratio in terms of net environmental benefit of 10:1 be reduced to 3:1 equating to a 'set aside' area of 270 hectares. In respect to seagrass disturbance, given the good condition of the community, the standard set aside ratio of 10:1 be applied equating to an area of some 200 hectares.

Various options for 'set aside' areas within the district have been discussed with the Council and the Aboriginal Lands Trust, which would require the preparation and implementation of a Management Plan. However, the approach to achieve suitable compensation for vegetation clearance has not been detailed or finalised. This issue would need to be resolved before construction could commence.

In addition, the proponent is prepared to implement a 'restricted area' within Murat Bay so as to limit access and activity within a designated area to the north-west of the development. The 'restricted area' would be designated and managed to limit or restrict access to persons and/or vessels to better enable habitat to be maintained and to reduce disturbance to birds. This will include:

- access control from the development area and along the highway by fencing and signage. Currently this area has open access for pedestrians and vehicles. There are many tracks through the area. These tracks will be remediated. This area is Aboriginal Homeland and the only access should be for the Aboriginal community.
- signage offshore and within the marina to advise of the restricted area for boats. The nature of and placement of signage will be determined in discussion with the Department of Transport, Energy & Infrastructure.

The proponent has not clarified how such controls over Crown Land (ie the tidal flats and seabed) would be imposed. In addition, the Department for Environment & Heritage has advised that public access to the beach should not be restricted. It is also unclear whether coastal dune communities would also be included. There would also need to be some form of agreement (or Development Plan zoning) put in place to ensure that the terrestrial vegetation to be conserved would not be cleared in the future. A Management Plan would also be required.

6.2.2 Native Fauna Communities

The subject land supports a variety of fauna habitats. The terrestrial habitat supports a low – moderate diversity of fauna species (mainly avifauna). The coast is of particular importance because it has an extensive area of tidal mudflats that provide habitat for waders and waterbirds, including many Commonwealth listed migratory species such as Common Greenshank, Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper and Grey Plover. Significant numbers of these species could use the area during September to April.

The data on fauna species was collected from observations made during a limited number of site visits (in late November during extremely hot weather) and existing information from published sources. A list of the birds, reptiles, mammals and invertebrates that were observed or have been recorded for the area has been provided. However, a count of the numbers of each species present has not been undertaken. The description of the fauna on and around the site provides only minimal detail and is qualitative, rather than quantitative. Standard survey and trapping methods have not been employed. Thus, it is difficult to make

a comprehensive assessment of the impacts of the development on local and regional biodiversity or the conservation status of threatened species.

The majority of the proposed site supports native vegetation cover, but due to degrading processes, has limited habitat value for terrestrial fauna. The coastal dunes still contain a narrow strip habitat, comprising coastal shrubland vegetation communities that extend west along the coast to Denial Bay. Due to available remnant terrestrial habitat being restricted to the coastal strip, species diversity is low and dominated by avifauna and species that have adapted to a modified, largely agricultural landscape, particularly introduced species. The EIS (Sections 6.7 to 6.10) provides a description on the likely fauna to inhabit the site, based upon a interpretation of existing literature/databases and visual inspections. Common native mammal species, such as the Western Gray Kangaroo and Short-beaked Echidna may inhabit the site. Birds and reptiles are likely to be the most prominent fauna that uses coastal vegetation.

The EIS (Section 6.7) provides a listing of bird species that are likely to occur in the area and their conservation significance (from Birds Australia counts). The EIS also provides a list of wader species (and numbers of birds) from data collected during the Bird Australia wader counts in 1984 and 2000. However, recent seasonal counts of wader and waterbird populations that use the area have not been undertaken, especially to establish baseline data to monitor the long-term impact on such populations. In particular, there has been no detailed assessment undertaken of the value of the tidal mudflats to migratory shorebirds, nor the potential impacts on these species from the proposed development.

The EIS identified numerous species of conservation interest, including the Blue-billed Duck, Musk Duck, Little Egret, Eastern Reef Egret, Osprey, Rock Parrot, Gilbert's Whistler, Rock Dove (which are all Rare species), White-bellied Sea-eagle, Eastern Curlew, Hooded Plover, Fairy Tern, White-winged Chough (which are all Vulnerable species) and migratory waders (many of which are listed under international treaties for their protection). Significant numbers (ie over 100 birds) of Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper, Sooty Oystercatcher and Banded Lapwing have been recorded in Murat Bay.

Various reports (e.g. Watkins 1993, Wilson 2000) have highlighted the value of the Murat/Tourville Bay area as habitat of national significance for shorebirds. For example, Watkins (1993) identifies Murat Bay as a site of national significance for the Sooty Oystercatcher, Ruddy Turnstone and Grey Plover. Hames Sharley Australia (1989) also recorded the Musk Duck, Eastern Reef Egret, Osprey, White-bellied Sea-eagle, Hooded Plover and Fairy Tern in the Ceduna area. An extensive area of samphire low shrubland occurs around the bay, which could provide habitat for the Rock Parrot (listed as a rare in South Australia) as a post-breeding visitor.

The proposal would impact on a large area of tidal mudflats (and fringing mangroves and saltmarsh communities) of national significance that provides feeding habitat for a significant number of migratory waterbirds.

The proposed construction of the breakwaters and entrance channel would result in a small loss of shoreline habitat used by waders and waterbirds. However, most of the species of conservation significance would be detrimentally affected to a greater extent by human disturbance and other threatening processes resulting from 'people pressure' in the long-term. Fauna that use the site are likely to be discouraged from using habitat in the area, due to the substantial increase in human activity and boating movements.

It is considered that the EIS (namely Section 6.7.2) does not adequately address the direct and indirect impact that a significant increase in human disturbance would have on bird species, especially migratory waders. The wider implications of increased visitation and recreational use of significant conservation areas in the region (especially nearby bays and islands) has not been considered. The EIS states that maintaining current drainage patterns on the tidal flats (ie by including culverts in the breakwater design) would protect existing habitat, especially food sources. It is stated that boat noise and movement may disturb the more sensitive species. The Response (Section 5.1.10.1) states that the location of the marina is not an area where any species is dependant, nor does it contain any invertebrate or flora species

assemblages that are not widespread elsewhere. The Response also states that the potential for the activities within the marina and boating to impact on the migratory birds was discussed with Associate Professor, David Paton (University of Adelaide), who considered that:

- The restrictions on access as proposed will be a positive step.
- The birds should not be disturbed by boating as long as there is no speeding (hooning) in close proximity. This is not possible anyway because it is generally too shallow. The birds will rapidly become accustomed to these changes, as they are not directly threatening.

Whilst the site is on the northern boundary of the township, the potential increase of 1,500-2,500 people in the area would result in considerable disturbance to fauna. This part of the bay currently has a low level of use and disturbance. The main concern for this species is from domestic or feral cat predation, the impact of which could be significant for a species that has very low population numbers. The loss of only a few birds that could visit the area would have serious ramifications for the survival of the species.

With such a large number of residences being established, a considerable cat population is likely to develop (ie a minimum number of 750-1,250 cats overall, based on a conservative cat ownership estimate of 0.5 cats per household). Thus, a cat trapping and destruction program would need to be instigated for land around the site to mitigate this risk. Autopsies on feral cats should be undertaken to monitor whether threatened species are being preyed upon. The use of fencing to prevent cats entering habitat areas would be ineffective and a waste of resources that would better be used for a trapping program.

A necessary mitigation measure for impacts on native fauna would be the control of domestic cats and dogs. There is also likely to be a need to implement a regional fox and feral cat control program, in conjunction with the Department for Environment & Heritage (Parks & Wildlife).

Many coastal bird species are particularly prone to human disturbance, especially from motorboats. This impact is likely to affect migratory birds over a much larger area than the development itself. Birds are also likely to be disturbed when feeding or resting by people using the tidal flats and beach, especially if walking dogs. Interruption of feeding patterns can have a profound impact on migratory bird species that need to build up sufficient body fat reserves for their migration journey. The expenditure of additional energy fleeing a site or searching for alternative feed sources can also reduce body weight and threaten the survival of individual birds.

These impacts could be mitigated by improving the habitat value of remnant vegetation communities, pest animal control, control of domestic pets, limiting access to the beach and public education. The Response (Section 3.3) proposes the establishment of a 'restricted area' within Murat Bay so as to limit access and activity within a designated area to the north-west of the development. The 'restricted area' would be designated and managed to limit or restrict access by people and/or boats to better enable habitat to be maintained and to reduce disturbance to birds. Access from the development area and along the highway would be controlled by fencing and signage. Currently this area has open access for pedestrians and vehicles. This area is owned by the Aboriginal Lands Trust and the only access would be for the Aboriginal community. The many tracks through the area would be remediated. Signage offshore and within the marina would advise boats of the restricted area.

It should be noted that a detailed avifauna survey has not been undertaken and that the brief visual inspections of the site undertaken for the EIS may not give a clear indication as to whether threatened species utilise the habitat found on or nearby the site. In particular, surveys were not undertaken in spring when wader species are most likely to visit the area. Whilst the EIS considers that the proposal would pose a small risk to threatened species, such as migratory waders, there is the possibility that it could pose a moderate risk due to off-site impacts (especially if a precautionary approach is adopted). A loss of local biodiversity would result.

In general, the proposal is likely to have a detrimental impact on local avifauna, mainly due to human disturbance. The impact is unlikely to affect the conservation status of regional populations. Local populations of the waders and waterbird species may avoid using habitat, but would find suitable habitat elsewhere in the region. The proposed mitigation measures, mainly environmental improvements to the dune habitat and the establishment of a 'Restricted Area', may alleviate any negative impacts. The control of cats and dogs would be a high priority. However, there are uncertainties as to effectiveness of these measures or how they could be implemented.

6.2.3 Marine Environment

Discharges to the Marine Environment

The establishment of the marina will create a point source discharge to the marine environment, via the entrance channel. The channel will provide an avenue for potential pollutants originating from the road network and from the residential land and from the boating, commercial, retail, recreational and tourist related uses of the site. The main concerns are:

- elevated nutrient levels, which promote algal blooms and epiphytic growth on seagrass
- heavy metals and hydrocarbons, which both affect the health of marine communities
- sediment, especially fine fractions that attract pollutants and can accumulate as a pollutant sink

Discharges to the waterways would need to be avoided through the careful management of run-off and pollution sources.

The EIS (Section 6.14) calculates the flushing characteristics of the waterways and entrance channel design for various tidal variations (based on statistical analyses of tide data). The results indicate the marina would be well flushed and that there would be no period of poor flushing. A water turn-over rate of every 3.5 days is expected. The northern and eastern most canals are likely to have the lowest flushing rate and careful management would be needed to minimise the input of contaminants (especially nutrients) in these areas of the development. These calculations were based upon the assumptions that the majority of stormwater would not directly enter the waterways and the design of the breakwaters would minimise seagrass wrack ingress, accumulation and decomposition (or that seaweed would be removed on a regular basis)

In this regard, the EIS (Section 6.16) proposes to treat stormwater through water sensitive design measures/devices. In addition, it is proposed to manage discharges from vessels, provide appropriate waste disposal facilities (ie for oil, bilge water, wastewater etc) and to manage hardstand areas.

The nature, extent and behaviour of discharges from the marina into Murat Bay has not been adequately addressed in the EIS (especially dispersion, mixing and water quality implications). Thus, it is difficult to make a comprehensive assessment of the impacts of discharges on the marine environment. The EIS expects that suitable water quality would be maintained in the waterways and that the quality of discharges would not pose a threat to marine ecosystems.

Water quality would be dependent upon the inputs to the system and the processes and conditions within the waterbody. Nutrient inputs leading to algal growth would be the main concern, which could be sourced from the leaching of fertilizer through the sandy soils of domestic gardens and the decay of accumulated seagrass wrack. It is considered that the waterways are likely to be adequately flushed to avoid any build up of contaminants that could be discharged to the marine environment. However, in the absence of detailed modelling to verify this, water quality would need to be monitored to identify and problems.

Despite the implementation of best practice measures to avoid contamination of the waterways, it is inevitable that a low level of pollutants would be discharged to the marine environment. This load is likely to be low and would not have a significant effect on the marine environment. Natural currents and tidal movements would result in rapid dispersal and dilution, so an accumulation of pollutants is unlikely to occur. However, a localised impact may occur in the long-term. Ongoing monitoring would be used to determine the effect of such discharges, especially on water quality and seagrass and reef communities.

It should be noted that seagrass communities are currently affected by epiphytic growth. However, it is uncertain whether this is a natural phenomena or whether nutrient inputs from anthropogenic sources encouraged such growth.

Marine Ecosystems

The main impacts on the marine environment would be seagrass loss associated with the construction of the entrance channel, discharges from the waterways (that may have low levels of contaminants, including sediment) and increased boating activity. The expansion of aquaculture operations (or the establishment of finfish farming) could also have a significant effect, depending upon the level of increased activity (ie number of sea cages and boating movements). Increased recreational boating would result in greater fishing pressure and is likely to affect some commercially targeted species. Offshore reef systems are also likely to be subject to increased fishing activity, which could affect their conservation values.

The EIS (Section 6.11 and Working Paper 2) provides a detailed description of the intertidal and subtidal flora and fauna communities in the part of Murat Bay affected by the development. However, the survey was restricted to benthic communities and no data is provided on other marine fauna, including species of fish, invertebrates, sharks, rays, seahorses, seadragons, pipefish, and marine mammals that inhabit the bay. The survey was conducted in 2000 and no recent data has been collected to determine the current condition of benthic communities. Thus, the EIS focuses on the direct impacts of construction on organisms that inhabit the seabed and tidal flats.

The potential impact of the development on the Murat Bay is difficult to comprehensively assess, as there is a general paucity of information about the intertidal and subtidal habitats. Whilst the EIS fills some of the knowledge gap, a greater level of baseline data would need to be collected to measure the short and long term impacts of the development (if approved).

The EIS considers that the effects associated with construction would be minimal and would not have a significant effect on the marine environment. Inland excavations for the marina basin and canals would be conducted behind a coffer dam to contain sediment and prevent turbidity problems. The dredging of the entrance channel could result in a short term increase in turbidity of near shore waters, but would be minimised by the use of a cutter suction dredge. The coarse nature of the material to be excavated and good tidal flushing would ensure that impacts on water quality and seagrass are likely to be minimal.

The proposed construction methods are considered to be the most effective measure of minimising marine turbidity during construction. Testing of sediments for potential contaminants (including Acid Sulphate Soils) would also be undertaken prior to dredging to determine whether the methodology would need to be modified. The use of clean armour rock for the breakwaters and edge treatments would further reduce the risk of turbidity problems during construction. Core material for the breakwater would also need to be free of fine sediment, such as clay. The greatest incidence of increased turbidity would be when the coffer dam is removed to allow the gradual flooding of waterways. This impact is expected to be of short duration and would quickly dissipate due to tidal movements.

Sediment sampling to the required depth of excavation along the entrance channel has not been undertaken. Thus, it is difficult to assess the implications of dredging for water quality, especially marine turbidity.

The Response (Section 3.3) calculates that approximately 1.25 hectares of seagrass would be cleared. The EIS (Section 6.11.4) states that the entrance channel would be stabilised by either rock or geotextile material to prevent erosion (scarping) and further loss of seagrass. This potential impact would need to be monitored and contingencies put in place for mitigation (such as further erosion control measures).

It is uncertain whether natural recovery of seagrass along the entrance channel would occur on the new substrate.

Further monitoring of seagrass habitat health (annual surveys) in affected areas would need to be undertaken for at least five years to determine whether seagrass loss is continuing or re-establishing. A contingency plan should be developed to address ongoing seagrass dieback. The proponent has only briefly mentioned a monitoring plan which will be undertaken with EPA consultation. It is recommended that the monitoring should include some measure of the seagrass health close to the marina entrance and further away from any development at a similar depth in Murat Bay. This could be provided by a video transect every two years along with an estimate of seagrass cover. In addition, the cause of the reported high levels of epiphytic growth on seagrass should be further investigated. The potential discharge of nutrients could exacerbate any nutrient loading problems that may currently exist in the bay.

The greatest impact on the marine environment is likely to be from human disturbance, especially increased use of the surrounding bay for recreational purposes. A substantial increase in boating activity would not only result in an increased pollutant load on the bay, but would also lead to greater fishing pressure on existing stocks. Disturbance due to boating may also discourage marine fauna from using the area, especially pinnepeds and cetaceans. The nearby Nuyts Archipelago is also likely to experience greater fishing pressure and disturbance from diving activities, which could impact on species of conservation significance. The anchoring of boats for fishing or diving could have a damaging effect on reef systems in the long-term. Permanent moorings points for diving boats may need to be installed if this becomes a problem (especially if commercial diving enterprise are established).

The provision of infrastructure for the aquaculture and commercial fishing industries is likely to lead to an expansion of such activities and a consequent increase in associated impacts.

6.2.4 Off-site Implications

Human Activities ('People Pressure')

The proposal would result in a significant increase in the residential population and number of visitors to the Ceduna area, albeit over a 10 year period. This would lead to greater 'people pressure' on the surrounding environment, including beaches, coastal dunes, offshore islands and other sensitive ecosystems in and around Murat Bay. Nearby ecosystems and habitat areas would experience greater visitation and other impacts, such as pest plants and animals (especially cats and dogs), illegal dumping and off-road vehicle use. Greater use of the area leads to greater disturbance of fauna, coastal erosion, litter and pest plants/animals (especially garden plant escapees). The marine environment can also suffer problems such as increased fishing pressure, disturbance of marine fauna from boating movements and recreation (especially marine mammals such as whales, sea lions, seals and dolphins) and litter.

The Response (Section 3.3) proposes to minimise the impact of human disturbance on the surrounding environment by establishing a 'Restricted Area' for part of Murat Bay and fringing coastal vegetation. It is uncertain whether this measure would be effective or even able to be implemented. Any improvement of the conservation value of the adjacent dune ecosystem would be of benefit for local biodiversity, but is unlikely to mitigate the long-term impacts on the wider environment resulting from the substantial increase in human disturbance.

In particular, populations of threatened species in nearby bays and offshore islands could be significantly affected by increased visitation and recreational use, due to damage to habitat, disturbance during

breeding and nesting seasons or disturbance to feeding activities. In addition, the effects of 'people pressure' from increased resident and visitor numbers would also have a detrimental long-term effect, including litter, erosion, dogs, camping and trampling or removal of vegetation. The beaches and dunes west of the site would be most affected. Bosanquet Bay, which lies to the south of Ceduna, is likely to be used for recreation to a greater extent, as it provides wide, clean beaches and good swimming.

Increased seagull population, resulting from the provision of food sources and roosting sites within the marina, could lead to threats to native bird species. In particular, increased predation of eggs and competition for nesting sites could affect populations on offshore islands. This problem has developed in Port Lincoln since the establishment of the marina and aquaculture operations.

Recreational and Commercial Boating

The Response (Section 5.1.10.2) states that tourism and increased visitor numbers are being actively pursued, with water-based activities being the main attraction. Local boat ramp data indicates that there are between 210-330 boat movements/week. Assuming this means boats coming and going, approximately 15 – 23 boats are launched per day. Similar figures are also quoted for Smoky and Denial Bay ramps, although a significant proportion of launchings are likely to be for the aquaculture industry. The Response predicts that the marina would only result in a 10% increase in boating movements (based on approximately 96 boat movements per week). These estimates have not been thoroughly researched and are likely to have significantly underestimated the potential number of boats that could be launched from the marina development. In particular, the predictions do not consider the number of recreational boats that would be moored to waterfront allotments (which could total over 400, if both single dwelling and medium density allotments are considered). In addition, the modified proposal now includes a boat ramp, which would encourage greater use by visitors and residents who do not have private moorings.

The use of average figures of boating movements is also misleading, as peak periods are the most critical. It is expected that the greatest number of boating movements would occur during spring and summer, which coincides with the breeding season for native fauna and the presence of migratory waders.

Additional boating movement could also be generated by fishing charters and scuba diving charters.

The EIS does not address additional boat movement related to commercial fishing and aquaculture. These industries are to be encouraged to expand or establish through the provision of a commercial harbour. Experience from other commercial marinas indicates that the aquaculture industry can result in a significant amount of boating traffic, especially for the daily delivery of feed. The level of additional boating movements generated by the marina would be dependent upon the extent and type of aquaculture undertaken in the bay. Additional boating movement could also be generated by commercial fishing boats if existing fishers in the region relocate (such as from Port Lincoln) or if existing fisheries expand or new fisheries develop (such as for pilchard or shark).

Thus, it is considered that, when the development is fully completed, there would be a substantial increase in boating activity above that which this part of the coast currently experiences.

Commercial Fishing and Aquaculture

The surrounding bays (especially Denial and Smoky Bays) are used for Oyster and Abalone aquaculture. Murat Bay has the potential for the sea cage farming of finfish species, such as Southern Blue-fin Tuna, Yellow-tailed Kingfish, Trevally and Snapper. The provision of suitable infrastructure could also encourage existing shellfish farming, including Mussels.

