**Development Act 1993**

# ASSESSMENT REPORT

For the Environmental Impact Statement

For the

**CAPE JAFFA ANCHORAGE MARINA**

Proposal

Minister for
Urban Development & Planning

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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 Cape Jaffa Development Company Pty Ltd together with the Kingston District Council, to develop a marina and residential development at Cape Jaffa. The proposed development is located to the immediate south and east of the existing township of Cape Jaffa. Cape Jaffa is located approximately 23 kms south of Kingston in the South East of South Australia

The development is proposed to be undertaken in several stages over a twelve year period. The development will include breakwaters, a marina basin with associated marine facilities and residential allotments.

This AR 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 February 2005, public and council comments and submissions on the EIS, and responses to these submissions in the proponent's Response Document (RD). This AR also relies on information, comments and advice provided by relevant South Australian Government agencies and an additional proponent report dated 4/11/05 appended to this AR.

## 1.2 BACKGROUND

The proponent comprises, the District Council of Kingston and the Cape Jaffa Development Company Pty Ltd being an associated entity of a private earth moving company (Lucas earthmovers). An agreement exists between the two parties that protects existing ratepayers from financial exposure.

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

- Develop a protected marina for the use of the fishing fleet in the area,
- To provide residential development sites in a desirable coastal location,
- To improve the services and facilities available to the community of Cape Jaffa.

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

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

## 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 in Sections 46 to Section 48 of the *Development Act 1993* (the Act).

Pursuant to Section 46(1) of the Act, the proposed Cape Jaffa Anchorage marina was declared to be a Major Development on 19 December 2002 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 of Major Development status by the Minister, a development application was lodged with Planning SA on 20 February 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).

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 2003. 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 for the proposed Cape Jaffa Anchorage Marina and set the Guidelines, which were publicly released in June 2003. Pursuant to Section 46B 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 January 2005. The EIS was placed on public exhibition from Wednesday 23 February 2005 to 7 April 2005, during which time submissions were invited from the public, and relevant Government Agencies. The Council did not lodge a submission as it is partly the proponent for this development. Following the public exhibition period, the proponent lodged a Response to submissions on the EIS with the Minister on 14 September 2005, which contained some variations to the proposal. The proponent's Response Document (RD) was released on 19 September 2005. 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 46B(9) of the Act, the Minister, in preparing this AR, 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 AR 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 the Minister's AR and 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

The proposed site of the marina and residential development lies on the shores of Lacepede Bay. There is an existing jetty with an extensive mooring area for the fishing fleet, an associated commercial/industrial area, 23 dwellings, a tourist park and foreshore reserve areas. The site has an area of some 150 hectares and is gently undulating. The land is being used for grazing and occasional cropping purposes and has low agricultural productivity. Much of the works, inclusive of canals, housing and infrastructure, lies on the flats behind the foredunes. A channel will project through the foredune across the beach and a breakwater will be built out to sea.

The proposed Cape Jaffa Anchorage Marina is located to the immediate south and east of the existing Cape Jaffa township, approximately 23 kilometres south of Kingston and 40 kilometres north of Robe in the south east of South Australia (Figure 1).

## 2.2 THE LOCALITY

The site is located on the coast between Kingston and Robe in the south east of South Australia as stated above. The local area comprises the small township of Cape Jaffa, surrounding agricultural land and some land used for horticulture. Vineyards are also noted in the nearby Mt Benson/Cape Jaffa wine region.

The Southern Ports Highway is the major transport link between the South Eastern freeway and Mount Gambier. Kingston and Robe are important towns connected to the Southern Ports Highway.

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

See Fig 1 for locality plan.

## 2.3 THE SUBJECT LAND

The formal descriptions of the freehold land are contained in CT Vol 5853 Folio 840 and CT Vol 5560 Folio 348 (portion only). Portion of CT Vol 5560 Folio 348 is the subject of a separate application for the division of land to facilitate the separation of the land depicted in the development concept (as discussed in section 3.4 of the EIS). The subject land also incorporates portions of public roads as these are to be affected by the proposal. Portion of King Drive is proposed to be relocated south of its current alignment as depicted on the plan in Appendix 5 of the EIS whereas Cape Jaffa Road will be closed for the majority of its length seaward from its current junction with Rothalls Road and Limestone Coast Road. The proposal also affects a thin strip of the Rothalls Road reserve along the southern boundary of the site.

## 2.4 NATURE OF THE PROPOSAL

The proposal is for a safe boating harbour and marina with attendant boating facilities and tourist and residential accommodation and includes the following features:

- Two breakwaters extending out to sea approximately 200m
- Channel dredged to a depth of -3m AHD
- Main Harbour Basin

- Boat ramp
- Fishing and aquaculture industries services area
- Fuel and waste management facilities
- Boat washing and hull cleaning
- Maintaining and repairing vessels
- Public marina berths
- Commercial berths
- Commercial wharf
- Waterways
- Retail facilities
- Residential allotments
- Private marina berths
- Apartment, motel and cabin accommodation
- Motor Repair Station – marine servicing and hardstand
- Recreation Facilities and Open Space
- Landscape buffers
- Reticulated Power
- Telecommunications

Section 3.5 of the EIS provides greater detail on the above items and their uses.

See Fig 2 for the development concept plan

## 2.5 CONSTRUCTION STAGING AND OPERATION MANAGEMENT

The proposed development is expected to be staged over 10 to 12 years with up to seven or eight stages. The staging plan is provided in Figure 3.24 of the EIS. The first stage to be developed would be the breakwaters, boat moorings, commercial area and some residential allotments. This would allow the early transfer of fishing vessels presently in Lacepede Bay on swing moorings into the marina.

It is expected that the first three stages of the proposal would be developed at the same time which will establish the main marina basin and associated commercial areas. The majority of the residential development would be in the next stages after the initial basin is established.