An indirect impact of the proposal on the marine environment could be the potential increase in aquaculture operation in Murat Bay, though the provision of infrastructure and facilities. This could lead to a greater number of cages being established and a consequent increase in the loss of seagrass due to

scouring by anchor chains. This effect would need to be minimised through appropriate design of anchor points. An increased nutrient load would also be added to the bay due to the excreta of fish waste and, to a lesser degree, feeding operations. The cumulative impact of increased aquaculture and nutrient discharges from the marina may pose a long-term concern for water quality (including the risk of algal blooms).

These impacts can be minimised by ensuring adequate flushing around cages (and establishing a sustainable number of cages in the bay or having cages in deeper water) and the use of a pelletised feed source. The monitoring of water quality in Murat Bay would enable the detection of pollution problems that could develop over time and the identification of implications for human health, the marine environment and aquaculture. Being a low wave energy coast, flushing rates may not be adequate to ensure nutrient loading does not result in environmental harm.

Finfish aquaculture farms are known to pose a risk to sea lions and seals, in terms of entanglements in sea cages and the shooting of wildlife, which could have a detrimental impact on species with low population numbers (potentially reducing recovery rates). Their interactions with farms (damage to gear and stock predation) can also pose significant economic costs to operators. Southern Bluefin Tuna farms near Port Lincoln have recorded fatalities of Australian Sea Lions, whilst Atlantic Salmon farms off Tasmania have recorded deaths of fur seals. Most deaths are related to entanglements in anti-predator nets or shooting. The level of impact of aquaculture on seal populations is difficult to quantify as mortalities are generally under reported and/or carcasses are not recovered.

In the Murat Bay area, impacts on seal populations could be significant, as even a low risk could be detrimental to species that have very low population numbers (and are at the limits of their range) and/or breed infrequently. The Australian Sea Lion is the species most vulnerable, especially as it feeds along inshore waters, has limited distribution and low abundance and breeding rates.

Aquaculture also has the potential for the introduction and spread of introduced marine species and/or diseases, through boating movements, cages providing a surface for colonisation and the use of imported feed. Pinnepeds could be affected by diseases introduced by imported feed.

The current commercial fishery also has the potential to expand. The region includes major scale fisheries, including Whiting, Garfish, Snapper, Squid, Shark, Prawns, Lobster, Scallops and Abalone. The offshore waters also support significant deep sea fisheries, located off the continental shelf and in the Great Australian Bight. There is a potential that some of the existing commercial fishers could use the marina as a permanent base or for temporary mooring, especially if infrastructure is developed (including that used for the storage, processing or value adding of catch). Increased commercial fishing could have an impact on marine fauna due to competition for prey species, entanglements in nets/hooks, mortalities as bycatch, disturbance of the seabed from trawling, interaction with boats and litter. Aquaculture could also encourage additional fishing activity for feed stock, such as pilchards that are important for seal, sea lion and seabird populations. For example, Fairy Penguin mortalities in Victoria may have been a result of starvation, due to depleted Pilchard numbers.

There currently is no Aquaculture Management Policy for Murat Bay, nor has a draft policy been prepared. The Department for Primary Industries & Resources has prepared policies for other bays in the region (such as for Streaky Bay) to establish zones for current operations and for the potential expansion of the aquaculture industry in a carefully managed manner.

Nuyts Archipelago and St Francis Isles

The numerous collections of island that lie offshore from Ceduna are within easy reach by boat and are expected to be subject to greater visitation for recreation and tourism. In particular, St Peters Island is the largest island and is the closest to the mainland. It also has some of the highest conservation values of the islands, especially as habitat for threatened species (some of which are extinct on the mainland and have been reintroduced). In particular, the islands provide internationally important breeding, feeding and

resting sites for the endangered Australian Sea Lion and New Zealand Fur Seal. The islands are also important sites for threatened bird species, especially migratory waders. Reef communities support a high diversity of species and represent pristine ecosystems that have not been affected by recreational fishing. Murat Bay and surrounding embayments provide feeding habitat and nursery areas for many of the species that inhabit islands and reefs.

Increased nature based tourism would need to be carefully controlled and managed. In particular, the potential establishment of Great White Shark viewing tourism opportunities would need to consider the impact on sea lion and seal populations (ie increased shark numbers and predation).

6.2.5 Implications for Biodiversity

In conclusion, it is considered that the proposal has the potential to result in a range of impacts that have implications for biological communities and conservation values of the wider region (especially the marine environment). It is expected that the proposal would directly result in a significant loss of terrestrial and marine native vegetation. The clearance of coastal vegetation can easily be compensated for by revegetation and the protection and environmental improvement of nearby remnant stands. Existing coastal dune and intertidal habitat adjacent the proposed site would be detrimentally affected by threatening processes associated with urban encroachment, especially human disturbance and pest plant and animal species. Similarly, the marine environment of Murat Bay would be affected by greater human use (ie boating movements, fishing, diving, litter and aquaculture), potential discharges of pollutants and the possible introduction or spread of marine pest species.

The combined loss and disturbance of coastal habitat in the local area could have a significant detrimental effect on fauna. Due to high vegetation clearance rates and a low level of native vegetation remnancy, the proposal could have a significant impact on local biodiversity in the region. The main biological implication of the proposal is the establishment of a substantial resident population and a larger increase in visitors to the area that will result in a high level of 'people pressure' on a relatively undisturbed area. In particular, the direct and indirect loss of intertidal habitat for migratory waders could be significant. A lack of data on use of the area makes a comprehensive assessment of the impact difficult. Urban encroachment would deter fauna from using this habitat unless suitable buffers are established. In addition, anthropogenic impacts (especially a substantial increase in domestic/feral cat numbers, the walking of dogs, increased use of local beaches, off road vehicle usage) would significantly increase the level of threatening processes on the surrounding environment.

Providing resources to improve the management of the habitat value of nearby coastal communities would help mitigate the effects of the proposal to the west of the site. The detailed management of remnant vegetation on and adjacent the site and the establishment and management of the 'Restricted Area' would need to be addressed in the Native Vegetation Management Plan.

The direct impacts on the marine environment (ie seagrass loss) can only partly be compensated for by the possible regeneration of the entrance channel. However, a net loss of seagrass will occur due to the construction of the channel. Further loss of seagrass resulting from erosion along the edges entrance channel would need to be mitigated through strategies developed as part of the Sand and Seagrass Management Plan.

The off-site impacts (ie from increased boating activities, recreational use of the coast and an expansion of aquaculture and/or commercial fishing) would significantly increase the level of threatening processes on marine flora and fauna, possibly to a greater extent than on-site impacts. The offshore islands and surrounding embayments have high conservation value (with some being classed as pristine), especially as they provide habitat for threatened species. In particular, increased human disturbance and aquaculture could have a significant long-term effect on marine mammal species, especially the endangered Southern Right Whale and Australian Sea Lion. Whilst on-site impacts (ie vegetation clearance) can be compensated for, the off-site impacts are more difficult for the proponent to manage.

From a broader perspective, the establishment of a commercial/recreational marina and residential waterfront development has the potential to erode the conservation values of the area, which may reduce its potential for Marine Protected Area status. Therefore, the State Government would need to monitor and manage the majority of off-site impacts, especially on conservation reserves in the region.

6.2.6 Marine Pests

This type of development has the potential to increase the risk of marine pest introduction and establishment through physical disturbance and boating movements. The excavation and construction process would remove existing marine communities and result in a 'clean surface' for pest species to establish themselves upon. Whilst only of short duration, the reduction in competition and slow recolonisation by native species could allow fast colonising introduced species to become established, especially from existing pest populations in the bay or machinery and equipment brought on-site. Pest species could also be introduced by commercial and recreational boats, especially those that have visited harbours or areas where pest species exist. There is also the potential that pest species could be introduced via the disposal by residents of plants or animals from aquariums.

The EIS (Section 6.11.7) recognises the threats from marine pests and the potential that the marina would support an assemblage of introduced species. Pleasure craft have been identified as a more likely vector for marine pests than larger boats (particularly for hull fouling species), although fishing vessels can be agents for new introductions (particularly those that use bottom trawling or dredging equipment). Visiting vessels from major ports, such as Port Adelaide, present the highest risk.

It is considered that the risk of marine pest introductions resulting from the marina would not be high. Boats visiting from other ports would be of low frequency, although the marina does provide a stop-over destination for large recreational vessels cruising around the coast. The greatest risk would be posed by recreational and commercial fishing/aquaculture boats that could spread an introduced species if it became established in the marina. Thus, the range and distribution of existing marine pests in the region could be expanded. It should be noted that the marine ecosystems in Murat Bay (and the West Coast and Eyre Peninsula regions in general) are not currently affected by introduced marine species, so the initial risk is very low. However, the introduction and spread of a marine pest would have significant implications for local marine ecosystems and fishing industries.

The Department for Environment & Heritage considers that an annual inspection of the marina waterways and structures to detect and eradicate pests before they spread to the wider marine environment, as proposed in the EIS, is not sufficient. Thus, the frequency of inspections would need to be increased, particularly during the initial stages

The EIS and Response state that ballast water would need to be managed to reduce this risk. However, it is unlikely that any ships that are large enough to require ballast would visit the marina. Large ships using the port of Thevenard would pose a greater risk and ballast water would need to be managed at that facility to reduce the risk of marine pest species becoming established in the marina. For this reason, a high degree of monitoring would be warranted.

6.2.7 Coastal Processes

Murat Bay has a low energy coastal environment with extensive shallow flats extending out from the beach and exposed at low tides. This has resulted in low levels of sand movement along the coast.

The EIS (Sections 6.2 and 6.3) addressed issues relating to sea level rise, sand movement and seagrass and debris accumulation in the channel and marina. Batters, breakwaters and fill heights have been determined to withstand anticipated seawater level increases and storm surges. On this basis, the

proponent has adopted a minimum general fill level of 3.2 m AHD and a minimum building floor level of 3.7 m AHD to take into account the potential for sea level rise.

The EIS states that, provided the channel sides were stabilised (either naturally or with rock protection), the deposition of sand would be minimal, but some sea grass would accumulate. The construction of training walls outside the breakwaters which, in addition to dissipating wave energy, would cause sand and seagrass to accumulate in the re-entrant corners where the training walls join the breakwaters (thereby being more accessible to removal by land based equipment), rather than moving into the marina entrance and waterways. The revised layout in the Response includes these training walls.

The EIS concluded that sand and sediment movement and the deposition of seagrass are not anticipated to be a significant factor in terms of impacts on the access channel to the marina, and on this basis maintenance dredging of the channel would be infrequent. The proponent has indicated that discussions would be had with the Coast Protection Board when maintenance dredging is required and appropriate methods and disposal options of the dredged material determined.

In conclusion, no large sand interception issues are expected as a result of breakwater construction. Erosion impacts on the dredged channel may also be minimal, although tidal movement (as water ebbs at low tide) and storms may produce some scouring that would require some repairs if the channel batters are eroded. Low profiles on the batter sides and inshore protection against erosion would protect the channel from scouring and slumping.

Any sand and seagrass moving along the coast is expected to be trapped by training walls and removed by land based earth moving equipment. Periodic maintenance of the channel will be required and sand and seas grass build up on the breakwaters will have to be excavated and moved. The frequency and extent of these operations will depend on storm frequency and wave movements. Monitoring on a continued basis will be required to deal with issues as they arise and establish patterns in local sand movements.

6.2.8 Water Quality of Marina Basin & Waterways

The establishment of the residential component has the potential to impact on water quality through the discharge of pollutants such as herbicides, pesticides and fertilisers directly to the waterways.

All potential discharges into the waterways would need to be controlled, through the management of pollutant sources, spills and stormwater, in order to protect water quality

The EIS considers that the waterways would be well flushed during normal tidal conditions over a three to five day cycle. However, the project detail does not provide modelling to adequately demonstrate the level of flushing that will occur.

6.2.9 Water Quality in Murat Bay

The EPA recommends that the proponent use the "WHO Guidelines for safe recreational water environments" and the ANZECC Guidelines for *E-coli* in shell fishing waters as well as the SASQAP monitoring guidelines. It is foreseeable that with the increase in houses and effluent, stormwater discharge may increase the amount of bacteria in the water after periods of heavy rain. This may be a concern given the proximity of oyster farms. The proponent should provide details of:

- the current tidal speeds in Murat Bay and
- the direction in which any plume of discharged water from the development will move.

This may be an issue if water discharged from the development moves towards the township swimming beach or the oyster farms.

6.3 EFFECTS ON COMMUNITIES

6.3.1 Construction and Operational Workforce

The EIS (Section 7.1) states that a large proportion of the workforce would be sourced from the local and regional community and that the effect of the employment impact in the first few years of the development would be substantial.

A demographic breakdown of the local and regional residents has not been undertaken and therefore it is impossible to assess whether there are people who are likely to be available and skilled to take up these employment positions. It has not been possible to undertake such a demographic investigation of the Ceduna area as part of this assessment in the time available. The EIS (Working Paper 4 of the Appendices) indicates that the resident population of Ceduna is 3,500. The only other relevant piece of information provided is that indigenous people comprise 22% of the total population and that some of these people have been involved in previous employment schemes operated by the Council. It is proposed that a similar indigenous employment scheme be implemented by the proponents of the marina.

The EIS estimates that approximately 129 employees will be required for the first few years of the development and that there is enough existing accommodation to accommodate any workers imported from outside the region. However, the EIS (SA Centre for Economic Studies report in Working Paper 4 of the Appendices) contradicts this assertion by stating that there is a shortage of rental housing and a capacity constraint of existing accommodation at certain times. In addition, the skills required for the development of the marina will also be in demand for other development projects in Ceduna and also any proximate mining developments.

Section 6.5 of this report provides a discussion on the economic benefits to Ceduna.

It is concluded that there are probably enough trained and available local employees to undertake the tasks required. If not, the proponent will invariably import them from elsewhere especially for the initial few years of the development. After the marina is established the workforce numbers will decline substantially in any case.

6.3.2 Aboriginal Employment Opportunities

This is adequately discussed in the EIS (Section 7.2 and Working Paper 4 of the Appendices). As discussed above, it is unknown what competing demands for employment will have on Aboriginal employment.

There is a strong commitment from the indigenous community to be involved in Commonwealth Department of Employment Program (CDEP) scheme projects which offer training in the community for skill development. It is expected that a scheme of this sort would be implemented for the development of the marina. However, a growth in ongoing jobs offers the possibility of long term improvement in social well being and housing.

6.3.3 Community/Cultural Centre

The nature of the proposed community centre has not been clearly defined by the proponent. The EIS (Section 3.6) states that a Community Centre would be developed that would form an important focus for cultural, recreational and leisure activities for the Ceduna Community. However, the Response (Section 5.2.7) states that a Cultural & Interpretive Centre, that provides a tourism venue, could be developed. Now it appears that a Community & Cultural Centre would be developed. The proponent has publicly stated that the centre can be 'whatever the community want'. In addition, there is no information on the

urban design of the community centre, its size or height, the amount of car parking to be provided or any other details.

Without any clear direction it will be hard to determine who might use the centre and for what purpose.

Nevertheless, the Department of Health supports the concept of a community centre to enhance social inclusion and the centre should be assisted by the Council undertaking consultation and collaboration with local groups on the form of activities to be undertaken in the centre.

Whilst the EIS indicates that the centre would be located on the south-western boundary of the site (for the purpose of integrating the development with the township), it will be physically cut off from the rest of the development by the diverted Eyre Highway and associated acoustic protection mound. This road will carry heavy vehicles including road trains and no pedestrian crossing will be provided for safety reasons. A pedestrian bridge over the highway may be needed to connect the development site with the Centre and other adjacent recreational facilities (especially the golf course and sports oval). Public access points may also be needed in the acoustic protection mound.

6.3.4 Public Facilities

The proponent has agreed to provide a number of community facilities and public use infrastructure, including walking trails and public open space. It is not certain that the proponent or the Council intend to provide public facilities like public toilets or public phone/communication facilities or public seating. The issues were raised in the Guidelines document and have not been addressed by the proponent. Facilities of this sort may be provided in the community/cultural centre but they would also be needed in the marina. Private facilities within commercial enterprises are a separate matter and their provision should not be relied upon for public use.

There are no usable land-based open space reserves within the development. The open space areas are either to comprise waterways or be used for noise attenuation or stormwater management. There are no recreational facilities for children (or grandchildren) or families apart from boating/marina focus. There are no playgrounds or casual picnic areas or areas to kick a ball.

In regard to the land division that would be sought for the site, the EIS has not calculated the 12.5% open space contribution (of financial compensation payment to Council) that would be required. It is expected that the inclusion of waterways as open space would fulfil this requirement. From a community perspective, the waterways do not provide the traditional form of reserves that would be expected. The waterways would have limited useability, being predominantly utilised for power boating. Swimming would be prohibited (due to safety and water quality concerns), power boats may pose a risk to small boating (especially sailing and canoeing) and fishing would be restricted to areas where public access is provided.

The proposed development will dissect the beach through the construction of the breakwaters and channel. This will result in restricted public access across the beach from east to west. The Department for Environment & Heritage advises that appropriate and unrestricted public access to the coast is maintained to car parks, breakwaters and boat ramp facilities.

6.3.5 Public Service Providers

There is potential to substantially increase the number of residents at Ceduna from this proposed development. It is estimated that anything from 1500 people up to 2,500 people could be accommodated in the marina development in the long-term. Any increase in population in a remote/rural area will automatically increase the demand for health services. Any increase in emergency retrieval services

(provided by the Flying Doctor) is likely to add significant cost pressures due to the increased retrieval and visiting services.

The Ceduna District Health Services has ageing infrastructure and, although identified as a priority for upgrading, there is no budget allocation to address this issue. The proponent counters in the Response Document that increased population will strengthen arguments for improved services which can be phased in over the 10 year development program. This is not agreed with by the Department of Health.

There is a limited existing aged care facility of 10 beds attached to the hospital which would probably need expanding due to higher demand coming from the residents of the marina.

It is not known how many children might be living in the marina, but on past experience with marina development, it is likely to be few. It is not known if there will be any impact on the educational services providers in Ceduna.

In terms of existing private health and wellbeing businesses in the town (ie doctors, dentists, physiotherapists, chiropractors, homeopaths etc), the proposal should provide support and possibly growth in some areas. The town population has been declining for some time and this must have had an impact on commercial operations within the town centre. The proposal when fully developed will be important for the stability of the commercial sector.

It is not known what impact the development would have on existing non-government organisations (NGO's) like domiciliary care, district nurse or meals on wheels organisations. It is likely there would be some increase in demand.

There may be an impact on the service provided by the Child Youth and Family Services in terms of it's assistance program on budgeting for aged people and those on limited incomes. This service is already struggling to provide good service.

Health Services will require expansion due to a proportional increase in demand and nature of health services especially with change to age profile in the town. The cost of these expanded facilities both in terms of capital and ongoing operational costs have not been determined due to the fact that the age profile, disability profile, ethnicity and permanent residency has not been determined by the proponent. The proponent's position is that the supply (of health and other services) will automatically follow the demand.

Aboriginal health may improve with the provision of extra health resources but this is not a given and needs specific attention by the providers of such services.

6.3.6 Integration with the Ceduna Township

The marina development is separated from the township of Ceduna and, like the Lincoln Cove Marina and canal estate at Port Lincoln, will have its own identity. Similar to Lincoln Cove, the main 'linkages' to the town will be the walking/bike trails and use of the public facilities provided by the proponent, like the hotel, restaurants, cafes and sporting/cultural facilities.

Apart from visiting an attraction provided by the development that is not available any where else in Ceduna, such as the waterfront hotel or walking around the public parts of the marina waterfront, it is expected that there will not be much integration with the rest of the town. For the indigenous community that currently walks from outlying settlements to Ceduna, a detour around the marina will now be necessary.

6.3.7 Social Inclusion/Integration and Harmony

Ongoing social problems are mentioned in the EIS and are an issue for the wider Ceduna community. The proposed development will do little to address the issue in itself and the design of the proposal takes little cognisance of the adjacent indigenous communities resident in the town, the transitional accommodation program, the homeland settlement and surrounding communities as far away as Oak Valley. Ceduna tends to be a meeting place for many of these outlying communities as well as a source of supplies. The marina is located such that it is between the indigenous community settlements and the town centre.

It could not be said that the proposal in its current form will encourage social inclusion and integration with the surrounding indigenous and multi-cultural society that characterises the far west coast.

The proponent is encouraged to consider implementing processes to deal with the issue of social inclusion/harmony between the indigenous and non-indigenous communities as social inclusion/harmony is a determinant of health.