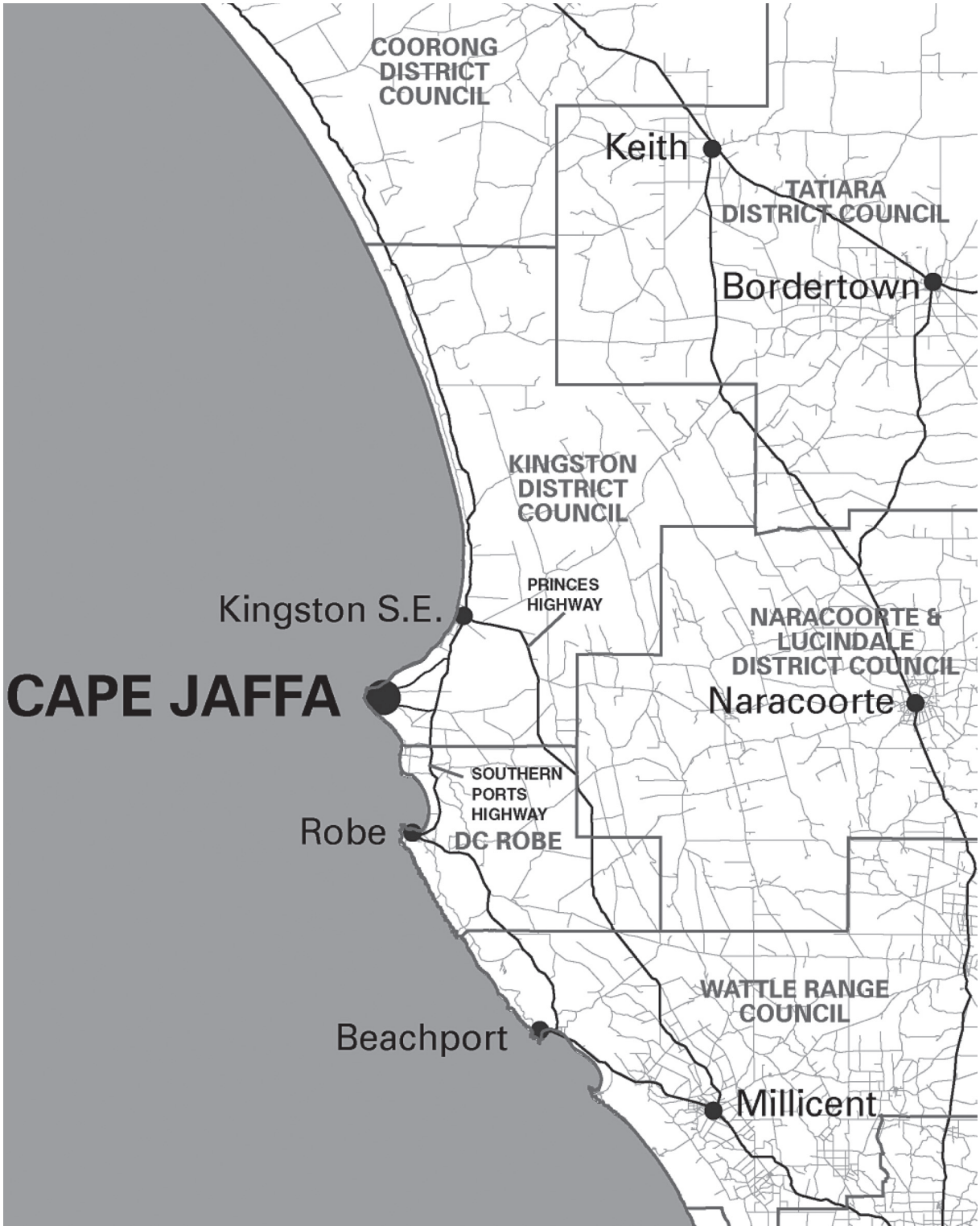
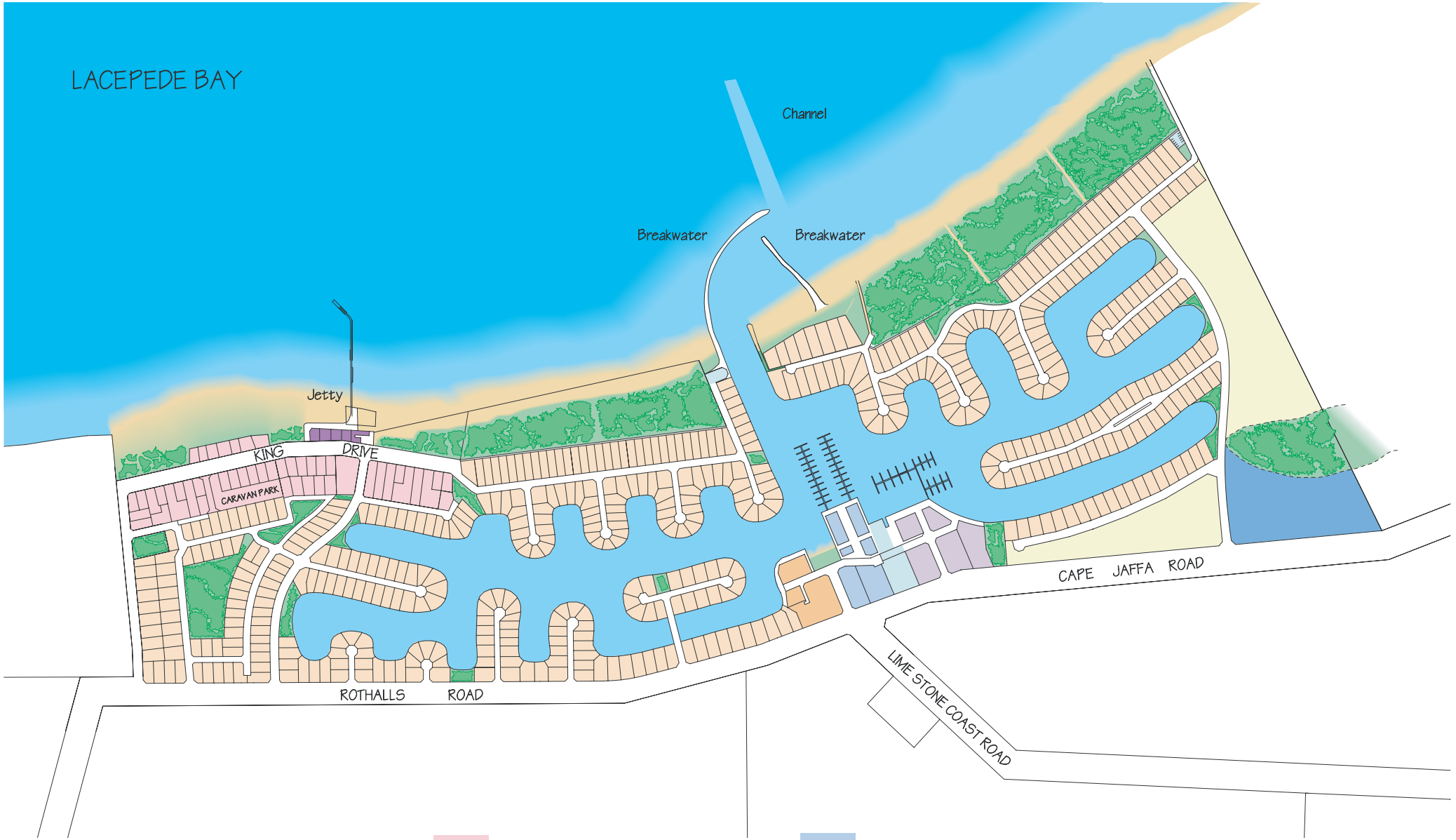



Figure 1: Location Plan

SOURCE: ENVIRONMENTAL IMPACT STATEMENT (2005)




SOURCE: RESPONSE TO SUBMISSIONS (2005)

**Figure 2**

**CONCEPT PLAN**

## 2.6 INFRASTRUCTURE REQUIREMENTS AND AVAILABILITY

In the EIS the proponent has indicated that all required infrastructure services (including power, water, wastewater treatment and telecommunications) could be established on the site of the proposed development, either as new facilities or by connection to existing services.

Investigations by the proponent, subsequent to the release of the EIS, indicated that groundwater located below the site would not be suitable as a source of potable water. Additional investigations undertaken by the proponent has indicated that water for the proposal will be sourced from a bore approximately 17kms to the north east of the development. The details are outlined in a letter from the proponent, dated 29 September 2005 appended to this AR. The Department of Water, Land and Biodiversity Conservation indicated that on the basis of the information provided by the proponent the proposed water supply would be suitable for all stages of the proposed development in terms of water quality, volume, and impacts on the resource and other users of the resource (letter dated 24 October 2005). It is proposed that the pipeline to connect the water supply to the bore will follow the route marked alternative source (Fig 1 in attachment to AR from proponent dated 4 November 2005).

Kingston Council has agreed to establish the pipeline within the road reserve of the Limestone Coast Road (letter dated 27 October 2005). The proponent has indicated (letter dated 4 November 2005) that the pipeline would be located in the area between the guide posts and the road surface, avoiding the need for disturbance of native vegetation. The location of additional sites in which to install groundwater extraction bores are proposed to be investigated in order to provide back up to the existing defined well. The proponent expects that the bores would be located along the proposed pipeline route alignment. The establishment of any new bores would be in accordance with the Water Allocation Plan.

A package wastewater treatment system will be established for the development. This will need to be to the standard agreed by the Department of Health.

# 3 EXISTING ENVIRONMENT

## 3.1 PHYSICAL SETTING

The physical setting of the project was outlined in Section 4.2 of the EIS. Essentially the proposed development is located to the east and south of the Cape Jaffa settlement and adjacent to a north facing beach area. The Cape Jaffa settlement includes a range of activities including, residential dwellings, outbuildings for the storage of fishing vessels, fish receival area, commercial/light industrial premises associated with fishing activities, tourist park (caravan sites, cabins, shop and camping sites), fuel storage, a waste incinerator, vacant land and a coastal reserve.

Topographically the proposed development site includes an off-shore area, the adjacent beach and fore-dune and adjacent coastal land that varies from 1.5 m to 5 m AHD. The land south of the dune area is gently undulating and swampy depressions are present in the western portion of the site.

## 3.2 SOCIAL DEMOGRAPHICS

The social characteristics of the Cape Jaffa township and surrounding areas was described in section 4.3 of the EIS document using Census data from the Australian Bureau of Statistics from the 1991 – 2001 Census Period.

The investigations undertaken for the EIS indicate that there was a 4.75% growth in population in the affected areas which is much more than the growth for the State as a whole. There was an increase in the proportion of older people and correspondingly a decrease in the proportion and number of younger people in the area. This is similar to that experienced in the whole of the State. The reduction in the number of young people is attributed to the aging of the population and the availability of work opportunities in the immediate region.

For those who are employed in the region the largest employer group was in the agriculture, forestry and fishing industries which accounted for over 50% of all employed persons in the last Census.

According to the supply and demand studies for housing undertaken in the EIS, there is currently a shortage of vacant residential land in the Kingston District Council area. It would also appear that there is not much diversity in the housing stock available with most dwellings being single dwellings on a standard housing block.

The description of the social demographics provided in section 4.3 and expanded in section 5.3.1 of the Response Document provide further information on the status of the communities at Cape Jaffa and surrounding areas.

## 3.3 HISTORICAL DEVELOPMENT

In 1802 Cape Jaffa was discovered by the French explorer Nicholas Baudin who named it Cape Bernouilli. The English explorer, Captain Matthew Flinders, mis-identified it and called it Cape Jaffa ( a name originally given to another location by Baudin after the town of Jaffa in the middle east) and it was known by this name by 1850. The ‘Cape’ was also known as Kings camp named after W.F. King the works superintendent for the construction of the lighthouse. The settlement has always had a fishing focus and it is known that whaling activities occurred in the area. A small community has developed around the existing jetty and associated fish processing facilities. There is also a caravan park and associated general store. There is no other commercial development at Cape Jaffa and for all other requirements the inhabitants of Cape Jaffa must travel to Kingston, Robe or further afield.

The Margaret Brock Reef lighthouse is of significant historical importance to the Cape Jaffa area. The lighthouse was commissioned in 1872. Margaret Brock reef was named after a wrecked ship in the area. The light house operated for 100 years until a new lighthouse at Robe was constructed. A fund was established in the 1970's to relocate the lighthouse to Kingston and this was accomplished in 1976 by dismantling and re-constructing the lighthouse on Marine Parade at Kingston, where it currently stands. It is considered a rare example of a lighthouse which contains living quarters in the lighthouse structure. The site is managed by the National Trust and is open to visitors.