6.3.8 Noise

In terms of construction noise the following activities are applicable:

- Excavation of the waterways, transportation and placement of soils either to spoil or for building platforms.
- Offshore dredging works.
- Operation of dewatering pumps

To reinforce the control of noise during construction, it is recommended that the proponent refers to the noise requirements in the EPA *Handbook for Pollution Avoidance on Commercial and Residential Building Sites 2004*, in finalising its management and monitoring documentation. This Handbook indicates that construction noise levels in residential areas should not exceed 45dB(A) outside of standard construction hours and, in particular, that noisy activities should not occur before 9 a.m. Additional noise control measures that should be included by the proponent, are outlined in the EPA's Handbook and include:

- Appropriate siting of noisy machinery and the use of proprietary sound reduction measures (e.g. mufflers for relevant equipment for which proprietary treatment is available)
- Regular servicing and maintenance of plant and equipment, particularly for mufflers and other noise control devices
- Provision of a noise monitoring program during construction, and
- Provisions to notify the adjacent community of proposed start and finish times for construction activities, including any activities which may have a potentially greater noise impact.

In terms of operational noise the following are applicable:

- Loading, unloading, fuelling and maintenance of commercial fishing vessels, and rigging noise.
- Building construction.
- Transport impacts from commercial activities.

- Entertainment activities.
- Service infrastructure

The EIS (Section 6.29) states that that noise would be generated during construction, through the range of activities within the marina when completed and operational, and also as a result of re-alignment of the Eyre Highway and the presence of the railway line. The proponent indicated it would comply with EPA noise policies and the following measures:

- Construction of 3 m high acoustic mound between the residential development and the re-aligned Eyre Highway and the railway line
- Separation of potentially incompatible land uses
- Containment of noise sources within building and enclosures of suitable design, siting and layout
- Management of point sources
- Insulation and other acoustic measures to ameliorate impacts on sensitive noise receivers

In its response the Department of Health (DoH) indicated that there had been no assessment undertaken to determine background noise levels, prediction of noise impacts and comparison of anticipated noise levels to current standards. The DoH also indicated that health effects could occur if exposure to noise levels exceeded WHO standards.

The EPA indicated that the proposed 3 metre high acoustic protection mound would have negligible benefit for mitigating noise from rail locomotives and the vertical exhaust associated with articulated road transport. In addition it indicated that a number of design considerations would need to be incorporated into the residences to ensure that noise impacts were consistent with maintaining the amenity of the residential areas. The EPA also indicated the development should be designed to provide a major outdoor area for each individual residence that limits the noise level associated with road and rail traffic to 52 dB(A) (taken to be an equivalent noise level over the period 7am to 10pm). This should be achieved through separation, acoustic mounding, building orientation, continuous fencing (including points of access), and the like.

The residential building facade and other measures such as separation, building and floor plan orientation and layout, continuous fencing, mounding and the like, should be designed to limit the noise level inside the dwelling associated with road and rail traffic.

The internal noise level should ensure the potential onset of sleep disturbance effects does not occur within the bedrooms and that the maximum limits within living and work areas of the proposed residence achieve the maximum limits prescribed by AS/NZS 2107 "Acoustics - Recommended design sound levels and reverberation times for building interiors".

The onus of proof that the noise reduction measures prevent adverse noise impacts will rest with the proponent.

The following general treatments should be considered in achieving the recommended limits:

- Use of separation, building orientation, sheds, continuous fencing and mounding to reduce noise levels outside of the residence
- Locating less sensitive areas of the proposed residence such as the kitchen, storage areas and laundry towards the traffic noise source
- Minimising the size and numbers of windows oriented towards the traffic noise source
- Replacing conventional pitched roof / eaves designs with flat roof / parapet designs

- Using construction techniques that seal air gaps around doors and windows
- Relocate conventional wall air vents to areas not facing the traffic noise source
- Using solid core doors in conjunction with rubber seals and internal doors with rubber seals into habitable rooms to provide an “acoustic air lock” arrangement.
- Using thicker window glass or double-glazing to critical rooms such as bedrooms.

Providing alternative means of ventilation for rooms where elements such as windows in the dwelling facade are to be closed to provide a minimum acoustic performance.

The proponent commissioned a preliminary environmental acoustic assessment to obtain qualitative information on existing noise levels and potential impacts of the proposed development on the residential component of the proposed development. The report considered the potential sources of noise, including noise from aircraft, the railway line, traffic on the Eyre Highway and on local roads, and noise from commercial areas of the development.

The report concluded the following:

- EPA day time and night time Laeq criteria of 52 dB(a) and 45 dB(a) to be applicable for the residential areas of the development
- Recommended internal Laeq noise levels of 30-40 dB(a) and 35-45 dB(a) for bedroom and living areas respectively
- The EPA night time criteria and sleep disturbance criteria could not be met with the mound and barrier approach unless the bedroom windows are closed
- Noise sensitive spaces be located away from the railway and highway with windows and openings directed away from the railway and highway
- Thicker glazing be installed for the windows to the noise sensitive spaces
- Windows in noise sensitive spaces to be closed during the night time

The Response (Appendix G) also recommends that the acoustic protection mound and fence/barrier be increased to a minimum height of 5.70 metres in order to meet the EPA daytime noise criteria. The Response also recommends that, whilst noise from the marina and commercial activities is not expected to significantly affect the residential areas, care should be taken for the apartments located close to the commercial area.

The proponent considered that these measures should enable the proposal to proceed.

It is considered that while these options could be technically feasible they would result in the development appearing like an enclosure and the requirements to have all noise sensitive windows facing away from the highway and railway line and closed during the night as impractical and unrealistic. There would be a considerable cost burden for allotment owners to meet these requirements for domestic dwellings and tourist accommodation. There is also likely to be a reduced quality of lifestyle for a significant proportion of residents.

The marina and commercial areas (and associated activities) would need to be suitably managed to minimise noise impacts, including:

- restricting activities associated with the fishing vessels (such as to between 7am and 10 pm)
- early departure of fishing vessels

- Vessels with rigging will be required to use spar and rigging separators to eliminate as far as is practicable rigging impact noise
- entertainment activities will be required to incorporate noise prevention and abatement measures

It is concluded that noise impacts during construction and operation of the proposed marina are able to be managed. Accordingly, the proponent will be required to prepare noise monitoring and management protocols for incorporation in relevant construction and operational management plans and these are to be consistent with EPA requirements. However, there are significant concerns with the proposed mitigation measures for noise impacts on the residential areas from the railway and Eyre Highway. While these could be argued to be technically feasible they do not appear to be practical or realistic and would require further work. The design of housing and noise amelioration would need to be addressed in the Plan Amendment Report proposed by the Council, to ensure noise sensitive design is used in areas exposed to noise.

6.3.9 Air Quality

The EIS (Section 6.28) considers that the only significant potential source of air emissions is related to dust from construction activities. In addition there is potential for odour emissions from the wastewater treatment plant and seagrass wrack if allowed to accumulate or is inappropriately managed.

Dust Emissions

Dust emissions would occur mainly during the construction phase from the following sources:

- excavation of the waterway
- establishment of finished platform levels for the residential development
- transport of soil to and from stockpile areas
- from the site access roads and haul roads
- completed, but undeveloped allotments

The proponent has acknowledged that site management measures will be required during construction to ensure that potential impacts are minimal and the general management principles have been provided in section 10 of the EIS.

In addition to potential environmental harm associated with uncontrolled dust emissions to the adjacent coastal and marine environment and reserve areas, dust can also have social implications. These include the 'nuisance' factor, but may also pose a potential health risk to adjacent residents/landowners (particularly with stage development) and employees/contractors, with the possible exacerbation of respiratory illnesses (e.g. asthma, bronchitis).

The proponent expects that there will be no long-term dust impacts in the local environs as the soils are predominantly sandy in nature and implementation of appropriate management measures such as:

- Control of traffic movement
- Controlled application of water for dust suppression
- Establishment of silt fences to prevent the transportation of sediment off-site

- Staging to reduce the overall impact and to minimise interaction between stages

Section 7.1 of this report refers to the draft Site Construction Environmental Management Plan (CEMP) that has been prepared by the proponent.

It is concluded that the proposed development will not be a significant source of dust pollution, once completed (if approved). There is potential for dust emission during construction, but this should be manageable, provided that the mitigation and management measures are implemented in accordance with a final approved CEMMP and that the effectiveness of these measures are continuously monitored.

Odour Emissions

The proposed development also has the potential to generate odour emissions during operation through the reuse of treated and recycled wastewater for irrigation purposes on the adjacent golf course, and the waste water ponds (if anaerobic conditions occur) and the accumulation of seagrass wrack.

The proponent has not conducted any odour source modelling (e.g. units of odour measurement), or provided any baseline information of existing odours in the local environs. This is not considered to be a major omission given the proponent's overall conclusion that there is an adequate separation distance between the proposed residential areas and the wastewater ponds and that the irrigation of wastewater will be undertaken in accordance with a management plan. These issues should be confirmed following detailed design and approval from the EPA and the Department of Health.

The removal of seagrass wrack is an activity that is controlled by PIRSA (Fisheries) and the proponent will be required to liaise with PIRSA to develop appropriate collection and disposal options. The proponent has indicated that it does not expect significant volumes to accumulate as a result of its breakwater and marina design.

To reinforce the odour management process, it is also recommended that the proponent refer to the EPA's *Guidelines on Odour Assessment, Using Odour Source Modelling 2003*, which also outlines 'best practice odour management'.

It is concluded that odours are not expected to be significant. However, it is still important that the proponent and or Council monitors potential odorous emissions associated with the treatment, reuse and storage of any wastewater. In addition appropriate management measures for seagrass wrack will need to be documented in a management plan to ensure that objectionable odours do not occur.

6.3.10 Amenity

This is discussed in section 7.4 of the EIS. There is nothing to add to that discussion. The issue of seagrass management is addressed elsewhere in this report.

It is considered that the proposal would provide an interesting feature to the area that would have its own amenity value, depending upon streetscaping and the design and consistency of built forms and appearance. However, the acoustic protection mound would block views of the development from the Eyre Highway.

6.3.11 Residential Character

The proponent has not provided a clear indication of design themes, expected built appearance, streetscaping/landscaping or an idea of the overall 'look' of the development. There is also only a minimal amount of useable open space reserve or 'green areas' provided. This would require details to be submitted by the proponent to Council and managed through the Plan Amendment Report (PAR) process.

The housing to be developed in this marina is not the subject of the EIS assessed here, as Council will be the decision-making authority after the rezoning of the site (ie through a PAR process). It is expected that there will be a significant amount of medium density housing and an expectation of a maximum of 2-3 storey development on parts of the site.

It is not agreed that residential allotments within the development would fall within the description of 'affordable housing'. It would be expected that the annual income levels for the majority of existing Ceduna residents would effectively preclude them from being able to afford an allotment and house in the marina. The Response (Section 5.2.4) states that Council has strategies in place to improve access to the real estate market for lower income families and first home buyers elsewhere in Ceduna.

The State Housing Plan has as a target 15% of affordable housing within new developments (including 5% for 'high needs' housing). Ceduna marina is not compelled at this time to make this provision and is unlikely to meet this requirement. As this situation may change in the future, the proponent is encouraged to consider the issue of affordable housing.

The EIS discusses briefly the need for 'appropriate security measures' in order to manage behaviour and prevent crime but the detail of these measures is not provided. It is acknowledged that there are social conflicts in the Ceduna and district communities. This should be dealt with on a holistic basis.

A day care centre is shown on one of the artist's impressions but there is no detail about it in the EIS report. Day Care centres have specific design criteria which need to be applied.

It is likely that the development will have a motor vehicle focus as there is no direct pedestrian access to the Ceduna town centre. To walk into the town centre would require a round trip walk of 2-3kms. This may be acceptable to some residents as a recreational use, but most people would drive if they need to purchase goods.

6.3.12 Effects on Character and Lifestyle

The proposal would provide a variety of housing types which will add to the amenity of the Ceduna Township. The EIS (Section 7.7) states that the development would provide new services and facilities for the community. The EIS discusses the provision of a visitor information centre as part of the development but this was opposed in several government submissions. The Response Document has deleted it from consideration. This report concludes that the visitor centre should remain in its present location in the town centre for accessibility and convenience reasons.

The location of the sporting and Golf complex will be physically separate from the rest of the development due to the location of the Eyre Highway and the associated acoustic protection mound. Although it will add facilities and attractions to Ceduna, it does not 'relate' well to the remainder of the marina development due to its separation, especially as a recreation resource for families. It is assumed that there would be a charge to use these facilities in any case.

It is likely that the development would appeal mainly to older people. It is expected that disability access would be available to all the public areas and facilities. This is supported by the Department for Families and Communities.

The proposal will add a 'marina waterfront' lifestyle opportunity to Ceduna's range of housing types. This experience is generally sought after around the South Australian coast, although in locations that are not too distant from the Adelaide metropolitan area. It does not address integration and inclusion issues for the diverse Ceduna community, rather it will require enhanced security measures to protect its inhabitants and their property. Apart from the proposed 'day care centre' there is little to attract families.

The proponent would need to investigate opportunities for providing some usable open space areas for recreation that is not related to water based activities.

6.3.13 Land Tenure

The majority of the subject land is owned by the Ceduna District Council, which has an agreement to sell the land to the proponent if the proposal is approved (and provided economic, employment and community benefits result from the development). The remainder of the site is Crown land held as follows:

- a strip of coastal land, which is the responsibility of the Minister for Environment & Conservation
- a strip of coastal land, which is the responsibility of the Aboriginal lands Trust (and managed by the Yarlana Community as a homeland settlement)
- the seabed, which is the responsibility of the Minister for Transport

The transfer of land associated with the seabed and coastal land would need to be negotiated with the Minister for Transport. For a development such as this, the Council would need to enter into an agreement with the Minister for the construction period and the purchase of reclaimed land for residential and commercial uses. Council could then on-sell this land to the proponent. Land and waterways for public purposes (including the breakwaters, channel and waterways) would be vested into the care and control of Council. The Council would lease any marina berths or private moorings from the Minister and then sub-lease them to the proponent or third parties (ie commercial boat owners or purchasers of waterfront allotments). Council would need to provide a substantial bond or bank guarantee to ensure that the works are completed to the satisfaction of the Minister.

The Aboriginal lands Trust land would be secured under a long-term lease, subject to an agreement with the Yarlana Community.

Native Title matters would need to be resolved as part of the land tenure negotiations.

In regard to land tenure, the Department of Transport, Energy & Infrastructure submission on the EIS raised the issue that the development should not be undertaken until all issues surrounding the Eyre Highway realignment and the land adjacent the foreshore have been resolved. This is discussed in Section 6.6 of this report. Re-location of the quarantine station has not been resolved with the relevant authorities.

6.3.14 Adjoining/Adjacent Land Uses

These land uses are adequately described in the EIS (Section 7.15). Adjoining land uses include:

- Farming and rural zone
- Public utilities zone
- Recreational zone and a coastal zone

Aboriginal Homeland Settlement

The proponent has guaranteed that, during construction, access to the homeland settlement and the school bus would be maintained.

The proponent has committed to causing as little inconvenience to the homeland settlement residents and those residents of Denial Bay as possible during the construction period.

There will be longer term impacts as the route into the town will now be significantly longer, particularly for those in the indigenous community who may not have access to a vehicle and walk into Ceduna from these outlying areas. This has also been discussed elsewhere in this report.

The proposal is visible from the homelands settlement, but is not close enough to cause a significant detrimental impact on their views of the surrounding areas.

6.4 VISUAL IMPACT

The visual amenity of the area will be changed with the development of the marina.

The EIS (Section 7.3) acknowledges that the development would alter the existing landscape and visual appearance of the coast in this part of Murat Bay. However, the EIS does not provide any visual representations or modelling to gain a clear understanding of the visual impact on the coast and township (especially from prominent structures, such as the breakwaters). In addition, no streetscaping or landscaping plans are provided to gain an insight into look or theme of the overall development. Neither is there any indication as to whether a consistent approach to building design, especially for prominent buildings, would be adopted. Thus, it is difficult to assess the built form and appearance of the development, nor the quality of the standard of design. The Council will assess this in due course, after a Plan Amendment Report process has been completed.

The artist's impression in the EIS (Figure 3.1) provides an oblique view of the proposed layout to show how the development may look in the future. As with all coastal marina developments there will be an impact on the coast and the views that can be found presently in that location. Two to three storey developments appear to be proposed on the site and will be quite visible from surrounding areas and from the coast around Murat Bay. The development would also be highly visible from boats on Murat Bay. In particular, the breakwaters would have medium density residential and tourist commercial uses, which are likely to be prominent. The EIS does not mention what height restrictions would be imposed.

The acoustic protection mound would also be a prominent visual feature of the proposal that would block views of the coast and the development from the Eyre Highway. It would provide a vegetated backdrop to the development. The screening of the fence on top of the mound by vegetation may soften its hard lines and appearance.

There has been no discussion to date on the need for lighting along the re-aligned Eyre Highway. Light poles may affect the visual impact of the development. Light spill may also be a problem for residents close to the Highway. Safety aspects of the light poles are discussed in Section 6.6 of this report.

As indicated in the EIS (Section 7.3) the PAR proposed to be prepared by the Council should address some of the issues relating to the scale and appearance of the built form on the site. The visual amenity of the site and the present landscape quality will change substantially as a result of this development, particularly as it is a little removed from the settlement of Ceduna.

6.5 ECONOMIC ISSUES

Section 8 of the EIS outlines the potential economic impacts from the proposed development and includes information based on investigations undertaken by the South Australian Centre for Economic Studies (Working Paper 4 of the EIS).

The proponent has indicated that the proposal will generate a range of local, regional and state wide economic benefits which include the following:

- Creation of an estimated 130 jobs in the initial construction phase of the project.
- Further opportunities for ongoing employment during the establishment and operation of the development, in a range of related sectors including residential building, landscaping, wharf services and various maintenance services.
- Creation of employment opportunities for local aboriginal people
- Growth and diversification of the aquaculture and fishing industries through provision of infrastructure and facilities, which will also relieve existing vessel congestion at Thevenard, by providing additional facilities for smaller vessels. Offshore waters adjacent to Ceduna have been identified as having significant potential for future aquaculture development in species such as finfish, abalone, scallops and other molluscs. The proposed facilities would allow improved efficiency for the Pt Lincoln tuna fleet.
- Enhancement of tourism levels in Ceduna, through creation of accommodation facilities and an interpretive centre, and increased levels of visitors pursuing recreational boating and fishing activities, and
- Creation of opportunities for new investment and additional benefits to existing businesses

Whilst the proposal has the potential to generate economic benefits, there are also a number of potential concerns, which were raised during the consultation period including the following:

- Financial risk to Council associated with long term costs of management and maintenance of facilities such as the breakwaters, revetment walls and waterways and associated impacts on ratepayers outside the development area, and
- Potential impacts on businesses in the existing township based on a concern that existing businesses will be replicated in the area indicated for commercial zoning

The EIS discussed measures or factors that should minimise the risk of any negative impacts such as those described above, which include the following:

- The Plan Amendment Report will ensure that uses in commercial areas would not replicate existing businesses and that retail and commercial development and would be restricted to provision of a limited range of goods
- Council was required to prepare a Risk Assessment Report, pursuant to Section 48 of the Local Government Act, to ensure that it was not entering into financially risky arrangements, which have the potential to impact on rate payers outside the development area
- The proponent will seek to bond infrastructure development to ensure that the relevant infrastructure is in place for each stage of construction

The Department of Trade and Economic Development has reviewed the economic assessment undertaken by the proponent and has indicated that the development proposal will have obvious social and economic benefits through increased employment and potential growth in the tourism, fishing and aquaculture industries. In particular it supports the opportunity for employment of local aboriginal people and suggests the need for further consultation about a suitable mix of uses in the commercial zone and vessel size in the marina facility.

The South Australian Tourism Commission indicates that despite Ceduna's remote location and access constraints, there is some evidence that tourism levels to Eyre Peninsula generally have grown in recent times with a growing propensity for passing traffic to stop at Ceduna.

The proposal would require a financial investment of over \$50 million, mainly for large scale earthworks (including the creation of a recreational lake/wetland) and the provision of infrastructure/services during construction. A mix of private investment, Council funds and Commonwealth/State government funding (especially to assist infrastructure upgrades) would need to be secured.

The financial viability of a proposal such as this is often a concern, given the high cost of breakwater construction and earthworks (ie. to excavate the entrance channel, basins and canals and to form the land for residential allotments). Viability is based on the successful sale of allotments to fund the costs of providing the necessary infrastructure. By staging the development, finances can progressively be generated to fund future works. It is proposed that the breakwater, channel, marina basin and residential waterways within the bay would be developed during the first stage, especially to enable the residential component to proceed. This would ensure that the majority of construction costs are committed to from the outset. Substantial bonding arrangements are likely to be required to ensure finances are available for the necessary works to be satisfactorily completed. The costs of sand management and seaweed removal may be a significant management cost in the long-term.