## 3.4 GEOLOGY AND HYDROGEOLOGY

### 3.4.1 Geology

The geological and hydrological setting of the proposed development is included in Section 4.8 of the EIS.

The geology of the region is characterised by the Tertiary age Dilwyn Formation and Gambier Limestone and Quaternary age sediments. The Dilwyn Formation consists of an inter-layered sequence of sands gravels and clays, whereas the Gambier Limestone comprises bryozoal limestone, marl, chert and dolomite. A clay sequence separates the Dilwyn Formation and Gambier Limestone.

The Quaternary soils include the Bridgewater Formation (calcareous sand beach and coastal ridges), the Padthaway Formation (lagoonal and lacustrine deposits of limestone, clay and sand) and the St. Kilda Formation (sand beach and dune deposits and lagoonal and lacustrine sediments and shells beds.)

The site was investigated by the drilling of 34 bores and the following subsurface profile was interpreted by the proponent:

- St Kilda and Bridgewater Formations – 5.00 m to 10.00 m thick, yellow brown to pale grey sands
- Clay Unit separation layer, variable thickness, 0.2 m to 2.2 m
- Gambier Limestone – limestone and sand

### 3.4.2 Hydrogeology

The hydrogeological conditions on a regional scale and within the site were described by the proponent in section 4.14 of the EIS.

Groundwater is located in two systems, the Tertiary Confined Sand Aquifer (Dilwyn Formation) and the Tertiary Unconfined Limestone Aquifer (Gambier Limestone). As indicated above a predominantly clay sequence acts as a confining layer between the two aquifers. In addition in some places the unconfined aquifer extends into the Quaternary sediments (Bridgewater Formation and Semaphore Sands).

**Unconfined Aquifer**

At the site the unconfined aquifer has been interpreted to occur to a depth of 5 m to 10 m below the existing surface and recharge occurs through direct infiltration predominantly from rainfall. Groundwater flow has been interpreted to be in a northwest direction towards the coast at a hydraulic gradient ranging from 0.0004 to 0.0007. The salinity measured in the wells generally varied from 439 mg/L to 14,900 mg/L.

The hydraulic conductivity was determined by the proponent by undertaking conductivity falling and rising head tests in the on-site bores, and indicated a range between 1 m/day to 30 m/day and averaging 5 m/day. The data indicates a north south trending zone of higher permeability in the western portion of the site. Water levels in the wells were noted to vary seasonally by up to 3m (generally 0.5 m to 1.0 m) and near the coast there was a tidal influence.

Groundwater samples were collected from the bores and analysed for a range of chemical parameters to assess the current water quality below the site, and this has been compared to the EPA Environment Protection (Water Quality) Policy (section 4.14.13 of EIS). The following locations and chemicals exceed the guideline levels:

- Total nitrogen (7.03 -12.5 mg/l) at bores CJ08, CJ26, CJ30 and CJ31
- Total organic carbon (11-78 mg/L) at bores CJ13,CJ14,CJ15, CJ15A, CJ21 and CJ21A
- Oxidised nitrogen (0.57-6.53 mg/L at bores CJ03A,CJ08,CJ11,CJ17,CJ26,CJ28,CJ30 and CJ31
- Phosphorus (0.12-0.87 mg/L) at bores CJ14,CJ15,CJ15A,CJ21,CJ24 and CJ31
- Total arsenic (0.092 mg/L) at bore CJ21
- Cadmium (0.0028 mg/L) at bore CJ21
- Total cyanide (0.006-0.265 mg/L) at bores CJ15, CJ15A, CJ21, CJ21A and CJ24.

Re-sampling of the bores indicated a decrease in the total arsenic and cadmium concentrations to below the guideline levels where they had previously exceeded the guideline. The concentrations of total cyanide had decreased in the later sampling and analysis. The highest concentrations of arsenic, cyanide and cadmium occurred in the northeast portion of the site. The proponent has indicated that this may be related to the historical disposal of animal effluent.

**Confined Aquifer**

The investigations did not intersect the Tertiary Confined Sand Aquifer. Information from regional bores indicates that the piezometric level of the aquifer is above ground level indicating that bore drilled into the aquifer would be artesian or free flowing.

Recharge to the confined aquifer on a regional scale occurs to the east near the Victorian border by downward migration from the unconfined aquifer.

**Freshwater Seawater Interface**

In section 4.14.11 of the EIS the proponent undertook an assessment of the likely location of the freshwater-saltwater interface for the unconfirmed aquifer. On the basis of the results of the drilling program, the proponent concluded that the interface was located a greater depth than penetrated by the bores.

The proponent used an empirical assessment (Ghysen/Herzberg relationship) to estimate the depth to the freshwater/saltwater interface. Table 4.23 in the EIS indicates that the interface is located between 18 m-23m below ground level near the existing settlement and 55 m-63 m in the south east corner of the site.

### 3.4.3 Groundwater Use

Groundwater from the unconfined aquifer is currently used for irrigation, stock water and for domestic purposes.

Water extracted from the confined aquifer in the Kingston area is used for irrigation, town water supply and aquaculture. The proponent has indicated that the nearest well deep enough to extract water from the confined aquifer is approximately 10 kilometres from the site.

Two public submissions indicated there was a free flowing bore located about 6.4 kilometres form Cape Jaffa. The proponent indicated in the RD that the information had been obtained from the PIRSA groundwater well database.

Planning SA obtained additional information from DWLBC on the location of groundwater wells in the Cape Jaffa area and this confirmed the presence of a bore on section 98, Hundred of Mount Benson, as indicated by the public submissions.

## 3.5 GENERAL CLIMATE

Cape Jaffa has a temperate maritime climate with cool wet winters and warm dry summers. Records from nearby townships and Jaffa Hills (3km south-east of Cape Jaffa) have had to be used to infer the temperatures, rainfall and wind expected at the site.

Jaffa Hills receives 559mm annual rainfall, with 100mm falling in July, the wettest month. Rain falls mainly in winter and this is when most aquifer recharge occurs.

Temperature figures from Robe (25km south of Cape Jaffa) indicate a mean daily summer temperature range of 13-23 degrees centigrade and a mean daily winter temperature range of 8-15 degrees Centigrade. Maximum and minimum temperatures normally lie between 2-35 degrees Centigrade.

## 3.6 WINDS

Wind direction during summer is normally from the south and south west. In winter winds are normally from the north.

Table 4.11 in the EIS describes the range of expected wind speeds for Average Recurrence Intervals (ARI years) up to 100 years.

The maximum wind speed for a 1:100 ARI is 49.7 knots.

## 3.7 TIDES

Tides are usually higher in winter than summer, astronomical tide ranges are mainly -0.65 to +0.9mAHD (Australian Height Datum). In 2004 the highest recorded tide was 1.2mAHD, with the lowest -0.982mAHD at the Cape Jaffa jetty.

Tide levels are also affected by weather, including air pressure, wind direction and speed. This results in the highest tides generally occurring during winter storms and the lowest tides during fair weather in summer.

Extreme high tide for a 1:100 year ARI is estimated to be 1.38m AHD.

## 3.8 WAVES

Wave heights for 1:100 year ARI winds are found in Table 4.15 of the EIS and also in Appendix 15 and 16. These have been used to determine the impacts on the coast and proposed structures.

Generally the waters on the coast of Cape Jaffa are relatively calm due to the extensive shallow waters offshore and protection afforded by the reef system to the west.

## 3.9 COASTAL PROFILE AND LONGSHORE DRIFT

The present coastline is a long sweeping bay, facing north westerly with shallow water extending out to sea. A 10m water depth is reached at 18 kilometres off shore at Lacepede Bay. Combined with shallow off shore reefs, this results in a very low energy coastal environment, influencing erosion, deposition and longshore sand movement.

The beach is gently to moderately sloping, backed by extensive heavily vegetated dunes. The beach is prone to being covered in seagrass washed into shore from the large and continuous seagrass meadows within the shallow bay.

Sand and materials such as seagrass, move along the coast in a north easterly direction. Sand grain size is classified as medium to course with 70-80% carbonate content.

Natural coastal processes have resulted in complex cycles of erosion and deposition but there is an overall trend of sand deposition in the region of the marina development.

The coastline is actively eroding and accreting sand, but due to the low energy wave conditions, change is slow over time. Since 1958 the drift of sand along the coast has resulted in a loss of 20m of beach at the proposed western breakwater, while at the eastern end of the project the beach has receded only a couple of metres. Seasonal variations in erosion and deposition of sand are significant, compared to long term trends. This would require dredging of sand and associated materials such as seagrass, as required and part of maintenance of the breakwater, dredged channel and adjacent beaches.

Due to the continually changing nature of the beach profile as sand is deposited and removed by longshore processes, constant monitoring to determine the need for dredging or deposition of sand and seagrass removal will be required.

## 3.10 TERRESTRIAL ECOLOGY

The Biodiversity Plan for the South East of South Australia (1999) recognises that since early European settlement, most of the south east has been cleared of native vegetation for agricultural use, especially the interdunal flats and watercourses. Consequently, most of the ecosystems and plant communities of the region are considered threatened. Native vegetation clearance, drainage of wetlands, degradation of remnant vegetation, introduced species and disease has reduced the indigenous biodiversity of the region. Wetlands and coastal systems are identified as significant areas. In particular, *Gahnia filum* and *Gahnia trifida* sedgelands are considered vulnerable plant communities that should be protected and restored. All of the coastline can be considered important for the nationally threatened Orange-bellied Parrot, with ocean beaches also important for the threatened Hooded Plover.

The Otway Basin coastline (south of Cape Jaffa) is poorly conserved in Government reserves, but retains some native vegetation backing the coastal features. On a regional basis, significant areas of coastal habitat are conserved within the Bernoulli Conservation Reserve and the Butchers Gap Conservation Park. The latter contains some of the last remaining significant stands of coastal vegetation between the Coorong and Robe. It includes three salt lakes, which provide refuge for birds during summer and

drought periods. Sixteen species of waterbirds have been recorded for the Park, including three that are listed as migratory.

The proposed site is within the Coolatoo Environmental Association (Laut et al, 1977), that extends from the lower Coorong to Cape Jaffa. The area is characterised by coastal dunes (with distinct ridges separated by narrow swales) and coastal plains. Coastal lagoons (seasonal wetlands) are present within inter-dunal corridors. Native vegetation comprises open coastal heath on the dunes and tussock sedgelands on the plains. Most of the native vegetation in the region has been removed and replaced by improved pastures for grazing purposes. Low levels of remnant vegetation (mainly along the coast) and wetlands provide valuable habitat.

## 3.11 MARINE ECOLOGY

The South East coast comprises some of the most diverse and productive waters in South Australia. Lacapede Bay and the coast stretching from Cape Jaffa to Robe lie within a transition zone between the warm temperate waters of the Flindersian Province (a biogeographical region that extends from southern WA to southern NSW) and the colder water Maugean Province (that encompasses Victoria and Tasmania). Hence, in this convergent zone, cool temperate and warm temperate species ranges overlap. East of Robe, the marine floral and faunal assemblages share more in common with the cooler water communities of Victoria than they do with the warm water communities typically associated with the rest of South Australia (ie west of Robe).

The Cape Jaffa area sits between the Coorong and Otway bioregions, which results in unique assemblages of marine communities (Edyvane, 1999). At a finer scale of marine classification, Cape Jaffa lies within the Coorong Biounit that extends from Newland Head (south eastern Fleurieu Peninsula) to the Margaret Brock Reef (western tip of the Cape Jaffa peninsula). The Canunda Biounit extends from Cape Jaffa to Cape Banks (south of Lake Bonney).