It is concluded that the establishment of the proposed marina has potential for significant economic benefits in terms of increased employment and investment associated with the construction and operation of the development. There also scope for significant potential growth in the tourism, fishing and aquaculture sectors as a result of the proposed development.

6.6 TRAFFIC AND TRANSPORT

Development of the marina will require the relocation of the Eyre Highway. While the proponent has indicated that the Department of Transport, Energy & Infrastructure (DTEI) has expressed no fundamental objections to the re-alignment, this does not appear to be entirely correct. There are a number of issues that still require resolution. In addition there is a requirement to ensure that any agreements between DTEI and the proponent are also agreed to by the Australian Department for Transport and Regional Services (DOTARS).

As indicated in Section 5 of this report, DTEI (Transport Services Division and Transport Planning Division) and DOTARS provided comment on the EIS and indicated that there was a need for additional studies to confirm the suitability of the proposed re-alignment and potential impacts.

In response to submissions on the EIS, the proponent prepared a Traffic Impact Assessment report. On the basis of the report the proponent concluded the following:

- There is minimal impact on the surrounding road network
- Congestion within the internal road network is not anticipated under normal conditions
- There are adequate sight distance at all intersections
- 80 km/hour speeds are appropriate up to allotment 617 (ie outside the boundary of the development) and then 60 km/hour into Ceduna
- The design of the railway crossing is in accordance with current best practice and meets DTEI requirements
- There is a high quality pedestrian and bicycle network that meets the requirements of the Development Plan
- Construction impacts can be catered for by restricting hours of operation
- Parking requirements cater for all land uses proposed for the development

The proponent has also indicated that in-principle agreement has been reached with the owner of the Highway One Motel and Roadhouse in relation to the Eyre Highway alignment and access.

DTEI considered that the option of relocating the Eyre Highway to the other side of the railway line should have been considered in more detail as potentially there are significant road and rail safety benefits, as well as amenity and economic benefits for the proponent. It was acknowledged that the proponent will need to acquire land to achieve this option. In particular DTEI indicated that:

- An alignment can be developed that is commensurate with the speed environment of the northern approach to Ceduna
- The alignment would not be as tight or constrained by the railway line as is the proposed realignment
- The 'safe' operation of the alignment would not be dependent on the location of the PIRSA Quarantine Station
- The existing level crossing would be closed and be replaced with a new level crossing, with no adjoining conflict points
- Noise levels from the Eyre Highway would be reduced for the proposed development, as the alignment would be further removed from residential development. A lesser treatment would be required than the proposed acoustic mounding with a fence/barrier on top of a mound to a height of 5.7 metres. Noise is an important issue that warrants careful consideration given that the number of heavy vehicles on the Eyre Highway is likely to increase in the future.
- More land would be available to the proponent for development purposes, especially around the location of the existing level crossing and Denial Bay junction. This would help to offset the costs.

DTEI indicated that the traffic figures provided by the proponent highlight that there will be a significant interaction between local/marina/tourist traffic and the through traffic on the Eyre Highway, with a mix of commercial and passenger vehicles. The Eyre Highway is already duplicated within Ceduna but reverts to one lane prior to the proposed realignment. The increase in traffic volumes indicate that an extension of that duplicated section of road may be warranted once the marina is fully operational. Accordingly, DTEI requires that sufficient road reserve be set aside for potential duplication in the future.

Additionally, the traffic assessment predicts a significant increase in traffic at the Eyre Highway/Kuhlmann Street intersection and that improvements are likely to be required at this location. Any modifications to the existing road network, even outside of the development area that can be shown to be directly attributable to the proposal, must be borne by the proponent.

DTEI has concerns regarding the safe performance and design standards of the proposed road realignment and the impact of this realignment on the safety of the rail crossing, the access to Denial Bay Road and access to the existing roadhouse. These issues can only be resolved through a detailed design process. The possible structure plans shown in the EIS and response document are insufficient to resolve these issues. DTEI has indicated they are prepared to support the proposal in-principle subject to the Proponent demonstrating that the proposal and the associated realignment of the Eyre Highway (including all the proposed junctions and access points) will not adversely impact on the safety of the road and rail operation, the role and function of this National Road and Rail links and that all costs associated with the realignment are borne by the proponent. The impact of the proposal on the realigned Eyre Highway requires careful consideration and appropriate design elements to ensure that the safety and efficiency for both road and rail transport are not compromised.

Agreement on the traffic and access issues associated with the realignment of the Eyre Highway must be reached before any construction of any component of the proposal (ie as a reserved matter).

The current design of the railway crossing is not acceptable in relation to the angle of the crossing, the curved road through the crossing, the proximity of the proposed Denial Bay Road junction and the associated sheltered right turn lane that encroaches over the crossing. Changes to any arrangements at the rail crossing will need to be approved by DTEI (Level Crossing Unit), DOTARS and the rail owner, Australian Rail Group (ARG).

DTEI has also requested that evidence from the proponent is required that demonstrates that an in-principle agreement has been reached with the owner of Highway 1 Roadhouse and Motel.

DOTARS is concerned that the Response and traffic assessment is seriously deficient in addressing safety and traffic issues. The proposed realignment of the Eyre Highway in its present form does not take sufficient account of the need to preserve its function as a safe and efficient section for traffic, especially heavy vehicles.

The proposed development will also require the relocation of the existing PIRSA Quarantine Inspection Station. DTEI has indicated that its location and reconfiguration must be resolved before the commencement of any detailed design for the realigned Eyre Highway. The station should be located and designed to the satisfaction of PIRSA and the associated changes to the Eyre Highway require approval by DTEI and DOTARS.

Consideration of the need for effective lighting of the Highway would need to be undertaken as part of the safety requirements of the re-alignment. No costings have been estimated for providing lighting to a suitable standard.

It is concluded that there are significant issues that are still to be resolved in relation to the re-alignment of the Eyre Highway. DOTARS is concerned that the response document and traffic assessment is seriously deficient in addressing safety and traffic issues. DTEI is prepared to give an in-principle agreement to the proposal provided that appropriate conditions/reserved matters are included in any approval that may be given. These are required to ensure that issues of concern are resolved to the satisfaction of DTEI, DOTARS and to ARG (with regard to the level crossing).

6.7 EFFECTS ON INFRASTRUCTURE

The proponent has indicated that the proposed development will require a significant investment on infrastructure, including roads, electricity supply, water supply and sewage treatment.

6.7.1 Provision of Sewerage

The Ceduna and Thevenard Septic Tank Effluent Disposal Scheme (STEDS) operated by Council is currently at its maximum operating capacity. The proposed development is proposed to have a gravity sewer main system supplemented by pumping stations as required. The wastewater would be pumped to the existing Council treatment area. The proponent has indicated that Council would establish a new activated sludge treatment plant adjacent to its existing lagoons (it is assumed that this would be at Council cost). In addition there will be a requirement to provide an additional 90ML winter balancing storage. This is intended to be achieved by deepening the existing effluent lagoons from 1.0 m to 2.0 m. In addition to funding issues there will need to be confirmation that the proposed separation distance of the base of the proposed ponds complies with the Environment Protection (Water Quality) Policy.

If the required separation distance cannot be met, due to shallow groundwater, then alternative options would need to be considered, including:

- a high quality liner system
- an expansion of the existing lagoon
- the construction of an additional lagoon

All of these options would increase the cost of developing a sewerage system to adequately cater for the proposed development. This cost would be borne by the Council.

6.7.2 Water Supply

SA Water has indicated that subject to appropriate augmentation and extension charges, mains water may be supplied to the proposed development.

Additional advice from SA Water indicates that a water supply is available to the proposed development, subject to the following:

- Timing of commissioning of an additional water resource on Eyre Peninsula
- Re-alignment of the existing 200AC main along the Eyre Highway where the highway is re-located (approximate length of 3.2 km)
- Works associated with abandoning approximately 1.6 km of 200 AC MAIN
- Installation of 3.3 km of 150 mm diameter main on the country lands main branches off the Tod - Ceduna main upstream of the township
- Installation of 750 m of 250 mm diameter main on the branch to Smoky Bay
- Possible duplication of existing mains in the township

The above works were to be considered as indicative. The supply to the allotments would be restricted to 300 kilolitres per allotment per annum and 200 kilolitres per community title allotment per annum.

6.7.3 Electricity Supply

ETSA Utilities advised the proponent that additional infrastructure would be required for the proposed development at an estimated cost of \$1.2 to \$1.25 million, and there may be additional costs to relocate existing infrastructure.

6.7.4 Other Services

The Telstra main optical fibre cable route is located on the eastern side of the Eyre Highway and other cables are located along the northern side of Denial Bay Road. Telstra has advised the proponent that sufficient capacity is present within the existing infrastructure to accommodate the demand of the proposed development.

6.7.5 Recreational and Commercial Boating Facilities

The proposal would provide a range of facilities and services for the commercial fishing and aquaculture industries and for the recreational boating fraternity. In particular, a commercial harbour would be established and a public boat ramp would be constructed. Maintenance and repair facilities would not be provided, as such activities can occur elsewhere in Ceduna or Thevenard where such uses are appropriately catered for. Fish processing and the cleaning of fishing/aquaculture equipment would also not be permitted.

6.7.6 Financial Arrangements for the Cost of Infrastructure

The proponent has expressed the view that both State and Local Governments should contribute to the cost of providing infrastructure as it would otherwise be a significant burden. The proponent has

indicated that it will continue to hold discussions with Government in relation to assistance. It is considered that the infrastructure requirements for the development would not provide a direct benefit to the Ceduna community or surrounding region (apart from economic development and employment), as additional infrastructure capacity is unlikely to be provided.

This AR concludes that establishment of the development is contingent on resolution of a number of key issues, the supply of potable water, agreement on the re-alignment of the Eyre Highway, upgrading the Ceduna wastewater treatment system and who will be responsible for the associated costs.

6.8 WASTE AND EFFLUENT MANAGEMENT

6.8.1 Waste Management for Commercial and Recreational Boats

The proposal will encourage the berthing of large recreational and commercial boats that have the potential to generate a significant pollutant source of black water, bilge water and grey water that could contaminate waterways and the marine environment if not suitably minimised or managed.

The EIS (Section 6.23) only provides general statements relating to the collection and treatment of wastewater from commercial and recreational vessels. Additional details would be provided as part of detailed design, following approval. Similarly the proponent indicated that commercial facilities would be required to develop specific management measures. Areas of the site that produced process wastewater would be bunded and the water pre-treated prior to discharge to sewer or separate wastewater facility. Hard rubbish from vessels would be management in accordance with the requirements of a Land Management Agreement, collected and disposed off at a licensed landfill.

The impact of litter and fishing/aquaculture related wastes (including packaging materials, nets, ropes etc) on the marine and coastal environment is a significant concern for fauna. Entanglement and ingestion can result in mortalities of sea lions, seals and turtles. This aspect needs to be appropriately managed.

It is concluded that there is insufficient detail provided in relation to the control and management of wastes from commercial and recreational boats or maintenance activities associated with these. Issues that will need to be addressed include:

- Wastewater pump-out facilities to be provided in accordance with current best practice guidelines for use by both recreational and commercial vessels. The facilities should be able to receive both grey and black water and pump out facilities connected to the dedicated sewage treatment and disposal system.
- A waste oil reception station should be provided in the commercial area.
- A designated secure receptacle for the disposal of quarantine wastes from overseas vessels should be provided (if relevant)
- Solid waste receptacles with self-closing lids should be located within the commercial wharf, public boat ramp and public wharf with ample facilities provided. These measures should minimise the potential for vermin to access the waste, rainfall infiltration and odours to be generated. Users should be encouraged to segregate waste types to enable recycling. The waste should be collected by a licensed contractor on a regular basis and disposed at an EPA landfill licensed to receive the wastes.

It is concluded that all waste sources from the proposed development must be managed in accordance with *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in*

Australia and New Zealand (ANZECC, 1997). In addition the marina facility must also be managed in accordance with the *EPA Code of Practice for Vessel and Facility Management: Marine & Inland Waters* and the *Code of Practice for Materials Handling on Wharves* (currently in draft form).

The proposal must comply with the *EPA Code of Practice for Industrial, Retail & Stormwater Management* and a Pollutant & Waste Source Management Plan should be prepared and implemented for the whole of the development to guide ongoing construction and operation.

Bunded areas must conform to EPA guidelines 'Bunding and Spill Management' EPA 080/04

6.8.2 Solid Waste Management - Domestic and Tourist

The proposal has the potential to generate a significant amount of solid waste and litter. In particular, litter is also a concern for local amenity and the environment.

Trash racks should intercept litter, and other gross pollutants at any side entry pits or similar entries to the stormwater system, and if not passing through a management feature capable of intercepting them, trash racks should be fitted to outlets discharging to receiving waters.

Litter bins must be provided at all public recreation areas and should include recycling sections for such items as cans and other metal waste. Construction areas should be fenced to contain wind blown litter and debris and recreation and other public areas should be fenced to effectively stop litter leaving the area.

The significant expansion of the Ceduna township and population is likely to require an upgrade of Council facilities and waste management practices. The proponent has indicated in section 6.24 of the EIS that waste from the domestic and tourist area will be collected on a weekly basis and disposed to an upgraded Council depot, subject to EPA requirements. The proponent has indicated that recycling would be undertaken at both the Council depot and at Ceduna Bottle and Can and additional initiatives would be investigated in consultation with Zero Waste SA.

It is concluded that the proposed measures to manage solid waste outlined in the EIS are reasonable.

6.8.3 Sewage Management

The proponent intends to install a dedicated sewage collection and management system that includes the installation of gravity sewer mains and pumping stations as required (section 6.25 of EIS). The effluent would be treated at the Council facility following upgrading. The proponent has indicated that the project will provide an opportunity for a significant upgrade of the facility. It is also indicated that there is an appropriate buffer distance in which to mitigate any potential impacts to nearby land owners. Treated wastewater will be used to irrigate the golf course, sporting fields, existing foreshore and other landscaped areas. Wastewater would not be reused in the development.

The proponent has indicated that a winter balancing storage will be required and this will require deepening the existing pond from 1.0 m to 2.0 m in depth. It is not clear whether there will be adequate separation distance between the underside of the proposed pond and groundwater to conform to the requirements of the EPA Water Quality Policy. In addition the increased volume of wastewater that would be used for irrigation will necessitate an upgrade of piping and pumping systems for use at the golf course. The inference from the EIS is that the costs of the Council waste water treatment plant and associated infrastructure for the delivery of treated wastewater would primarily be the responsibility of Council. If the required buffer cannot be achieved, alternative methods would be needed (such as lining systems, an extension of the existing pond or the construction of a new pond).

There was no specific information provided on how risks of spillage will be managed where sewer lines are near waterways.

The Department of Health sought additional information on the location and site conditions for the proposed upgrade infrastructure and irrigation usage details, which has been provided in the Response. The DWLBC asked whether fish processing waste to be undertaken. The proponent indicated that no fish processing was anticipated or allowed for in the development. It is considered that fish processing is not acceptable within the development and this activity should occur in more appropriate locations (such as at Thevenard). Commercial fishing related industrial uses are likely to result in conflict with surrounding residential and tourism related uses.

It is concluded that additional information is required on the design of the collection and treatment systems for sewage to the satisfaction of the EPA and Department of Health. It is recommended that sewers be constructed within the road reserves and the development avoid construction of sewer mains below the waterways as far as is practicable. An alarm system should also be installed at all pumping station control points to provide an early warning of spills.

6.9 CONSTRUCTION AND OPERATIONAL EFFECTS

Development of the proposed marina and associated residential canal estate will require the establishment of two breakwaters, an entrance channel, marina basins and waterways.

6.9.1 Construction of Breakwaters

The breakwaters will be founded on the sea floor and consist of an earthfill core and two outer layers of rock armour. Construction will involve the progressive end tipping of the earthfill core, commencing from the shoreline and spreading seawards using either a dozer or loader until an initial height just above mean sea level is achieved. The proposed design incorporates the use of fine material to ensure there is reasonable water tightness during dewatering of the completed basin. The proponent has indicated that any excessive leakage would be rectified by the post construction addition of clay material into the core of the breakwater.

The sub-armour will be tipped onto the core material and then manoeuvred into place by the use of excavators in that portion located below sea level and dozer for the portion above sea level. The final armour rock will be placed using an excavator until the final design height. The side slope of the breakwaters are to be 1:3 (vertical:horizontal) and a height in the order of +4.0 m AHD at the entrance and on the southern side. The western breakwater is proposed to have a height of + 3.0 m AHD.

6.9.2 Dredging Works and Re-Use of Material

An entrance channel will be required to enable boating access to the marina. The channel is expected to have the following characteristics:

- A length in the order of 800 to 1,000 m
- A minimum water depth of 3 m at the lowest tide
- A channel base width of 50 m
- Side slopes of 1:3 (vertical:horizontal)

Investigations of the materials located in the proposed channel area have not been undertaken. The proponent expects this material to be sandy and able to be excavated by cutter suction dredge. The dredged material is proposed to be pumped to holding and settling basins located on the shore. Return water is proposed to be tested prior to discharge back into Murat Bay. Hard material not able to be removed by the cutter suction dredge would be excavated using a barge mounted excavator and spoil transported to shore in barges.

6.9.3 Creation of Marina Basin and Waterways

The EIS (Section 3.2.3) states that the marina basins and waterways would be excavated in the dry using conventional earthmoving equipment (excavators and trucks). This will require establishment of a bunded area to dewater the site. Surface and groundwater collection channels would be constructed to enable settlement of sediment and subsequent pumping or drainage to the marine environment.

On the basis of preliminary testing the proponent has formed the view that the bulk of excavated material will be predominantly calcareous sandy soil and that all fill material will be used on site. Additional material, such as rock armour and concrete aggregate would be sourced from other locations (although specific sources were not nominated). Soil that is unsuitable for engineered fill is proposed to be stockpiled and used for other purposes, including landscaping. The total volume of material required to be excavated for the waterways has been estimated by the proponent at 588,000 cubic metres.

The slopes of the waterways are proposed to vary from 1:2 to 1:3 (vertical:horizontal) depending on site conditions, and would be protected from erosion by the placement of rock fill (rip rap).

6.9.4 Earthworks and Formation of Allotments

Preliminary testing indicates the northern end of the development site is very sandy extending below 3m. The southern area typically has a clay surface overlying calcrete and sands at depth. Groundwater is generally found at less than 0.5m - 0.0m Australian Height Datum and heavy metal and diesel contamination has been found in groundwater bores on the site. However, soil investigations for this site did not reach the depth of the expected waterway excavations, therefore soil conditions at depth are largely unknown. The salinity of deeper excavated material (or dredged material) is likely to affect the quality of fill material and final uses of formed allotments (especially the growth of vegetation).

Some imported soils may be brought in to provide less toxic topsoil for landscaping and to meet engineering specifications for works.

More soil will be dredged from the marina basins than can be utilised on site for fill and mounding.

Highly saline soils from dredging of the marina may be used as fill, which can result in impacts on landscaping and building practices. Fill likely to produce problems with proposed landscaping should not be used and infrastructure and building foundations should be designed to deal with the conditions found in dredged materials that they are imbedded in, or on.

Conditions found in a highly saline subsoil are likely to make it impossible for vegetation, that isn't very salt tolerant, to establish. Landscaping options on such soils are likely to be limited and significant irrigation required to rapidly establish plants on such features as the acoustic protection mound, if it consists of such soils.

Soils of an Acid Sulphate nature can be treated with limestone to reduce their potential to acidify on oxidation. They may still be unsuitable for building or landscaping for reasons apart from pH, due to structure, texture, salinity or chemical composition.

Soils in a semi arid locality such as Ceduna are often prone to wind or water erosion, especially when disturbed and landscaped into mounds or swales for water drainage. Construction areas that haven't had time for vegetation to re-establish or that have significant slopes, such as harbourside batters, can be prone to water or wind erosion.

Although Ceduna is a low annual rainfall area, storms can still deliver heavy rain in short periods which can deliver large amounts of sediment to marine and coastal waters as well as damage structures and block drains. Wind erosion is also prevalent on light soils that have been disturbed or which lack sufficient vegetation cover.

Drainage works and landscaping should be designed to reduce the impacts of water and wind erosion within the proposed development. Damage from rilling or gullyng of soil based structures such as swales, batters and mounds can undermine their function and carry soil into adjacent waters where it can smother vegetation, introduce pollutants and fill navigation channels.

Wind erosion can undermine or cover works and vegetation and make conditions unpleasant for workers and neighbouring residents.

Soil Erosion and Drainage Management Plans should be developed for both Construction and Operational phases of the development to combat these issues.

Soil Erosion and Drainage Management Plans should be produced for the Construction and Operational phases of the development and be contained within the EMMP.

6.9.5 General Construction Impacts

The DTEI indicated in its submission that it would need to be consulted during detailed design of the breakwaters, channel and waterways.

The proponent has indicated that, if required to ensure water quality is maintained, a coffer dam could be installed downstream of the settling ponds prior to pumping out to sea.