The coastal and inshore regions of the South East coast are very diverse and productive and support one of the highest centres of macroalgal and seaweed diversity in the world. The high level of biodiversity is attributed to the converge of the two biogeographic provinces, which results in unique communities of flora and fauna. The area contains several key habitat types, including rocky reefs, soft sediment bottoms and seagrass meadows. Dense beds of seagrass have formed within the lower energy waters on the lee side of the offshore reefs (up to ~ 12 metres depth). Such communities are uncommon along the largely exposed and high energy South East coastline. The transition zone between warm and cold waters results in the spatial extent of the distribution of several species of seagrass being reached in this area (such as *Posidonia sinuosa* reaching its eastern most extent).

Lacepede Bay and offshore waters provide habitat for a wide range of marine mammal species, especially cetaceans (whales) and pinnepeds (sea lions and seals). The endangered Southern Right Whale is often sighted from May – June along this part of the migratory path from Tasmania to the Head of the Great Australian Bight. Pygmy Right, Pygmy Sperm, Sperm and Minke whales also occur. Bottlenose and Common dolphins frequent the bay. The Australian Sea Lion (*Neophoca cinerea*) has been recorded at a haul out site on the nearby Baudin Rocks Conservation Park. The Australian Fur Seal (*Arctocephalus pusillus doriferus*) does not breed in South Australian waters; however, numbers appear to be increasing. Records of regional haul out sites have been made in the South East and on Kangaroo Island. The waters surrounding the Margaret Brock Reef are likely to be a feeding ground for this species (Robinson *et al*, 1996). The New Zealand Fur Seal (*Arctocephalus forsteri*) is also likely to occur in the area.

The extensive seagrass meadows in Lacepede Bay are ecologically important, especially as nursery and feeding areas for fish and crustacean species. The region is one of the State's most productive fisheries (especially for Southern Rock Lobster and Blacklip Abalone), due to nutrient rich coastal upwellings, which are the most significant upwellings found along the whole of southern Australia's coastline.

The Margaret Brock and North Reefs support the western most extent of Giant Kelp (*Macrocystis angustifolia*) and Bull Kelp (*Durvillea potatorum*) along the southern temperate coastline of Australia. There is a large abundance of marine life, especially fish species. The Leafy Seadragon (*Phycodurus eques*) and Weedy Seadragon have been recorded on the reef system (and also the Kingston jetty). At the instigation of the fishing industry, the reef system was declared a marine sanctuary for Southern Rock Lobster populations in 1971. The area is also listed as one of the best dive sites in the State by the Diving Industry Association of South Australia.

The South East is the most under-represented region in South Australia in terms of Marine Protected Areas. There are no marine reserves or parks and only two sanctuaries. The Margaret Brock Reef Lobster Sanctuary is the largest, being 314 hectares in size.

The Lacepede Bay – Cape Jaffa – Margaret Brock Reef area has been identified (Edyvane, 1999) as having prime conservation values as endorsed by the International Union for Conservation of Nature and Natural Resources (Kelleher & Kenchington, 1991). The area has been given a Category 1A rating, due to its level of naturalness and high biodiversity and social values (including cultural). This is the highest level of protection for areas that could be established as strict nature reserves. As such, it could be managed mainly for science, due to it containing outstanding representative ecosystems, geological or physiological features and/or species available primarily for scientific research and/or environmental monitoring. The conservation values of the area include:

- transitional zone between a cold water and warm water biogeographical regions
- coastal upwellings
- seagrass and kelp forests
- endangered species, including the Southern Right Whale, cetaceans, Leafy Seadragon and Orange-bellied Parrot
- Southern Rock Lobster Sanctuary and fishery
- Butchers Gap Conservation Park

In recognition of these values, the Department for Environment & Heritage recently recommended that the area, the Upper South-East (Coorong/Otway Bioregions), 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 *Development Act, 1993,* does not apply to the Major Development provisions of the Act.

## 4.1 DEVELOPMENT PLAN

The relevant Development Plans are *The Kingston (DC) Development Plan, Consolidated 3 November 2005,* where the majority of the subject land is located and the *Land Not within a Council Area-Development Plan consolidated 24 July 2003,* where part of the marina structure would be located. The subject land would currently fall predominantly in the existing Residential and Industry (Cape Jaffa ) Zones, but also lie partly in four other existing Zones, namely the Local Centre, Urban Coastal, Rural Coastal and Primary Industry Zone as prescribed in Map King/29 of the Development Plan.

Section 5.9.1 of the EIS and Appendix 22 include a detailed assessment by the proponent against the two Development Plans.

### 4.1.1 Kingston (DC) Development Plan Zone Provisions

The following provisions of the Kingston DC Development Plan for each of the subject existing Zones are considered to be particularly relevant and an assessment against them is provided as follows:

***RESIDENTIAL ZONE***

***Objective 1:*** *A zone primarily accommodating detached dwellings located on sites of varying size with other forms of medium density residential development, district educational, recreational facilities, tourist accommodation and community facilities in suitable areas.*
***Objective 2:*** *The visual appearance of residential streets progressively improved through well designed new dwellings, substantial front garden landscaping and street tree planting.*
***Objective 3:*** *A zone containing residential development consistent with the coastal outlook and location.*
***PDC 13*** *Within the Cape Jaffa Policy Area 5:*
*(a) the area should accommodate residential and tourist accommodation development;*
*(b) residential development should not be undertaken on any allotment with an area of less than 1000 square metres;*
*(c) all development should have a minimum site level of 2.4 metres Australian Height Datum (AHD) and a floor level of 2.65 metres AHD; and*
*(d) all dwellings should provide for the installation of a rainwater tank of at least 22 500 litre capacity.*
***PDC 20*** *Areas of public reserve should be located strategically and, wherever possible, linked.*

**Under the proposed development, the existing Residential Zone would accommodate predominantly residential uses incorporating a mix of dryland and waterfront allotments, which are mostly in the vicinity of 800m$^2$. Although the proponent acknowledges that demand for smaller allotment sizes may occur and these issues would be dealt with in the proposed PAR. The proposal creates the opportunity for the creation of orderly urban development with a coastal/fishing port character. Residential development in this Zone will be consistent with site level requirements and some**

**provision for open space is made, including a reserve in the western part of the site. The EIS indicates that development and design guidelines would be prepared to ensure that new housing would reflect the coastal and port character of the area.**

***INDUSTRY CAPE JAFFA ZONE***

***Objective 1:*** *A zone containing a range of commercial, storage and light industrial activities.*
***PDC 1*** *This zone should accommodate a range of commercial and light industrial development to serve the local fishing industry, marine and onshore aquaculture industry, and local primary industries.*
***PDC 20*** *Development of land that is adjacent to the Residential Zone should be established to ensure the use:*
*(a) is compatible with adjoining residential uses having regard to noise, odour, air pollution, hours of operation and outdoor lighting; and*
*(b) includes a continuous buffer to adjoining residential development consisting of earth mounding to a height of 3.0 metres at a maximum grade of 1-in-4 with landscaping.*

**As a result of the proposed development, this Zone would be occupied by a mix of uses which are predominantly residential but also include tourist accommodation, some local retail and commercial and a small section of the new marine industry area. With the exception of the marine industry area, the proposed uses can be considered largely inconsistent with the types of land use currently envisaged in this Zone. The majority of the new industry area is proposed in an existing Primary Industry Zone.**

***LOCAL CENTRE ZONE***

***Objective 1:*** *Provision for a limited range of convenience services and facilities catering for the day to day requirements of local residents and visitors.*
***PDC 2*** *Large-scale retail development, and other services which would be beyond those required by the local community, should not be undertaken in the zone.*

**The existing Local Centre Zone would contain primarily new residential development which is inconsistent with the policies of this Zone. Under the proposal, the Local Centre uses are proposed adjacent the area where tourism and commercial uses are proposed.**

***URBAN COASTAL ZONE***

***Objective 1:*** *A zone containing mainly low-intensity recreation activities and minor public works associated with the coast.*
***Objective 2:*** *The conservation of natural coastal vegetation and dune systems.*
***PDC 1*** *This zone should remain undeveloped except for facilities associated with recreational use of the coast.*
***PDC 3*** *Car parking areas should be designed and located so as to minimise their impact on the coastal features of the zone.*
***PDC 5*** *Development should not be located on the sand dunes or land subject to erosion.*
***PDC 6*** *Development which would have an adverse impact on the dune system or natural vegetation should not be undertaken.*
***PDC 8*** *Development should not restrict the effective public access to the coast.*
***PDC 11*** *All kinds of development are* ***non-complying*** *in the Urban Coastal Zone except for:*
*Recreation Area*
*Public Amenities*
*Public Shelters*

**Proposed uses and activities in the Urban Coastal Zone include re-development of road reserve for road purposes, creation of public walkways, redevelopment of carparking areas and creation of public spaces that will result in buffers and fencing and revegetation of degraded areas. There is creation of some residential allotments in this Zone, which is non-complying in this Zone, although the EIS indicates that setbacks would be put in place to ensure that there is no building within the current Zone boundary. In general terms the majority of proposed land uses within this Zone are consistent with the provisions, in that they would facilitate public recreational use of the coast and not impact significantly on the natural features of the Zone**

***RURAL COASTAL ZONE***

***Objective 1:*** *A zone in which the natural coastal features and scenery are preserved.*
***1*** *Development which would detract from the natural coastal features and scenery of the zone should not be undertaken.*
***2*** *Development which would have a detrimental effect on the coastal environmental or landscape amenity of the zone should not be undertaken.*
***3*** *The development of buildings and structures other than those:*
*(a) necessary for navigation, public works or public recreation or park management; or*
*(b) associated with the management of an agricultural activity,*
*should not be undertaken.*
***4*** *All development within this zone should have a minimum site level of 2.40 metres Australian Height Datum (AHD), and a floor level of 2.65 metres, AHD.*
***Appearance of Land and Buildings***
***5*** *Buildings should not be erected:*
*(a) on active dunes, cliff tops or in other locations likely to result in environmental damage;*
*(b) if the clearing of significant areas of native vegetation would be required;*
*(c) in areas of significant vegetation;*
*(d) if they would affect detrimentally the scenic amenity of the coastline, beaches, parks, lookout points and other public places, or the view from Princes Highway;*
*(e) if their location, siting, form, design, materials or colour is inappropriate for the locality;*
*(f) if the intensity of development would change the function or nature of the natural features of the locality;*
*(g) if it would result in restriction of public access to a beach; or*
*(h) if effluent cannot be disposed of satisfactorily within the boundary of the allotment.*
***Environmental***
***6*** *Development should not result in the creation of any additional allotments.*
***9*** *Development involving the clearance of native vegetation should not be undertaken.*
***11*** *All kinds of development are* ***non-complying*** *within the Rural (Coastal) Zone with the exception of facilities ancillary to the solid waste land-fill depot on Allotment 4 in Filed Plan 2408.*

**Proposed uses and activities in the Rural Coastal Zone include remediation and rehabilitation of weed infested areas, creating part of the eastern breakwater and protected channel and residential and public areas to the east of the channel. The creation of the structures and residential allotments would be non-complying uses in this Zone and at variance with the provisions. The EIS argues that there is no serious loss of landscape amenity in the Zone as the areas to be developed for residential purposes are on cleared agricultural land behind vegetated coastal dunes. It also suggests that the breakwater and channel development serve public purposes for vessel navigation.**

***PRIMARY INDUSTRY ZONE***

***Objective 1:*** *The long-term sustainability of primary industries.*
***Objective 2:*** *The protection of primary industry from incompatible uses.*
***Dwellings***
***Objective 18:*** *Residential development only where:*
*(a) there is a demonstrated connection with primary production which can be substantiated*

*in the long term; and*
*(b) the use of a dwelling will not jeopardise the continuation of primary production on adjoining land or elsewhere in the zone.*
***PDC 61** The following kinds of development are **non-complying** in the Primary Industry Zone:*
*…Dwellings on allotments smaller than 40 hectares created after 24 July 2003….*
**Proposed uses and activities in the current Primary Industry Zone include maritime industrial areas for the fishing industry, residential waterfront allotments, tourist accommodation, utility service infrastructure and an area deferred for further residential use. The majority of these activities are inconsistent with policies under this existing Zone. The EIS suggests that the land is considered to be of low agricultural productivity and its conversion to other uses is unlikely to impact on the long term sustainability of primary industry in the region.**