The EPA sought additional information on the storage methodology for the excavated spoil and proposed holding times of the dredged material to deal with supernatant water.

The Response further states that the storage pond would have a capacity of 5,000 cubic metres and would have a storage time of 5 hours on the basis of a dredged throughput of 1,000 cubic metres per hour. Drainage water would be pumped back to the marine environment or the enclosed harbour (subject to acceptable water quality). It is uncertain whether this would be adequate to ensure fine sediment would not be discharged to the marine environment and cause turbidity problems. Detailed investigations of the substrate within the entrance channel alignment have not been undertaken to determine the type of material that would need to be excavated. This is critical, as the amount of fine sediment in the material dictates settlement times required to minimise marine turbidity resulting from dewatering discharges.

The Response states that further testing of marine substrate will be conducted prior to construction. However, this would only comprise penetration testing. Marine sediments would need to be sampled to the proposed depth of excavations and tested for standard soil parameters, including acid sulphate soils.

A licence will be required from the EPA and management and monitoring measures should be incorporated in a Dredging Environmental Management Plan. The EPA will also require a monitoring program to be implemented for the dredging works and this will need to be independently verified.

Consideration will also be needed on the impact of using saline soils from the dredging and excavation works as fill material. Testing of the dried material will be required and sequencing of fill placement at appropriate depths will also be needed to limit the impacts of residual saline material.

The Response (Section 5.1.1.2) states that there would be a 'surplus' of ~ 350,000 – 400,000 m³ of material from waterway excavations. However, it is not clear whether this material would be used for allotment formation or would need to be removed from the site. If it needs to be removed, this would generate a substantial amount of truck traffic (~ 30,000 trips) that could have a significant impacts on local roads.

6.9.6 Site Contamination

Soil Contamination

The site history review determined a range of potential sources of contamination:

- Temporary storage of insecticides at the quarantine station
- Diesel fuel storage to power the incinerator at the quarantine station
- General dumping of rubbish

In their submissions on the EIS, the EPA and the Department of Health indicated that the site investigations were not adequate and additional work was required to provide a definitive statement as to the status of soil contamination and that investigations should be undertaken in accordance with the National Environment Protection Measure (Assessment of Site Contamination), 1999. The EPA also indicated that an Environmental Auditor (Contaminated Land) should be appointed to prepare a site audit report in order to confirm that the proposed development is suitable for the intended uses.

The Response confirmed that a consultant would be appointed to undertake additional investigations. In addition an Environmental Auditor (Contaminated Land) had been appointed (refer to Letter dated 14 November 2005) to provide an independent review to ensure that the site is suitable for its intended use.

There is insufficient information provided in the EIS and Response to form an opinion as to the status of groundwater and soil contamination at the site and whether there are potential risks to human health and the environment. There will need to be additional investigations undertaken, which should be independently reviewed by an Environmental Auditor (Contaminated Land), and a site audit report completed to confirm whether the site is suitable for the intended uses. This would need to be a reserved matter on any approval, requiring resolution before construction commences.

Acid Sulphate Soils

Inland and coastal areas of the development are likely to be prone to Coastal Acid Sulphate Soils (CASS).

Soil investigations for this site did not reach the depth of the expected waterway excavations, therefore conditions below this depth, which comprises a large part of the development, are largely unknown. The site has not been properly assessed for CASS at this time.

Excavation and drainage will dry out these soils and cause oxidation of the sulphates, resulting in low pH drainage water which has the potential to cause fish kills and damage to marine and terrestrial flora. Lowering of local water tables due to Marina works and operation can also dry out CASS resulting in acidification of groundwater and impacts on marine and terrestrial ecosystems.

The leachate from excavated CASS can be acidic and toxic to environments if it escapes protective bunding. Leachate will need to be prevented from leaving stockpiles by appropriate containment mechanisms.

Infrastructure and foundations laid in CASS can degrade if appropriate materials or soil amelioration procedures are not followed.

Any works associated with the proposal should comply with the Coast Protection Board's policies on Coastal Acid Sulphate Soils. The Board has released a set of guidelines that should be followed in areas where acid sulphate soils may be likely to occur.

It is therefore recommended that all steps to manage CASS as stated in the CEMMP, including compliance with the Coast Protection Board's policies on Coastal Acid Sulphate Soils, be followed, especially with regard to seeking expert advice with any aspects of the development that will require earth or building works that are likely to uncover CASS (including the monitoring and management of stockpiled matter).

Groundwater Contamination

On the basis of the limited sampling program the proponent concluded that groundwater below the site is not significantly contaminated either directly or by off-site impacts. The proponent has concluded that despite some chemicals exceeding the Environment Protection (Water Quality) Policy, these would not cause an impact on human health or the environment, as a result of the high levels of dilution that would occur in the waterways prior to discharge to Murat Bay. The proponent proposed in the EIS that additional investigations would be required to confirm this conclusion.

In their submissions on the EIS, the EPA and the Department of Health indicated that the groundwater investigations were not adequate and additional work was required to provide a definitive statement of the extent of groundwater contamination, the direction of groundwater flow, extent and nature of off-site impacts and that investigations should be undertaken in accordance with the *National Environment Protection Measure (Assessment of Site Contamination) 1999*. The EPA also indicated that an Environmental Auditor (Contaminated Land) should be appointed to prepare a site audit report in order to confirm that the proposed development is suitable for the intended uses. A public submission raised concern about the potential for contaminants from the Council landfill to impact on the proposed development.

The proponent re-sampled the Council bores and the test results presented in the Response indicate that the concentrations of copper, manganese, selenium and zinc slightly exceed the EPA Water Quality Policy. The proponent is of the opinion that, given the measured concentrations and the expected dilution in the aquifer and ultimately in the water ways, that there should be no impediment in terms of groundwater quality for the granting an approval. The bores are located in close proximity to each other and therefore do not provide a detailed overview of potential impacts from the adjacent landfill.

The proponent confirmed in the Response that a consultant has been engaged to undertake additional investigations to:

- determine the configuration of the shallow (unconfined) aquifer
- aquifer hydraulic conductivity
- depth of groundwater
- groundwater flow paths and hydraulic gradients
- groundwater salinity

- possible tidal influence on groundwater

It is considered that groundwater quality sampling should not be limited to salinity, but should test the full range of standard water quality parameters (including organics, nutrients, heavy metals and hydrocarbons), consistent with the requirements of the EPA.

In addition, an Environmental Auditor (Contaminated Land) has been appointed to provide an independent review to ensure that the site is suitable for its intended use.

6.9.7 Stormwater Management

The EIS (Section 5.2.19) proposes the use of Water Sensitive Urban Design (WSUD) features, as outlined in the Good Residential Design Guide (Planning SA, 1999), which would ensure approximately 88% of the total stormwater would be captured through plumbed-in rainwater tanks, swales, detention basins or soakage features.

The remaining 12% directly discharged into the marina would pass through Gross Pollutant Traps (GPT's). The definition used by the proponent for GPT's in the EIS (Section 6.16) refers to an in line interceptor, rather than a "trash rack" which can be little more than a net over the end of the pipe or placed in a channel or basin outlet to intercept larger particles such as litter, leaves and dead animals. The effectiveness of GPT's varies widely depending on their design and size and many allow the vast majority of pollutants to pass through with only heavier and larger particles such as coarse sediment and litter being intercepted. Typically almost all nutrient, heavy metals, hydrocarbons and bacterial pollutants are not intercepted by GPT's unless the flow is low and it is detained within the GPT and ameliorated by residence time.

The proponent summarises the estimated distribution of stormwater by volume as:

- 41% plumbed-in roofwater, with surplus water discharged to marina waterways
- 21% soakage on allotments
- 2% discharged to inland golf course.
- 26% directed to detention basins
- 12% to marina waterways via GPT's

Various aspects of WSUD will be used by the proponent, including:

- First flush bypasses will be used to direct roof stormwater onto garden areas
- Vegetated swales are to be used as pre-treatment for stormwater rather than conventional kerbing "wherever possible". Perennial native grasses may have to be used or combined with pebble or gravel mulches due to the low rainfall restricting the growth of normal lawn species. Species composition and other options apart from grass should be investigated if vegetated swales are used
- Infiltration systems are expected to be widely used, comprising swales, channels, basins and gravel filled trenches or underground storage cells
- Porous pavements
- Kerb line turf strips
- Irrigation of street trees from kerbside infiltration via agricultural slotted drains

The proponent proposes that clean roof runoff that is not recycled via rainwater tank, should run into the marina or marine receiving waters. Excess "fresh" water from roofs should discharge via vegetated strips or to vegetated open space to water those areas before discharging to receiving waters.

Kerb line grass strips should be resistant to erosion from stormwater runoff and should comprise hardy low water requirement native species.

The EIS (Appendix D - *Stormwater Catchment Plan Concept*) indicates a mixture of discharge to Marina waters via Gross Pollutant Traps (GPT's), grassed swales and depressions which may be retention or detention features (as they are not described). There is no key provided with the *Stormwater Catchment Plan Concept*, so interpretation is difficult and several roads do not show their drainage management.

In addition to the above measures, there would need to be an emphasis placed on education of land owners about the use of fertilisers and pesticides. This is a major source of nutrients and toxicants which would need to be addressed through education campaigns.

Drainage from the Eyre Highway would be generally separated from the marina development by the noise attenuation mound and directed along swales to "downstream systems" via culverts. Grass filtration and infiltration treatment is suggested by the proponent. Downstream of the Highway means the marina and associated developments. It appears that a culvert would collect Highway runoff and discharge it, via a GPT, to the marina. Given the wide variety of GPT's available and the fact that they are only effective in removing some pollutants unless several are used in a linear "train", this appears an inadequate treatment measure.

More detail needs to be provided on the treatment and disposal of stormwater from the Highway, especially in the case of a toxic spill. Detention features should be part of the swale design for drainage, with provision for diversion to a holding basin in the case of spills.

The stormwater drainage plan for the Eyre Highway adjacent and discharging to the marina environs, should include adequate removal of pollutants common to highway runoff and management features capable of diverting and holding spills of toxic material on or adjacent the highway. A "treatment train" approach needs to be adopted.

No stormwater should discharge to marine or marina waters without first passing through management features to remove pollutants to a standard acceptable to the EPA. Stormwater discharges should not be responsible for breaching ANZECC standards for marine or estuarine waters within the Marina or coastal waters. (see COA 35) Excess "fresh" water from roofs should discharge via vegetated strips or to vegetated open space to water those areas before discharging to marina or marine waters.

All residential, commercial and industrial buildings shall have rainwater tanks fitted. Residential buildings shall be able to use rainwater thus collected for hot water and toilets.

Run-off should be collected through terracing or scalloping on the mound to expedite growth and enhance vegetation establishment.

WSUD refers to the reusing of rainwater or stormwater either within residential, commercial or industrial premises or for landscaping purposes.

6.9.8 Management of Pollution Sources

Recreational & Commercial Boating

The proposal will encourage recreational and commercial boating uses that have the potential to become a significant pollutant source that could contaminate waterways and the marine environment if not suitably minimised or managed.

Pollution sources from boats could include:

- petrol and oil leaks from boats sitting in the water or on hardstand areas

- leaching of anti-foulants into the water column
- maintenance, especially hull cleaning
- spills from refuelling
- wash down water

Additional impacts from commercial fishing and/or aquaculture boats could include the spillage of fish wastes, waste from the unloading of fish products and the from the loading of fish feed. Associated car and trailer parking areas can also be a source of pollutants that would need to be managed.

The proposal would need to meet the *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand* (ANZECC, 1997). In addition the marina facility should also be managed in accordance with the *EPA Code of Practice for Vessel and Facility Management: Marine & Inland Waters* and the *Code of Practice for Materials Handling on Wharves* (currently in draft form).

Wastewater and residues from hull cleaning activities and oil and fuel residues would need to be diverted and collected in dedicated systems in accordance with EPA requirements and collected for off-site disposal by licensed contractors. Stormwater would need to be directed to treatment devices, such as dedicated holding basins or swales.

Whilst a development approval for the proposal would not apply to buildings related to the marina (ie boating related businesses) and semi-industrial, commercial, or retail uses, mechanisms would need to be put in place to ensure the ongoing development of the various component of the proposal are established in accordance with the above codes.

The proposal should also comply with the *EPA Code of Practice for Industrial, Retail & Stormwater Management*.

It is suggested that a Pollutant & Waste Source Management Plan be prepared and implemented for the whole of the development to guide ongoing construction and operation.

Boat Ramp, Washdown and Hardstand Facilities

Facilities should include cut off drains and collection systems according to the draft Code of Practice for Vessel and Facility Management: Marine and Inland Waters.

Runoff water should be discharged to sewer according to the above mentioned Code of Practice, the details of which will be incorporated into a Stormwater Monitoring and Management Plan.

Boat maintenance, repairs and building works would not be permitted in the marina. These activities would need to be undertaken at existing facilities in Ceduna or Thevenard. The boat ramp and slip-way provide a means of removing boats from the water for transport to suitable facilities elsewhere. Minor hull cleaning activities (and possibly the application of antifoulants) may be allowed at the hardstand.

Bunded areas must conform to EPA guidelines 'Bunding and Spill Management' EPA 080/04.

6.9.9 Pest Plants and Animals

The proponent acknowledges the development could exacerbate existing problems with feral animals and weed species.

Problems can occur from:

- Increased numbers of cats and dogs
- The feeding of feral birds and cats which could sustain feral populations
- Garden escapes of cultivars that become pest species in reserves and agricultural land
- Construction phase groundwork disseminating weed species and encouraging proliferation on disturbed sites
- Existing populations of rabbits and hares destroying landscaping. Rabbits can breed all year round if they have access to actively growing grasses available in landscaped areas, increasing grazing pressure on adjacent reserves
- Fox numbers may increase if they have access to refuse and an increased rabbit population

A Land Management Agreement (LMA) is proposed by the proponent, to limit impacts from landholders but no details are available on how it would address these issues.

Pest Plant Control

The proponent expects that the Construction Management Plan and landscape plans will minimise increases in pest plant species. A weed management program is proposed as part of the landscape establishment and maintenance period of approximately 2-3 years. An ongoing weed management programme will be part of the operational management plan.

Controls on species planted in gardens are not specified.

Residents must be provided with suggested planting guides of low water use, soil compatible, local provenance species.

Where landscaping is provided by the proponent, local provenance species are to be used, with the exception of feature plantings.

Dog and Cat Control

Apart from the issue of existing feral animals, primarily foxes, cats, starlings, sparrows, pigeons, seagulls and rabbits, there exists the issue of roaming domestic pets. There would need to be controls on animals kept that, if allowed to roam, may damage wildlife.

Unrestrained cats and dogs will effectively destroy native mammals, birds and reptiles within their range around the marina development. The high population density of these animals within the development will vastly increase the levels of predation that already exists from feral foxes and cats.

Feral animals will also benefit from irrigated pastures/lawns (rabbits) and the availability of garbage, accessible pet food and food scraps discarded in public use areas. This is likely to increase their numbers and increase predation pressures on remaining native fauna and stock.

There is also the risk of stock deaths from roaming dogs.

Feral birds and enlarged populations of seagulls present a risk to public health and populations of native birds that can have their nesting sites and territories usurped by these species. There have been significant problems from seagull populations in other coastal towns on Eyre Peninsula and the effect on offshore island marine bird breeding colonies from seagull population pressure should also be considered.

Public education discouraging recreational bird feeding and ensuring edible wastes are promptly disposed of will help control these problems. In the case of pigeons, poisoning may be required.

Council Powers under the Cat and Dog Management Act are also referred to in the EIS, but no specific solutions are suggested. A combination of utilising the existing legislation within the Cat and Dog

Management Act 1995, an education campaign encouraging the containment of cats in enclosures and dogs being restricted to leads when outside properties and a extensive and persistent poisoning programme (for foxes and rabbits) outside the development and within the coastal dunes should control the impacts of both existing feral and uncontrolled domestic pests.

This should protect stock and native fauna from the impact of residential development in this area.

Land Management Agreements should include limits on the numbers of cats kept and include management measures to prevent roaming.

6.10 LANDSCAPING & REVEGETATION

The proponent intends to prepare a landscaping plan at the detailed design stage. Areas to be landscaped include roadsides, highway/railway corridor and acoustic mound, reserves and streets.

The remaining dune system will be revegetated and stabilised. Sensitive dune and beach areas are required to be fenced and buffered. Landscaping will feature as an erosion control measure.

Unnecessary restrictions to beach areas should not be allowed to occur and restricted access should only be imposed for safety and rehabilitation purposes during construction.

Grey water and stormwater will be utilised for irrigation. Landscaping will consider the goals of minimising water use and enhancing the local ecology through use of local provenance species.

Soils used for landscaping and fill for sites which bear structures, such as houses, where landscaping or revegetation is likely to occur, should be suitable for plant growth.

This includes soil to a depth of at least 2m as excessive salinity, or other limits to plant growth, can restrict root penetration and plant vigour. Soils used for fill that are saline and are being used for landscaping of salt tolerant plants may be an exception to this condition.

The acoustic protection mound should be landscaped to soften its form and reduce wind and noise. The fence at the top should be screened by vegetation. Given that plants are slow to grow and establish within the low rainfall received in this area the mound should be terraced or scalloped to retain water and reduce erosion. Techniques such as mulching can also be used to enhance plant growth. Initial drip or microjet irrigation should be employed to expedite establishment and speed growth, as otherwise plants may take decades to perform their screening function.

Landscaping at all times should consider the goals of minimising water use and enhancing the local ecology through use of local provenance species. The use of surface runoff water should be considered to irrigate revegetated areas, wherever stormwater is directed or stored.

Rare and threatened species formerly found on the site should be planted in areas suitable for them. Landscaping goals should be integrated with SEDMP and stormwater management plans as well as mitigating noise and meeting amenity criteria.

6.11 RISK/HAZARD MANAGEMENT

Details on potential risks and hazards associated with the proposed development were addressed throughout the EIS.

6.11.1 Wastewater and Hazardous Chemicals

The EIS indicates that a Spill Contingency Plan for oils and sewage leaks will be developed in consultation with the EPA and DTEI. The plan would include response strategies in the event of a spill, containment procedures and clean up procedures.

The proponent has indicated that clean up of any sewage spills (if they occur) would be the responsibility of Council. Design of the new facility would include:

- Sufficient storage time to allow for back-up operation procedures to be put in place to prevent any overflows
- Dual pump systems
- Telephone dialler/pager installed to ensure operators are aware of any system failure
- External power sockets to allow operation of the pump station using portable generators during times of power disruption

Safeguards and contingencies would also need to be prepared for the boat effluent pump-out facility, which is expected to be connected to the development's sewerage system.

It is considered that in addition to the oil/sewage spill plan the proponent should include a spill management plan to deal with the risks associated with household chemicals and fertilisers.

The proponent has indicated that refuelling facilities will be designed in accordance with Australian Standards and technical guidelines. Flammable or potentially explosive chemicals that may be required for use in the commercial area will also need to be installed and managed in accordance with relevant Australian Standards. The proponent is advised that the provisions of the *Dangerous Substances Act* will also apply should development approval be granted by the Governor.

The facilities would need to be designed to ensure there is adequate protection from spillage by incorporating bunding and spill containment equipment and the storage tanks designed in accordance with *AS 1940 Storage and Handling of Flammable and Combustible Liquids* and the *Petroleum Regulation Act 1995*. Any installed underground fuel storage systems would require the installation of monitoring wells to ensure that any leakages were detected and the monitoring and management provisions will need to be incorporated in a specific Groundwater Monitoring and Management Plan (GWMMP).

Commercial vessels are required to meet provisions in the *Uniform Shipping Code* and *Harbours and Navigation Regulation 1994*, which includes fire safety management. The commercial berth area will need to be serviced by a fire main and hose reel and signage providing emergency services contact numbers will also be required.

The storage of hazardous chemicals (solvents, paint and degreasers) in any workshops in the commercial area will need to comply with relevant provisions of the *Dangerous Substances Act* and *Harbours and Navigation Act*.

6.11.2 Breakwater Design and Safety

The breakwaters have been designed as earthfill structures obtained from local sources and protected with rock armouring.

The DEH did not agree with the site and floor levels in the EIS and recommended minimum site levels of 2.7 m AHD and floor levels of 2.95 m AHD for development that is not exposed to wave run-up, and 3.0

m AHD and 3.25 m respectively for development that is exposed to wave run-up. In the RD the proponent indicated it would adhere to the DEH recommendations.

6.11.3 Safety for Marina Basin, Entrance Channel and Waterways

There is limited consideration given in the EIS to issues relating to public safety issues in the waterways. The following measures would need to be addressed in a waterways management plan:

- Boating speeds restricted to a maximum of 4 knots
- Fishing only undertaken in designated/signposted areas
- Only approved structures to be used for berthing of boats
- Use of personal water crafts to be governed by DTEI requirements
- Non-powered vessels less than 3m (canoes and kayaks) only allowed in recreational areas but not the commercial areas, wharfs and berths
- Diving, scuba diving, snorkelling and similar activities not allowed
- Commercial diving allowed within the marina waterways for maintenance and repair activities
- Designation of a specific authority (ie Council or Marina Manager) to control public areas and boat ramp
- The commercial and recreational berthing area to be appropriately managed by a designated authority
- The conduct of water based special events
- Navigational markers from the end of the channel to the main basin to define the navigation areas
- Appropriate lighting to be provided

The installation of appropriate signage will be required to ensure that safety issues are adhered to for the issues detailed above.

6.11.4 Earthquake Risk

The proponent undertook a preliminary assessment of the potential effects of earthquakes and the risk of liquefaction. While the site is underlain by loose fine grained sands the proponent concluded that risk was low given the lack of historical earthquakes in the region.

- A liquefaction hazard could exist in loose, saturated shallow sandy soils of the Semaphore Sand or the St Kilda Formation and that detailed design should take this into consideration
- The breakwater is unlikely to experience foundation problems, although some differential settlement could occur
- The wharf edge treatment is unlikely to experience impacts as foundations are located within limestone, provided backfill soils are appropriately engineered

- Base of waterways are within limestone and therefore below the zone of likely liquefaction. Ground improvement methods could be required if loose sandy soils are located in submerged batters
- The placement of engineered fill will minimise the potential impact of liquefaction, particularly if loose sandy soils are located greater than 3m below the completed surface and if flexible building structures on stiffened raft footings are included
- Remedial treatment would be required if loose unconsolidated sands are present below the groundwater level or sides of the wastewater storage dam

The proponent has indicated that the risks of liquefaction of soils would be considered as part of detail design, geotechnical investigations, construction and appropriate designs adopted. These provisions are in accordance with normal engineering design practice.

It is concluded that the potential hazards and risks, in relation to water safety issues and public risk associated with the use of the waterways, have not been adequately considered by the proponent. Additional information is required on the management and monitoring of hazardous substances and dangerous goods. The proponent must prepare appropriate management plans for further assessment and approval by relevant government agencies before construction commences.

7 PROPOSED MANAGEMENT, MAINTENANCE AND MONITORING

A multi-component proposal of large scale and magnitude that would be developed over a long period of time requires the co-ordination and management of a wide range of matters. For this proposal, these include the following:

Infrastructure

- marina (ie breakwater, retaining wall, basin, revetments, wharf, slip-way, boat ramp, access/parking, boat effluent pump-out facility, refuelling facility, waste management facilities etc)
- residential sub-division (ie waterways, revetments, services, stormwater management devices, open space reserves, landscaping/streetscaping, waste management/recycling etc)
- effluent treatment
- water supply to the development site
- road network and public car parks
- acoustic protection mound

Environmental Management

- 'Restricted Access Area' and/or coastal reserve (ie public access, pest plant & animal control, erosion control, revegetation etc)
- water quality of waterways and marina basin
- human disturbance (ie illegal dumping, feral animal control in nearby native fauna habitat and illegal vehicle use of local beaches and coastal dunes)

Buildings not part of a Major Development approval

- residential (single dwelling and medium density)
- marina related (commercial fishing/aquaculture processing and maintenance, administration, boating retail etc)
- tourist accommodation and facilities
- commercial and retail
- Community/Cultural Centre
- fish academy
- day care centre
- golf course buildings

Design controls and guidelines need to be considered for maintaining the visual amenity of the development (ie to establish a 'theme' or 'look' for the built form of the development), for environmental sustainability and for complying with building standards. For example, the following aspects would need to be addressed:

- appearance and use of suitable materials
- floor and building heights
- stormwater management
- water and energy efficiencies

- landscaping and amenity plantings
- noise
- private moorings (ie jetties)
- fencing

The activities and behaviour of residents, commercial operations and boat users would also need to be managed to ensure public safety and amenity. In addition, pollution sources would need to be managed to ensure suitable water quality in the marina and waterways, whilst human disturbance factors would need to be controlled to ensure protection of the environment.

These aspects can be addressed through a range of mechanisms (such as environmental management plans, encumbrances, Land Management Agreements, Development Plan policies etc), but should be co-ordinated through an overall framework discussed in a Management, Maintenance and Monitoring Agreement. The agreement would also need to address requirements imposed by government, such as conditions of development approval, EPA licences, leases and other related approvals.

It is proposed that, after completion of construction, the Council would assume care and control of the marina related infrastructure (excluding all privately owned structures and facilities) and coastal reserves. It will also be responsible for the ongoing management and maintenance of all land division related infrastructure and public facilities. However, the specific details of such arrangements (especially hand-over agreements and timing) have not been provided.

It is anticipated that the proponent would initially divide the land into super lots for further division (and for the proponent to develop, mainly for residential uses) or for the transfer of land to a third party (ie for the development of commercial and or retail uses).

The EIS (Section 11) describes how management, maintenance and monitoring matters would be addressed.

7.1 CONSTRUCTION AND OPERATIONAL ENVIRONMENTAL MANAGEMENT PLANS

The EIS (Section 10) states that a Construction Environmental Management Plan (CEMP) would be prepared to document the measures that would be adopted to control and manage construction activities, environmental standards that would be applied and the monitoring requirements that would be adopted during the construction phase. The construction contractor would be responsible for preparing a Environmental Management Implementation Plan (EMIP) that would document how the management requirements and environmental standards specified in the CEMP would be implemented during construction. An Operational Environmental Management Plan (OEMP) would also be prepared by the proponent to document the measures that would be adopted to ensure high standards of operation and maintenance, to manage environmental impacts, to ensure environmental protection, to maintain environmental standards and to undertake corrective actions (based on monitoring). Details of the CEMP, EMIP and OEMP are provided in the EIS, but would need to be verified, further clarified and/or expanded upon if the proposed development is approved.

It is suggested that the titles of the CEMP and OEMP be amended to CEMMP (Construction Environmental Management Plan) and OEMMP (Environmental Management Implementation Plan), as is common practice to ensure that monitoring requirements are recognised as an essential part of the plans.

The EIS also states that a number of associated plans would be prepared, including:

- Coastal Acid Sulphate Soils (CASS) Management Plan
- Soil Erosion & Drainage Management Plan (SEDMP)
- Spill Contingency Plan (Oils & Sewage Leaks)
- Waste Management Plan

It is suggested that separate SEDMP's be prepared for the construction and operational stages. The construction SEDMP would also need to address measures to control stormwater run-off and erosion for constructed allotments that may not be built on for a considerable period of time.

It is suggested that the following plans should also be prepared to form parts of the CEMMP and EMMP documents:

- Waste and Pollutant Source Management & Monitoring Plan – to address all waste streams and pollutants, including building waste, hard waste, litter, floating debris, organic waste, black water, grey water, heavy metals, hydrocarbons etc. Waste avoidance, minimisation, recycling and reuse of materials should also be addressed.
- Entrance Channel, Marina Basins and Waterways Management & Monitoring Plan – to address water quality, sand accumulation, seagrass wrack ingress/accumulation, navigation, boating safety, public safety and the conduct of activities.
- Dredging Monitoring & Management Plan – to address turbidity, seagrass erosion, erosion protection measures and the disposal, treatment and use of dredged materials
- Marine Construction Management & Monitoring Plan – to include the entrance channel, groynes, revetments and moorings
- Marina Facilities Management & Monitoring Plan
- Vegetation Management & Monitoring Plan – for the coastal dune system, mangrove communities, saltmarsh communities and seagrass communities
- Aboriginal Heritage Monitoring & Management Plan – for the monitoring of excavations for the potential discovery for items of Aboriginal Heritage significance and the management of any identified sites.
- Adaptive Coastal Monitoring & Management Plan – to address the potential future need for sand management or further coastal protection works.
- Pest Plant and Animal Management & Monitoring Plan – to address proclaimed species, nuisance species, feral species, domestic animals, garden plant escapees and marine pest species.
- Groundwater Monitoring & Management Plan – to detect contaminated groundwater that could enter the waterways from on-site and off-site sources.

7.2 MANAGEMENT, MAINTENANCE AND MONITORING AGREEMENT

The EIS (Section 11) states that a Management, Maintenance and Monitoring (MMM) Agreement would be prepared and entered into between the proponent and the Ceduna District Council. The agreement would be executed prior to the implementation of the proposed development and would clearly identify the respective roles and responsibilities of all parties in respect to the implementation and operation of the development.

The MMM Agreement would need to ensure the obligations and responsibilities of each party are clearly defined for both the whole of the proposed development and for off-site impacts.

It is suggested that the MMM agreement be prepared in consultation with all relevant government agencies to ensure the requirements of all approvals and relevant legislation (especially the *Environment Protection Act 1993*) would also be addressed.

The agreement should discuss the relevance and relationship of all documents and plans that relate to the development, including:

- CEMMP and OEMMP (and other management and monitoring plans that form these documents)
- Land Management Agreements
- Encumbrances
- By-laws
- Development Plan policies

The MMM Agreement would need to consolidate all the monitoring responsibilities that would be required as a result of any development approval, construction agreements or EPA licensing.

The MMM Agreement would also need to address the possible requirements of Council for financial bonds or bank guarantees that may need to be put in place to cover any maintenance costs (if not performed by the proponent) or for to remedy or complete infrastructure works.

The MMM Agreement would also need to address measures that Council would adopt to ensure that future development, which is not the subject of the Governor's development authorisation, is undertaken in a consistent manner to minimise and manage construction and operational impacts (ie in accordance with the standards prescribed in the CEMMP and OEMMP).

7.3 LAND MANAGEMENT AGREEMENTS

A draft Land Management Agreement (LMA) be prepared for the establishment and management of the marina facilities and to control the future development of residential allotments and associated activities. The LMA would be between the Council and the land owners, in the first instance the Ceduna marina Development Company, and subsequently the purchasers of the allotments.

The proposed draft LMA (EIS – Appendix B) includes *Design Guidelines and Use Obligations* that address a range of requirements for the design and construction of buildings and structures (including jetties) and the activities of allotment owners. A copy of the final LMA document would be attached to the Title of the allotment to ensure owners are aware of their responsibilities in regard to the conduct of activities on their land as part of the marina development community.

The draft LMA would need to include requirements in regard to the management of stormwater, including maintenance of the stormwater treatment devices (especially the infiltration plinth along the revetment edge), the collection of stormwater for irrigating gardens (if not used for domestic purposes) and limiting the amount of hard surfaces. The LMA should also make allotment owners aware of their obligations under the *Environment Protection Act 1993* to avoid the impacts of pollution on waterways and the existence of the EPA *Code of Practice for the Prevention of Stormwater Pollution for the Community*.

7.4 BY-LAWS

Council would need to enact by-laws under the *Local Government Act 1934* to regulate the use of public waterways, the use of public facilities and the marine toilet pump-out facility and refuelling facility.

7.5 DEVELOPMENT PLAN POLICIES

If the proposed development is approved, the Council would need to rezone the land through the Plan Amendment Report (PAR) process. The Council boundary would need to be extended offshore to encompass the full extent of the development (ie to include the breakwaters).

Ceduna Council will need to prepare a PAR for the area under its control to ensure that compatible and suitable Zones and policies are associated with the development, if the proposal is approved under the Major Development provisions of the *Development Act 1993*. To gain control over the whole of the development, Council will also need to extend the boundary of the Local Government area into Murat Bay.

Council has already lodged a Statement of Intent to the Minister for Urban Development and Planning for the PAR and the EIS outlines the investigations that will be undertaken in preparing the PAR, which include studies in the following areas:

- Land and housing supply/demand
- Retail and commercial capacity
- Industry needs analysis
- Transport and movement
- Urban form and character
- Physical infrastructure
- Open space and recreational needs and
- Tourism and demand for facilities

8 CONCLUSIONS

The assessment of the Ceduna Keys Marina has required the consideration of a range of social, economic and environmental issues.

The detailed information on which the assessment is based is contained in the EIS (dated June 2005) prepared by the Ceduna Marina Development Company, public comments on the EIS and the Response document (dated November 2005) prepared by the proponent. It also relies on information and comments provided in submissions through the consultation process and advice from relevant South Australian Government agencies.

Major issues raised during the public comment period and Government consultation included:

- Realignment of the Eyre Highway (including relocation of the PIRSA Quarantine Station)
- Impact on local businesses
- Implications for community service providers
- Social integration
- Integration with the township of Ceduna
- Impact on the marine environment, especially sensitive off-shore islands and threatened species
- Impact on the coastal environment, especially migratory wader habitat
- Native vegetation clearance or disturbance (including seagrass)
- Provision of public open space
- Water quality of the marina, waterways and Murat Bay
- Provision of facilities for the aquaculture/fishing industry
- Provision of a water supply and effluent disposal system

This assessment makes the following conclusions in relation to issues required to be addressed by the Major Developments Panel.

8.1 DEVELOPMENT PLAN AND PLANNING STRATEGY

The proposed development is, on balance, at substantial variance with the policies of the Coastal Zone, and is also generally inconsistent with many of the relevant provisions of the Rural Living and Recreation Zones in the Ceduna Development Plan. The proposal is generally consistent with economic and social policies in the Council wide provisions of the Development Plan, but at some variance with the environmental policies. The proposal is also considered not to be in accordance with many of the policies in the Land not within a Council Area (Coastal Waters) Development Plan.

If approval is granted, a Plan Amendment Report will need to be prepared to generate Zones and policies that are both compatible with the proposed land uses and which will not impact significantly on the surrounding areas and existing township. The proposed development is generally in accordance with the Planning Strategy.

8.2 ENVIRONMENTAL ISSUES

8.2.1 Habitat and Biodiversity

The proposal has the potential to result in a range of impacts that could not only detrimentally affect local biodiversity, but have implications for biological communities and conservation values of the wider region (especially the marine environment). It is expected that the proposal would directly result in a

significant loss of terrestrial and marine native vegetation. The clearance of coastal vegetation can easily be compensated for by revegetation and the protection and environmental improvement of nearby remnant stands. Existing coastal dune and intertidal habitat adjacent the proposed site would be detrimentally affected threatening processes associated with urban encroachment, especially human disturbance and pest plant and animal species. Similarly, the marine environment of Murat Bay would be affected by greater human use (ie boating movements, fishing, diving, litter and aquaculture), potential discharges of pollutants and the possible introduction or spread of marine pest species.

The combined loss and disturbance of coastal habitat in the local area could have a significant detrimental effect on fauna. Due to high vegetation clearance rates and a low level of native vegetation remnancy, the proposal could have a significant impact on local biodiversity in the region. The main biological implication of the proposal is the establishment of a substantial resident population and a larger increase in visitors to the area that will result in a high level of 'people pressure' on a relatively undisturbed area. In particular, the direct and indirect loss of intertidal habitat for migratory waders could be significant. A lack of data on use of the area makes a comprehensive assessment of the impact difficult. Urban encroachment would deter fauna from using this habitat unless suitable buffers are established. In addition, anthropogenic impacts (especially a substantial increase in domestic/feral cat numbers, the walking of dogs, increased use of local beaches, off road vehicle usage) would significantly increase the level of threatening processes on the surrounding environment.

Providing resources to improve the management of the habitat value of nearby coastal communities would help mitigate the effects of the proposal to the west of the site. The detailed management of remnant vegetation on and adjacent the site and the establishment and management of the 'Restricted Area' would need to be addressed in the Native Vegetation Management Plan.

The direct impacts on the marine environment (ie seagrass loss) can only partly be compensated for by the possible regeneration of the entrance channel. However, a net loss of seagrass will occur due to the construction of the channel. Further loss of seagrass resulting from erosion along the edges entrance channel would need to be mitigated through strategies developed as part of the Sand and Seagrass Management Plan.

The off-site impacts (ie from increased boating activities, recreational use of the coast and an expansion of aquaculture and/or commercial fishing) would significantly increase the level of threatening processes on marine flora and fauna, possibly to a greater extent than on-site impacts. The offshore islands and surrounding embayments have high conservation value (with some being classed as pristine), especially as they provide habitat for threatened species. In particular, increased human disturbance and aquaculture could have a significant long-term effect on marine mammal species, especially the endangered Southern Right Whale and Australian Sea Lion. Whilst on-site impacts (ie vegetation clearance) can be compensated for, the off-site impacts are more difficult for the proponent to manage.

From a broader perspective, the establishment of a commercial/recreational marina and residential waterfront development has the potential to erode the conservation values of the area, which may reduce its potential for Marine Protected Area status. Therefore, the State Government would need to monitor and manage the majority of off-site impacts, especially on conservation reserves in the region.

8.2.2 Coastal Processes

No large sand interception issues are expected as a result of breakwater construction. Erosion impacts on the dredged channel may also be minimal, although tidal movement (as water ebbs at low tide) and storms may produce some scouring that would require some repairs if the channel batters are eroded. Low profiles on the batter sides and inshore protection against erosion would protect the channel from scouring and slumping.

Any sand and seagrass moving along the coast is expected to be trapped by training walls and removed by land based earth moving equipment. Periodic maintenance will be required of the channel and sand and seas grass build up on the breakwaters will have to be excavated and moved, the frequency and extent of these operations will depend on storm frequency and wave movements. Monitoring on a continued basis will be required to deal with issues as they arise and establish patterns in local sand movements.

8.2.3 Water Quality in the Marina, Waterways and Murat Bay

The EIS considers that the marina and waterways would be well flushed during normal tide conditions to ensure good water quality. All potential discharges to the marina, especially stormwater run-off, would be controlled to ensure pollutants do not enter the waterways. By maintaining good water quality in the marina, discharges to the marine environment would have a minimal impact on the marine environment. A water quality monitoring program for the marina and offshore waters would detect any deterioration of water quality.

8.2.4 Waste Management

There is insufficient detail provided in relation to the control and management of wastes from commercial and recreational boats or maintenance activities associated with these. Issues that will need to be addressed include:

- Wastewater pump-out facilities to be provided in accordance with current best practice guidelines for use by both recreational and commercial vessels. The facilities should be able to receive both grey and black water and pump out facilities connected to the dedicated sewage treatment and disposal system.
- A waste oil reception station should be provided in the commercial area.
- A designated secure receptacle for the disposal of quarantine wastes from overseas vessels should be provided (if relevant)
- Solid waste receptacles with self-closing lids should be located within the commercial wharf, public boat ramp and public wharf with ample facilities provided. These measures should minimise the potential for vermin to access the waste, rainfall infiltration and odours to be generated. Users should be encouraged to segregate waste types to enable recycling. The waste should be collected by a licensed contractor on a regular basis and disposed at an EPA landfill licensed to receive the wastes.

All waste sources from the proposed development must be managed in accordance with *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand* (ANZECC, 1997). In addition the marina facility must also be managed in accordance with the *EPA Code of Practice for Vessel and Facility Management: Marine & Inland Waters* and the *Code of Practice for Materials Handling on Wharves* (currently in draft form).

The proposal must comply with the *EPA Code of Practice for Industrial, Retail & Stormwater Management* and a Pollutant & Waste Source Management Plan be prepared and implemented for the whole of the development to guide ongoing construction and operation.

Bunded areas must conform to EPA guidelines 'Bunding and Spill Management' EPA 080/04.

Additional information is required on the design of the collection and treatment systems for sewerage to the satisfaction of the EPA and Department of Health. It is recommended that sewers be constructed within the road reserves and the development avoid construction of sewer mains below the waterways as

far as is practicable. An alarm system should also be installed at all pumping station control points to provide an early warning of spills.

8.3 SOCIAL ISSUES

8.3.1 Workforce and Employment

There are probably enough trained and available local employees to undertake the tasks required. If not the proponent will invariably import them from elsewhere especially for the initial few years of the development. After the marina is established the workforce numbers will reduce substantially.

There would be significant employment opportunities for Aboriginal people. There is a strong commitment from the indigenous community to be involved in Commonwealth Department of Employment Program (CDEP) scheme projects which offer training in the community for skill development. It is expected that a scheme of this sort would be implemented for the development of the marina. However, a growth in ongoing jobs offers the possibility of long term improvement in social well being and housing.

8.3.2 Public Facilities and Service Providers

The EIS proposes that a Community Centre would be developed to promote cultural, recreational and leisure activities for the Ceduna community (and also interpretation of regional tourism attractions, especially the natural environment, and promotion of the fishing and aquaculture industries). However, the Response document indicates that it would be more of a Cultural Centre. The proponent has advised that it can be “what ever the community wants”. Its final position is also uncertain, as the EIS states that the location is subject to negotiation. It is currently proposed to be located to the southern boundary of the site for better integration with the town (and recreational activities). The EIS states that the precise design and layout would be the subject of a separate development application. The proponent has not made a commitment to fund its development. Therefore, it is expected that the Centre would be developed by the Council (with the aid of Government funds) and the nature of it would be determined through community consultation. The precise function and location of the proposed centre is uncertain at this stage.

An increased population in a remote/rural area will automatically increase the demand for health services. Any increase in emergency retrieval services (provided by the Flying Doctor) is likely to add significant cost pressures due to the increased retrieval and visiting services. The Ceduna District Health Services has ageing infrastructure and would need upgrading,

The full range of public and private health services will require expansion due to a proportional increase in demand and nature of health services, especially with a change to the age profile of the town. The cost of these expanded facilities, both capital and ongoing operational costs, cannot be determined due to the fact that the age profile, disability profile, ethnicity and permanent residency has not been estimated by the proponent. The proponent considers that the supply of health and other services will automatically follow the demand.

8.3.3 Social and Township Integration

There is a risk that the proposal may not be fully integrated with the township, not through a lack of physical connection, but mainly through social or cultural division. The proposal may not encourage social harmony if it results in a divided township, especially through perception. The development provides a minimal level of community facilities, with the Community/Cultural Centre being the main contribution. Within the development, there will be no low-cost housing made available in accordance with the State Housing Plan

and there are very few usable open space reserves. There could also be significant social-economic differences between the two parts of town. This could also be compounded if the business focus of Ceduna is split between the town centre and the marina.

8.3.4 Aboriginal Heritage and Native Title

Consultation has occurred (and will continue to occur) with local Aboriginal communities. An archaeological survey of the site identified very few sites of significance. Native Title implications are also being addressed in regard to securing tenure for Crown land. A Indigenous Land Use Agreement (ILUA) is currently being negotiated and is expected to be finalised in the near future to resolve these matters.

8.3.5 Air Quality

This AR concludes that odours are not expected to be significant, it is still important that the proponent and or Council monitors potential odorous emissions associated with the treatment, reuse and storage of any wastewater. In addition appropriate management measures for seagrass wrack will need to be documented in a management plan to ensure that objectionable odours do not occur.

8.3.6 Noise

This AR concludes that noise impacts during construction and operation of the proposed marina are able to be managed. The proponent will be required to prepare noise monitoring and management protocols for incorporation in relevant construction and operational management plans and these are to be consistent with EPA requirements. There are significant concerns with the proposed mitigation measures for noise impacts on the residential areas from the railway and Eyre Highway. While these could be argued to be technically feasible they do not appear to be practical or realistic and would require further work. The design of housing and noise amelioration would need to be addressed in the Plan Amendment Report proposed by the Council, to ensure noise sensitive design is used in areas exposed to noise.

8.3.7 Character and Lifestyle

The proposal will add a ‘marina waterfront’ lifestyle opportunity to Ceduna’s range of housing types. This experience is generally sought after around the South Australian coast, although in locations that are not too distant from the Adelaide metropolitan area. It does not address integration and inclusion issues for the diverse Ceduna community rather it will require enhanced security measures to protect its inhabitants and their property. Apart from the proposed ‘day care centre’ there is little to attract families.

The proponent would need to further investigate opportunities for providing usable open space areas for recreation that are not related to water based activities.

8.3.8 Visual Effects

The EIS does not provide any visual representations or modelling to gain a clear understanding of the visual impact on the coast and township (especially from prominent structures, such as the breakwaters). In addition, no street scaping or landscaping plans are provided to gain an insight into look or theme of the overall development. Neither is there any indication as to whether a consistent approach to building design, especially for prominent buildings, would be adopted. Thus, it is difficult to assess the built form and appearance of the development, nor the quality of the standard of design.

The artist's impression in the EIS provides an oblique view of the proposed layout to show how the development may look in the future. As with all coastal marina developments there will be an impact on the coast and the views that can be found presently in that location. Two to three storey developments appear to be proposed on the site and will be quite visible from surrounding areas and from the coast around Murat Bay. The development would also be highly visible from boats on Murat Bay. In particular, the breakwaters would have medium density residential and tourist commercial uses, which are likely to be prominent.

The acoustic protection mound would also be a prominent visual feature of the proposal that would block views of the coast and the development from the Eyre Highway. It would provide a vegetated backdrop to the development. The screening of the fence on top of the mound by vegetation may soften its hard lines and appearance.

The Plan Amendment Report proposed to be prepared by the Council should address some of the issues relating to the scale and appearance of the built form on the site.

8.4 ECONOMIC ISSUES

The establishment of the proposed marina has potential for significant economic benefits in terms of increased employment and investment associated with the construction and operation of the development. There is also scope for significant potential growth in the tourism, fishing and aquaculture sectors as a result of the proposed development.

8.5 CONSTRUCTION AND OPERATIONAL ISSUES

8.5.1 Groundwater and Condition of Land

There is insufficient information to assess the status of groundwater and soil contamination at the site and whether there are potential risks to human health and the environment. There will need to be additional investigations undertaken and these should be independently reviewed by an Environmental Auditor (Contaminated Land) and a site audit report completed to indicate whether the site is suitable for the intended uses.

8.5.2 Stormwater Management

No stormwater up to a 1:20 yr ARI rainfall event should be discharged to the marina or waterways in order to protect water quality and the marine environment. It is proposed to manage stormwater by the control of pollutant sources and the adoption of Water Sensitive Urban Design (WSUD) measures. All residential, commercial and industrial buildings would have rainwater tanks fitted. Residential buildings shall be able to use collected rainwater for hot water systems and toilets.

A Soil Erosion & Drainage Management Plan would need to be prepared to detail how erosion control and WSUD measures would be employed during construction and operation.

A stormwater drainage plan would be required for the realignment of the Eyre Highway and associated acoustic protection mound, including measures to avoid discharges to the marina and waterways, adequate removal of pollutants common to highway runoff and management features capable of diverting and holding spills of toxic material on or adjacent to the highway.

8.5.3 Hazard Risk Assessment and Management

The potential hazards and risks in relation to water safety issues and public risk associated with the use of the waterways have not been adequately considered by the proponent. Additional information is required on the management and monitoring of hazardous substances and dangerous goods. The proponent must prepare Management Plans for further assessment and approval by relevant government agencies before construction commences.

8.6 TRANSPORT ISSUES

The proposal requires the relocation of the Eyre Highway around the site. The design of the realignment needs to consider the impact on national freight movement, the effect on the existing roadhouse/motel and the safe movement of traffic onto the highway from existing roads and the development. The development would result in a greater volume of residential and commercial traffic entering/exiting the highway. Disruption to traffic flows would need to be minimised during construction. The proponent has prepared a traffic management study to address these matters.

The impact of noise emissions from traffic on the Eyre Highway and the existing railway line requires the construction of a noise buffer, especially for the residential component. The EIS proposes to establish a vegetated buffer mound and fence that would be 5.70 metres high. In addition, a range of design and behavioural requirements for housing and residents (especially sound proofing and keeping windows closed) would need to be imposed. The effectiveness and practicality of these mitigation measures needs to be further investigated and implemented through further design work, and through provisions of a subsequent Plan Amendment Report to address the detailed design of houses abutting the Eyre Highway.

The realignment of the Eyre Highway would necessitate the relocation of the PIRSA Quarantine Station to a location north of its current position. The design of the new station would need to ensure traffic safety and ease of operation.

The proponent needs to undertake final design work on the Highway realignment and noise buffer, to satisfy the requirements of the State and Commonwealth Government transport agencies, and to commit to the funding for such works.

8.7 INFRASTRUCTURE

This AR concludes that establishment of the development is contingent on resolution of a number of key issues, the supply of potable water, agreement on the re-alignment of the Eyre Highway, upgrading the Ceduna wastewater treatment system and who will be responsible for the associated costs.

8.8 MANAGEMENT AND MONITORING

A multi-component residential marina would result in a wide range of short-term and long-term impacts on the surrounding environment and community and also within the development itself. These would need to be managed through the preparation and implementation of a Construction Environmental Management & Monitoring Plan, an Environmental Management Implementation Plan (for construction) and an Operational Management & Monitoring Plan. Monitoring would be essential for measuring the impact of the development and triggering strategies for impact mitigation and adaptive management.

Dredging/earthworks drainage and the operation of the marina facility are activities that would need to be licensed by the EPA. The sewage disposal system would need to be approved by the EPA and Department for Health.

The proponent and the Council would also need to enter into a Management, Maintenance & Monitoring Agreement that identifies and allocates the roles and responsibilities of each party for all components of the development.

9 RECOMMENDATIONS

Should the Governor grant a provisional development authorisation, the approval should be based on the following requirements:

RESERVED MATTERS

1. Compliance with the Building Rules in relation to all aspects of the proposed Major Development relating to building works
2. Realignment of the Eyre Highway and associated roads and intersections - finalised plans, drawings, specifications and financial arrangements, which are to be prepared to the reasonable satisfaction of the Department for Transport, Energy & Infrastructure and the Commonwealth Department for Transport & Regional Services
3. The acoustic protection mound (including landscaping) - finalised plans, drawings and specifications, which are to be prepared to the reasonable satisfaction of the Environment Protection Authority and the Department for Transport, Energy & Infrastructure
4. The provision of an adequate water supply to the development site - finalised plans, drawings, specifications and financial arrangements for which are to be prepared to the reasonable satisfaction of SA Water
5. The arrangements for the expansion of the town's effluent lagoons to cater for the increased demand from the development, in relation to which the applicant and the Ceduna District Council must enter a binding agreement, to the reasonable satisfaction of the Environment Protection Authority and the Department of Health
6. The public boat ramp, slip-way, wash-down, hard stand and associated parking - finalised plans, drawings and specifications, which are to be prepared to the reasonable satisfaction of the Environment Protection Authority, the Department for Transport, Energy & Infrastructure and the Ceduna District Council
7. The Site Contamination Management Plan - finalised and consolidated version, which is to be prepared to the reasonable satisfaction of an Environmental Auditor (Contaminated Land) and the Environment Protection Authority
8. The Vegetation Management Plan - finalised and consolidated version, which is to be approved by the Native Vegetation Council
9. The Management, Maintenance and Monitoring (MMM) Agreement between the Ceduna Marina Development Company and the Ceduna District Council - finalised and consolidated version, which is to be concluded between the parties
10. The Construction Environmental Management and Monitoring Plan (CEMMP) for the pre-construction and construction phases - finalised and consolidated version of which is to be prepared to the reasonable satisfaction of the Environment Protection Authority, other relevant government agencies and the Ceduna District Council
11. The Stormwater Management Plan detailing the approach to the collection, storage, treatment and reuse of stormwater run-off for all components of the development during the operational phase of the development - finalised and consolidated version of which is to be prepared to the reasonable satisfaction of the Environment Protection Authority, other relevant government agencies and the Ceduna District Council
12. The Operational Environmental Management and Monitoring Plan (OEMMP) for the

- operational phase of the development - finalised and consolidated version, which is to be prepared to the reasonable satisfaction of the Environment Protection Authority, other relevant government agencies and the Ceduna District Council
13. The Management Plan for the implementation of the 'Restricted Area' (as identified by Figure 6 in the Response document) to limit public access and activities for the protection of the environment - finalised and consolidated version, which is to be prepared to the reasonable satisfaction of the Department for Environment & Heritage, the Department for Water, Land & Biodiversity Conservation and the Department for Primary Industries & Resources
 14. The Site Preparation and Landscaping Plan for the acoustic protection mound and the whole of the site - finalised and consolidated version of which is to be prepared to the reasonable satisfaction of the Ceduna District Council
 15. The Noise Emission Management Plan for mitigating the impacts of noise generated by the Eyre Highway and railway line - finalised and consolidated version, which is to be prepared to the reasonable satisfaction of the Environment Protection Authority

CONDITIONS

1. No works on any part of the proposed Major Development shall commence until a favourable decision has been notified to the applicant by me or my delegate in respect of all reserved matters.
2. No construction activities or building works shall commence until a heritage survey has been completed to identify any Aboriginal Sites, Objects or Remains in the site area, and monitoring shall be undertaken during construction to enable the development to proceed without a breach of the *Aboriginal Heritage Act 1988*. Details of the applicant's Heritage Agreement and consultation with the relevant Aboriginal group shall also be provided to the Development Assessment Commission and the Department of Aboriginal Affairs and Reconciliation prior to construction commencing.
3. No construction activities or building works shall commence until the Environment Protection Authority and an independent Environmental Auditor (Contaminated Land) have certified the approved Site Contamination Management Plan to identify any soil or groundwater contamination that could affect the development. Additional investigations shall have been undertaken to assess the extent of soil and groundwater contamination at the proposed development site, soil investigations of the proposed entrance channel and potential impacts from off-site contamination on the proposed development.
4. Minimum site levels of 2.70 metres AHD and minimum floor levels of 2.95 metres AHD shall be established for areas within the development that are not subject to wave run-up. Minimum site levels of 3.00 metres AHD and minimum floor levels of 3.25 metres AHD shall be established for areas within the development that are subject to wave run-up.
5. Construction activities shall be suitably managed to minimise and/or mitigate impacts on the community (especially noise and dust) and the natural environment as far as practicable.
6. All contamination management or remediation works shall be undertaken in accordance with an

approved Site Contamination Management Plan (as amended from time to time) and to the satisfaction of the Environment Protection Authority.

7. The storage capacity for the dredging discharge ponds and the required sediment settling times shall be recalculated following the completion and review of the detailed offshore soil investigations for the entrance channel excavation works.
8. A decision on building rules compliance will only be made after a Building Rules assessment and certification has been undertaken and issued by the Ceduna District Council, or a private certifier, in accordance with the provisions of the *Development Act 1993*, and after the Minister for Urban Development & Planning receives a copy of all relevant certification documentation, as outlined in Regulation 64 of the *Development Regulations 1993* (refer to 'Notes to Applicant' below for further information).
9. Before seeking my or my delegate's decision in respect of the matters reserved at paragraph b(x) of the Decision section, the applicant shall finalise and lodge a consolidated '*Construction Environmental Management and Monitoring Plan*' (CEMMP). The CEMMP shall cover the pre-construction and construction phases of the proposed Major Development and shall consolidate the applicant's previously submitted draft Construction Environmental Management Plan, Coastal Acid Sulphate Soils Management Plan, Soil Erosion & Drainage Management Plan, Spill Contingency Plan and Waste Management Plan. The matters to be addressed in the consolidated EMMP shall include, but shall not be limited to, the management, mitigation, monitoring, and corrective actions/contingency plans of the following matters during each of these phases:
 - dust and sediment control
 - odour emissions
 - surface and ground water management
 - site contamination
 - waste management (for all waste streams) and overall site clean up (including litter)
 - chemical, oil, construction-related hazardous substances and fuel use and storage, and other materials that have the potential to contaminate stormwater (including emergency responses).
 - noise emissions (including ongoing noise assessment and monitoring to ascertain the effectiveness of noise control measures)
 - Aboriginal Heritage requirements in accordance with commitments by the applicant and Heritage Agreement
 - vegetation clearance
 - introduced plants and animals
 - impacts on the marine environment (especially turbidity).

- visual impacts (including lighting)
 - traffic management strategies
 - effect on existing infrastructure
 - impacts on adjacent land users
 - site security, fencing and safety and management of impacts on local amenity for residents, traffic and adjacent land users
 - periods and hours of construction and operation in accordance with Environment Protection Authority requirements
 - management of ongoing earthworks and construction (especially residential and commercial buildings)
 - community complaints register regarding the above matters.
10. No construction activities or building works shall commence until an Environmental Management Implementation Management Plan (EMIP) has been completed, which shall meet the reasonable satisfaction of the Environment Protection Authority and the Development Assessment Commission.
11. Before seeking my or my delegate's decision in respect of the matters reserved at paragraph b(xi) of the Decision section, the applicant shall finalise and lodge a consolidated '*Operational Environmental Management and Monitoring Plan*' (OEMMP). The OEMMP shall cover the pre-construction and construction phases of the proposed Major Development and shall consolidate the applicant's previously submitted draft Operational Environmental Management Plan, Coastal Acid Sulphate Soils Management Plan, Soil Erosion & Drainage Management Plan, Spill Contingency Plan and Waste Management Plan. The matters to be addressed in the consolidated OEMMP shall include, but shall not be limited to, the management, mitigation, monitoring, and corrective actions/contingency plans of the following matters during each of these phases:
- dust and sediment control
 - surface and ground water management
 - stormwater management
 - waste management (for all waste streams) and overall site clean up (including litter)
 - chemical, oil, hazardous substances, fuel use and storage, and management/emergency response plans
 - safe boating navigation
 - water based activities
 - sand accretion and deposition
 - seagrass wrack accumulation

- coastal hazards (especially flooding)
 - impacts on the coastal and marine environment
 - pest plant and animal species (both terrestrial and marine)
 - odour emissions
 - noise emissions (including a monitoring program to ascertain the effectiveness of noise control measures)
 - visual impacts (including lighting)
 - streetscaping, landscaping and revegetation
 - traffic management
 - public access
 - public safety
 - impacts on adjacent land users
 - control of land and water based activities
 - buildings and structures (including private moorings and fencing)
 - periods and hours of building construction and operation
 - community complaints register regarding the above matters.
12. All works and site activities shall be undertaken in accordance with the approved Construction Environmental Management and Monitoring Plan, Environmental Management Implementation Management Plan and Operational Environmental Management and Monitoring Plan.
13. Transport routes for the delivery of construction materials shall be selected to the reasonable satisfaction of the Ceduna District Council.
14. Compaction specifications (certified by a registered engineer), shall be prepared to the reasonable satisfaction of the Ceduna District Council, for the areas for residential allotments, commercial development, retail development, tourist development, carparks, public boat ramp and hardstand shall be submitted to the Development Assessment Commission.
15. Stockpiled soils shall be suitably managed to control dust emissions, erosion and weed infestation.
16. Amour rock used for breakwaters and revetments shall not be contaminated by fine sediment.
17. No construction activities or building works shall commence until designs for the proposed effluent disposal system for the development site and connection to the town's STED scheme are be finalised and implemented.

18. Arrangements for the expansion of the town's effluent lagoons to cater for the increased demand from the development shall ensure suitable standards and facilities (with adequate capacities) are adopted and located for effluent disposal, including the potential long-term demand from the possible residential, commercial, retail and tourist related uses of the site.
19. The wastewater collection and treatment system shall be designed to ensure that the general obligations of the *Environment Protection (Water Quality) Policy 2004* are met, and to ensure that effluent does not overflow or escape from drains, pipes, sumps, tanks, storage/treatment basins into any watercourse, or into stormwater drains which do not drain into the effluent collection, treatment and disposal system, except where the effluent complies with criteria in the above Policy.
20. The proponent shall provide undergrounded public lighting, power supply, water supply, television antenna and telephone supply to each allotment in accordance with, and to engineering design standard plans approved by the electricity, mains water and telephone public utility authorities.
21. The applicant shall ensure that there is no direct discharge of stormwater into the marina basins, waterways or marine environment for rainfall less than, and including, 1:20 year ARI events.
22. The land to be used for land-based allotments shall be formed to prevent stormwater flows entering into the waterways.
23. Water-sensitive urban design measures and practices shall be adopted for the management of run-off, including stormwater capture and reuse.
24. Undeveloped allotments shall be left in a neat and tidy condition, with soil surfaces stabilised to minimise erosion.
25. Road, drainage, footpath and intersection designs (ie. engineering construction plans) shall be finalised in accordance with the requirements of the Department for Transport, Energy & Infrastructure and the Ceduna District Council, prior to construction commencing. Drainage arrangements for existing roads and the railway line easement must not be altered unless agreed by the owner of the road. Road and drainage designs shall include water table levels, drainage inverts and pavement details. The roads and drainage works shall be built in accordance with these designs.
26. Road and associated kerbing shall be designed and constructed to avoid stormwater flows entering into the waterways by directing flows to inland disposal areas.
27. Road designs shall not affect existing natural drainage lines in such a way as to cause flooding.
28. A set-back distance of 2 metres from the top of waterway edge treatments shall be provided for the construction of further coastal protection works if required in the future.

29. The design of the Eyre Highway realignment shall avoid spills of toxic materials from entering the marina basins, waterways or marine environment.
30. Appropriate navigational aids shall be erected in prominent locations, in consultation with the Department for Transport, Energy & Infrastructure, prior to use of the facility for boating purposes.
31. Further engineering designs for breakwaters, edge treatments and other waterway related structures, commercial and recreational moorings, public boat ramp (including associated car parking and access), hardstand, wash-down, travel lift, boat refuelling facility and marine toilet pump-out/treatment facility shall be prepared and independently certified by a registered engineer, to the reasonable satisfaction of the Department for Transport, Energy & Infrastructure. A certificate as to the structural soundness of the proposed structures shall be submitted to the Development Assessment Commission, prior to the commencement of their construction.
32. Access systems for all floating boat moorings shall be capable of adjustment or be readily adaptable to projected long-term sea level rise and all marina mooring structures shall be designed in accordance with the Australian Standard AS3962 – 1991 Guidelines for Design of Marinas..
33. The public boat ramp facility shall be generally designed in accordance with the South Australian Boating Advisory Committee’s Guidelines for Planning, Design and Construction of Boat Launching Facilities.
34. The boat refuelling dock and marine toilet pump-out facility shall be designed to meet the requirements of the EPA, the Department for Transport, Energy & Infrastructure and the Department of Health respectively.
35. The proponent shall ensure satisfactory oil spill and fire fighting facilities and contingencies, determined in consultation with the Department for Transport, Energy & Infrastructure and the Metropolitan Fire Service (MFS) and/or the Country Fire Service (CFS) respectively, are in place prior to commencement of operation of the marina.
36. The water contained in the marina basin must be kept to a quality appropriate for secondary contact recreation, public amenity and the maintenance of marine aquatic ecosystems, as stipulated from time to time by the ANZECC Australian Water Quality Guidelines for Fresh and Marine Waters.
37. The acoustic protection mound shall be designed and maintained to ensure stormwater run-off is suitably managed to minimize soil erosion and flooding, to provide public access and to result in noise levels from the Eyre Highway and railway that do not exceed:
 - (a) 52 dB (A) between the hours of 7am and 10pm measured and adjusted at the nearest existing residential property in accordance with the *Environment Protection (Industrial Noise) Policy 1994*.

- (b) 45 dB (A) between the hours of 10pm and 7am measured and adjusted at the nearest existing residential property in accordance with the *Environment Protection (Industrial Noise) Policy 1994*.
- (c) a short term typical maximum noise level of 60 dB (A) when measured at the nearest existing residential property.
38. The acoustic protection mound shall be planted with indigenous species and be constructed using suitable materials that are of a quality that would sustain the long-term growth of vegetation.
39. Landscaping of the acoustic protection mound shall comprise.
40. Landscaping and streetscaping of the site shall commence prior to the issuing of Certificates' of Title for each stage of the land division, and when established must be maintained in good health and condition at all times. A plant must be replaced if or when it dies or becomes seriously diseased within the first growing season after the plant dies or becomes seriously diseased. A weed control program shall also be implemented.
41. The Ceduna District Council shall be given seven days notice, prior to the commencement of works, and be provided with the name and contact facilities for the person responsible for coordinating site works covered by this approval.

NOTES

1. Approvals will be required for all components of the development not hereby approved, including:
 - the land division;
 - the marina moorings and other marina facilities;
 - the public boat ramp, travel lift, hardstand, boat repair/maintenance facility and carpark areas;
 - the boat refuelling and boat effluent disposal facility;
 - the installation of navigational aids;
 - the community/cultural centre; and
 - all residential, commercial, retail, tourist related and other buildings.
2. Further design and infrastructure/service plans (ie. subject to separate applications to Council in the future) would be required should further development approval be sought for the community/cultural centre and for commercial, retail and tourist related buildings.

3. Pursuant to *Development Regulation 64*, the applicant is advised that the Ceduna District Council or private certifier conducting a Building Rules assessment must-
 - (a) provide to the Minister a certification in the form set out in Schedule 12A of the *Development Regulations 1993* in relation to the building works in question; and
 - (b) to the extent that may be relevant and appropriate-
 - (i) issue a Schedule of Essential Safety Provisions under Division 4 of Part 12; and
 - (ii) assign a classification of the building under these regulations; and
 - (iii) ensure that the appropriate levy has been paid under the *Construction Industry Training Fund 1993*.

Regulation 64 of the *Development Regulations 1993* provides further information about the type and quantity of all Building Rules certification documentation for Major Developments required for referral to the Minister for Urban Development & Planning.

4. The Ceduna District Council or private certifier undertaking Building Rules assessments must ensure that the assessment and certification are consistent with this provisional development authorisation (including any Conditions or Notes that apply in relation to this provisional development authorisation).
5. Should the applicant wish to vary the Major Development or any of the components of the Major Development, an application may be submitted, provided that the development application variation remains within the ambit of the Environmental Impact Statement and Assessment Report referred to in this provisional development authorisation. If an application variation involves substantial changes to the proposal, pursuant to Section 47 of the *Development Act 1993*, the applicant may be required to prepare an amended Environmental Impact Statement for public inspection and purchase. An amended Assessment Report may also be required to assess any new issues not covered by the original Assessment Report and a decision made by the Governor pursuant to Section 48 of the *Development Act 1993*.
6. Pursuant to the Harbors and Navigation Act 1993, the Council will need to enter into a licence agreement with the Minister for Transport over adjacent and subjacent land on terms acceptable to the Minister prior to the commencement of construction. Such agreement will require completion of the works to the satisfaction of the Minister, at which time the responsibility and control of the area will be transferred so as to minimise the Minister's ongoing responsibilities. It is currently anticipated that the transfers will be via a sales agreement pertaining to the reclaimed residential, tourist and commercial portions of the land, and undertakings by the Council to accept the groynes/breakwaters as reserve and the remaining area under long term lease.
7. The applicant's CEMMP and OEMMP should be prepared taking into consideration, and with explicit reference to, relevant EPA policies and guideline documents, including, but not limited to: the *Environment Protection (Air Quality) Policy 1994*, the *Environment Protection (Water Quality) Policy 2003*, the *Occupational Health and Safety Regulations*, *EPA Guidelines on Odour Assessment*,

using odour source modelling 2003, EPA Handbook for Pollution Avoidance on Commercial and Residential Building Sites 2004, EPA Bunding and Spill Management Guidelines 2004 and the EPA Stormwater Pollution Prevention Codes of Practice, in addition to other legislative requirements and Guidelines/Australian Standards requiring compliance.

8. The following activities in relation to the components of the development hereby approved and/or requiring future approval will require licences under the *Environment Protection Act 1993*:
 - Earthworks Drainage: the conduct of earthworks operations in the course of which more than 100 kilolitres of waste water containing suspended solids in a concentration exceeding 25 milligrams per litre is discharged directly or indirectly to marine waters or inland waters.
 - Marinas and Boating Facilities: the conduct of -
 - (a) facilities comprising pontoons, jetties, piers or other structures (whether on water or land) designed or used to provide moorings or dry storage for 50 or more powered vessels at any one time; or
 - (b) works for the repair or maintenance of vessels with the capacity to handle five or more vessels at any one time or vessels 12 metres or more in length.
 - Dredging: removing solid matter from the bed of any marine waters by any digging or suction apparatus, but excluding works carried out for the establishment of a visual aid to navigation and any lawful fishing or recreational activity.
9. It is likely that as a condition of such licences the Environment Protection Authority will require the licensee to carry out specified environmental monitoring of water quality and to make reports of the results of such monitoring to it.
10. It is also likely that the Environment Protection Authority will require the identification to it of any vessels that visit the marina from international ports or from ports beyond Adelaide and the surrounding area, together with details of the routes travelled by such vessels (for the purpose of identifying the potential introduction of harmful marine species).
11. All works associated with the rehabilitation and remediation of the site must be undertaken in accordance with the General Environmental Duty as defined in Part 4, section 25(1) of the *Environment Protection Act 1993*, the *Environment Protection (Water Quality) Policy 2004*, and other relevant Environment Protection Policies made under Part 5 of the *Environment Protection Act 1993*, the ANZECC *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australia and New Zealand*, draft guideline *Environmental Management of*

On-Site Remediation and other relevant EPA publications and guidelines.

12. The proponent is advised of the General Environmental Duty under Section 25 of the *Environment Protection Act 1993*, which requires that a person must not undertake any activity, which pollutes, or may pollute; without taking all reasonable and practical measures to prevent or minimise harm to the environment.
13. The management plan for acid sulphate soils should comply with Guidelines issued by the Coast Protection Board.
14. The applicant is reminded of its obligations under the *Aboriginal Heritage Act 1988* whereby any “clearance” work, which may require permission to disturb damage or destroy Aboriginal Sites, must be undertaken with the full authorisation of the Minister for Aboriginal Affairs and Reconciliation, according to Section 23 of the *Aboriginal Heritage Act 1988*.
15. The applicant, and all agents, employees and contractors, such as construction crews, must be conversant with the provisions of the *Aboriginal Heritage Act 1988*, particularly the requirement to immediately contact the Department of Aboriginal Affairs and Reconciliation in the event that archaeological items (especially skeletal material) are uncovered during earthmoving.
16. The applicant, and Council after hand-over of infrastructure, must comply with the *Public and Environmental Health Act 1987* in regard to the maintenance of suitable water quality within the marina basin (and any stormwater holding ponds) to protect public health and amenity.
17. The expression ‘secondary contact recreation’ includes activities such as wading, boating and fishing in which some human contact with the water may occur, but in which the probability of bodily immersion or the intake of significant amounts of water is minimal.
18. If foreign vessels are allowed to berth in the marina the proponent would need to consult with Transport SA (Marine Safety Section) to address any requirements of the Australian Quarantine Inspection Service (AQIS) and Australian Customs Service.
19. It is recommended that the applicant approach the Ceduna District Council with a view to the Council enacting of by-laws to manage activities associated with:
 - the entrance channel and waterways to ensure safe navigation and to protect water quality
 - the boat ramp, wash-down, slip-way and hardstand
 - the refueling facility and marine toilet pump-out facility
 - the residential development and reserves (including stormwater management devices)
20. The Ceduna District Council will need to review and amend the zoning and policies in the relevant Development Plan to reflect any development approved by the Governor and for

future assessment and decision-making for buildings and structures not part of this development authorization.

21. Noise generated from the non-residential components of the development should not exceed:
 - (a) 52 dB (A) between the hours of 7am and 10pm measured and adjusted at the nearest existing residential property in accordance with the *Environment Protection (Industrial Noise) Policy 1994*.
 - (b) 45 dB (A) between the hours of 10pm and 7am measured and adjusted at the nearest existing residential property in accordance with the *Environment Protection (Industrial Noise) Policy 1994*.
 - (c) a short term typical maximum noise level of 60 dB (A) when measured at the nearest existing residential property.

22. When preparing development plan policies for the marina site, the Ceduna District Council will need to adopt the following EPA recommended noise criteria for the design of buildings used for residential or tourist accommodation that are potentially affected by noise impacts from the Eyre Highway and railway:
 - (a) internal noise levels ranging from 30-40dB(A) and 35-45dB(A) for bedrooms and living areas respectively
 - (b) indoor noise levels between 30-45dB(A) for sleep disturbance

23. When preparing development plan policies for the marina site, the Ceduna District Council will need to consider the following design requirements for buildings used for residential or tourist accommodation that are affected by noise impacts from the Eyre Highway and railway:
 - Use of separation, building orientation, sheds, continuous fencing and mounding to reduce noise levels outside of the residence
 - Locating noise sensitive spaces of the proposed residence away from the highway and railway (with the windows and openings directed away from the noise source) and less sensitive areas such as the kitchen, storage areas and laundry towards the noise source
 - Minimising the size and numbers of windows oriented towards the traffic noise source
 - Windows to noise sensitive spaces be closed during the night time
 - Replacing conventional pitched roof / eaves designs with flat roof / parapet designs
 - Using construction techniques that seal air gaps around doors and windows
 - Relocate conventional wall air vents to areas not facing the traffic noise source
 - Using solid core doors in conjunction with rubber seals and internal doors with rubber seals into habitable rooms to provide an “acoustic air lock” arrangement.

- Using thicker window glass or double-glazing to noise sensitive spaces, such as bedrooms.
 - Providing alternative means of ventilation for rooms where elements such as windows in the dwelling facade are to be closed to provide a minimum acoustic performance.
24. Land division creating allotments extending into the water over the sea bed need to negotiate tenure arrangements with the Minister for Transport. Current policy is that Freehold Title would not be granted if the seabed is alienated. Leasing arrangements are the standard form of tenure for private moorings.
25. It is unlikely that a land division will be approved unless provision is made for a set back distance of two metres from the top of the edge treatments (for the construction of coastal protection works if required in the future).
26. A common building scheme encumbrance or equivalent device for the purpose of ensuring compliance with design standards for residential and other buildings will be required at the land division stage.
27. Binding legal arrangements (eg. easements, encumbrances, charge-back arrangements etc. as appropriate) as between the proponent and allotment owners must be put in place, prior to application to the Registrar General for the issue of new Certificates of Title, to ensure financial and management responsibilities related to the maintenance of edge treatments, the design and appearance of structures and the installation of future coast protection works are clearly allocated. These arrangements must be to the reasonable satisfaction of the Development Assessment Commission.
28. A site audit report will be required to be completed by an Environmental Auditor (Contaminated Land) and submitted to the relevant planning authority, prior to the issue of Certificates of Title. The site audit report should be presented to purchasers of allotments.
29. The Minister has a specific power to require testing, monitoring and auditing under Section 48C of the *Development Act 1993*.

10 REFERENCES

Baker, J.L. (2004). *Towards a System of Ecologically Representative Marine Protected Area in South Australian Marine Bioregions – Technical Report*. Prepared for Coast & Marine Conservation Branch, Depart for Environment & Heritage, South Australia.

Major Developments Panel, South Australia, *Issues Paper – Ceduna Keys Marina and Community Centre Proposal*, April 2004.

Major Developments Panel, South Australia, Guidelines for the preparation of an Environmental Impact Statement for the Ceduna Keys Marina and Community Centre Proposal, June 2004.

Planning Strategy for Regional South Australia, 2003.

The Ceduna District Council Development Plan, 2003.

The Land Not Within a Council (Coastal Waters) Development Plan, 2003.

11 GLOSSARY

The 'Act'	<i>Development Act 1993 and Regulations</i>
AR	Assessment Report
CASS	Coastal Acid Sulphate Soils
DAC	Development Assessment Commission
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
DWLBC	Department of Water, Land and Biodiversity Conservation
Panel	Major Developments Panel
Response	Response Document
WHO	World Health Organisation

APPENDIX 1

ADDITIONAL MODIFIED PLANS PROVIDED BY THE PROPONENT

AMENDMENTS		
ISSUE	REMARKS	DATE BY
A	EIS SUBMISSION	5.8.04 JAF
B	LAYOUT MODIFIED	30.11.05 AB

STAGE A CONSTRUCTION ITEMS

- COMMENCE EYRE HIGHWAY DIVERSION INCLUDING WATER MAIN, SEWER MAIN AND ARCH CULVERT TO FUTURE LAND DIVISION
- CONSTRUCT WESTERN AND SOUTHERN BREAKWATERS INCLUDING TEMPORARY BUND
- INSTALL DEWATERING PUMPS AND SETTLEMENT PONDS
- EXCAVATE SOUTHERN WATERWAYS EAST OF EYRE HIGHWAY
- FILL ADJACENT LOW LYING LAND AND BUILD NOISE MOUNDS
- STOCKPILE EXCESS EXCAVATED MATERIAL OFFSITE

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PROJECT

CEDUNA KEYS MARINA
CEDUNA, SOUTH AUSTRALIA

CLIENT

CEDUNA MARINA DEVELOPMENT CO.

DRAWING TITLE

CONSTRUCTION STAGING
STAGE A

DRAFTER	ENGINEER/DESIGNER	PROJECT MANAGER	CIVIL/STRUCTURE MANAGER
JAF	BA	BA	WNC

DATE	SCALE
JULY 2004	NTS
DRAWING NUMBER	ISSUE

100026-ST01 B

DO NOT SCALE FROM THIS DRAWING
NOT FOR CONSTRUCTION



AMENDMENTS		
ISSUE	REMARKS	DATE BY
A	EIS SUBMISSION	5.8.04 JAF
B	HOLDING BASIN ADDED.	15.3.05 JAF
C	LAYOUT MODIFIED	30.11.05 AB

- STAGE B CONSTRUCTION ITEMS**
- INSTALL RIP RAP AND CONCRETE EDGE BEAM TO SOUTHERN WATERWAY BATTERS
 - INSTALL CULVERT TO CONNECT TO FUTURE NORTHERN WATERWAYS
 - CONSTRUCT STAGES 1, 2 AND 3 LAND DIVISION INFRASTRUCTURE WORKS (ROADS AND SERVICES)
 - INSTALL SETTLEMENT PONDS AND DEWATER ENCLOSED AREA WEST OF EYRE HIGHWAY
 - EXCAVATE WATERWAYS WEST OF EYRE HIGHWAY AND FILL LOW LYING AREAS
 - CONNECT DIVERSION ROAD TO EYRE HIGHWAY AND REDIRECT ALL TRAFFIC ALONG THE NEW DIVERSION ROAD
 - RE-ROUTE THE OVERHEAD POWER LINES ALONG EYRE HIGHWAY
 - CONSTRUCT THE ENTRANCE CHANNEL HOLDING BASIN AND COMMENCE DREDGING.

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DRAWING TITLE
CONSTRUCTION STAGING
STAGE B

DRAFTER	ENGINEER/DESIGNER	PROJECT MANAGER	CIVIL/STRUCT MANAGER
JAF	BA	BA	WNC

DATE
 JULY 2004

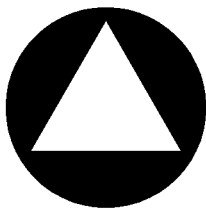
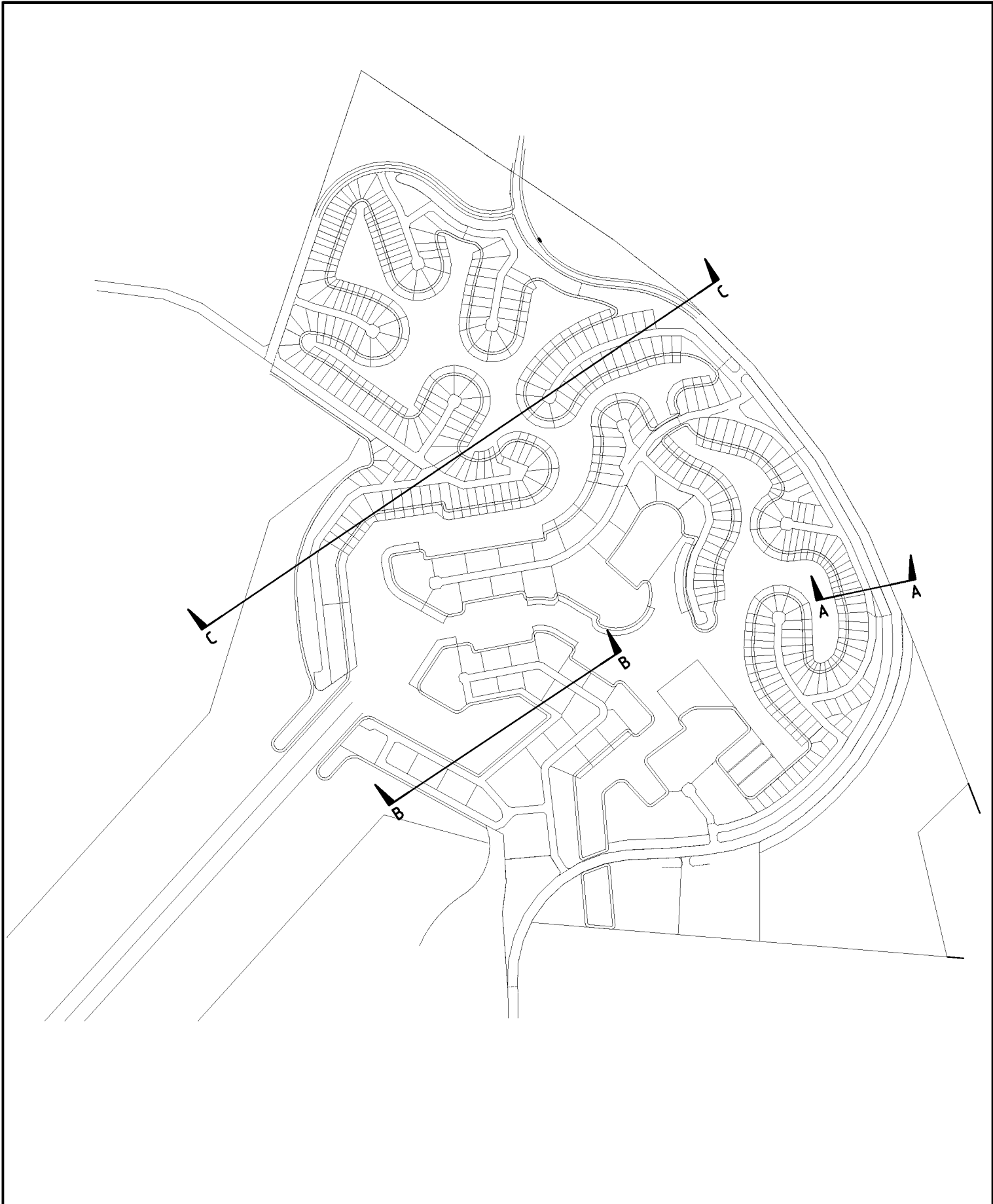
DRAWING NUMBER
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DESCRIPTION	SHEET No.
SITE PLAN	100026-SK-07
COMMENT CEDUNA MARINA DEVELOPMENT CO.	UPDATED
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