### 4.1.2 Kingston (DC) Development Plan Council Wide Provisions

The following provisions of the Council wide section of the Kingston DC Development Plan are also considered relevant:

***COUNCIL WIDE***

***Form of Development***

***Objective 1:** Orderly and economic development.*
***Objective 2:** A proper distribution and segregation of living, working and recreational activities by the allocation of suitable areas of land for those purposes.*
***Objective 3:** The proper location of public and community facilities by the reservation of suitable land in advance of need.*
***Objective 4:** The re-development of localities which have a bad or unsatisfactory layout, or have unhealthy or obsolete development.*
***Objective 5:** Development to satisfy the social, educational, cultural, employment, recreational, and economic, needs of the population of the district.*
***Objective 6:** Towns and settlements protected from the adverse effects of intensive rural industries.*
***Objective 7:** Provision for industrial, business, residential, recreational, tourist accommodation, and community, development in township areas.*
***Objective 8:** Development of the town of Kingston SE as the major urban and service centre for the district*

**The proposed development segregates the potentially higher impact land uses such as the commercial and industrial zones largely away from the residential areas. It also creates the opportunity for the existing Cape Jaffa settlement to be provided with power, water and sewer. It has the potential to create employment and recreation opportunities and facilitates the expansion of a small existing township by the creation of new residential, industrial and tourist accommodation zones. Its provision of a modest local commercial area will not impact on Kingston's regional function, and may in fact reinforce it, from increased patronage of services and businesses by the new Cape Jaffa residents.**

***Centres and Shops***

***Objective 10:** Centres established and developed in accordance with a hierarchy based on function of each type of centre as appropriate for the region.*

**The proposed centre area of Cape Jaffa will have neighbourhood service role, which is at the lower end of the centres hierarchy.**

***Movement of People and Goods***

***Objective 16:*** *A road network which facilitates safe and efficient movement within the district and towns, maintains convenient road connections with adjacent local government areas, and minimises future road maintenance costs.*
**The EIS indicates that the road network has been designed to ensure the safety of users and creates orderly connections and segregation of areas to minimise conflict between different users.**

***Public Utilities***

***Objective 19****: A range of services and utilities commensurate with development.*

**The EIS indicates that the service infrastructure is designed to be developed in a staged manner directly in accordance with the development requirements.**

***Conservation***

***Objective 27:*** *The conservation, preservation or enhancement of scenically attractive areas, including land adjoining water or scenic routes.*
***Objective 28:*** *The protection of water resources against pollution and contamination.*
***Objective 29:*** *Development should not lead to the deterioration in the quality of surface or underground waters.*
***Objective 30:*** *Land free from erosion.*
***Objective 31:*** *The preservation of roadside vegetation*
***Objective 39:*** *Conservation of significant areas of native vegetation, geomorphological features, important wetland swamp areas, sensitive sand dune environments and associated animal and bird life.*

**The proposal will have some impact on the scenic amenity of a coastal area by introducing a significant level of new development in areas which are currently without any structures. The proposal does however represent an extension of an existing settlement and proposes some restoration work of areas of coastal vegetation and introduction of fencing and designated paths. Extensive investigations have been undertaken into the water resources and groundwater generally and the Department of Land Water & Biodiversity Conservation are satisfied that the proposal will not result in pollution or contamination of ground water resources. The EIS indicates that surface waters will be managed in order to provide recharge to the groundwater through a process of filtration.**

***Tourist Facilities***

***Objective 42:*** *Provision of tourist information and facilities throughout the district and particularly in the town of Kingston SE.*

**The proposal facilitates the opportunity for the establishment of new tourism accommodation ventures and recreation activities.**

***Open Space***

***Objective 43:*** *The conservation and preservation of flora, fauna and scenery and the creation of recreation areas by establishing parks and reserves.*

**The proposal includes some areas of parks and reserves that would be established, including the area of coastal vegetation to the east of the proposed entry channel which will be for reserve and conservation purposes.**

***Country Townships***

***Objective 51:*** *Development of Cape Jaffa as a pleasant seaside township.*

**The proposal represents development of Cape Jaffa and incorporates some concepts and design elements which could be considered pleasant. The scale of the development is however more extensive than that currently envisaged in the Development Plan.**

***Coastal Areas***

***Objective 52:*** *Sustain or enhance the natural coastal environment in South Australia.*
***Objective 53:*** *Preserve and manage the environmentally important features of coastal areas, including mangroves, wetlands, dune areas, stands of native vegetation, wildlife habitats and estuarine areas.*
***Objective 54:*** *Preserve sites of heritage, cultural, scientific, environmental, educational or landscape importance.*
***Objective 55:*** *Maintain and improve public access to the coast in keeping with other objectives.*
***Objective 56:*** *Development which recognises and allows for hazards to coastal development such as inundation by storm tides or combined storm tides and stormwater, coastal erosion and sand drift; including an allowance for changes in sea level due to natural subsidence and predicted climate change during the first 100 years of the development.*
***Objective 57:*** *Developers bearing the costs of protecting private development from the effects of coastal processes or the environment from the effects of development rather than the community.*
***Objective 58:*** *Protect the physical and economic resources of the coast from inappropriate development.*
***Objective 61:*** *Manage development in coastal areas to sustain or enhance the natural coastal environment.*
***Objective 62:*** *Protect the coast from development that will adversely affect the marine and onshore coastal environment whether by pollution, erosion, damage or depletion of physical or biological resources, interference with natural coastal processes or any other means.*
***Objective 63:*** *Development which does not interfere with environmentally important features of coastal areas, including mangroves, wetlands, dune areas, stands of native vegetation, wildlife habitats and estuarine areas.*
***Objective 67:*** *Development only undertaken on land which is not subject to, or can be appropriately protected from, coastal hazards such as:*
*(a) inundation by storm tides or combined storm tides and stormwater;*
*(b) coastal erosion; or*
*(c) sand drift.*
***Objective 68:*** *Development located and designed to allow for changes in sea level due to natural subsidence and probable climate change during the first 100 years of the development. This change to be based on the historic and currently observed rate of sea level rise for South Australia with an allowance for the nationally agreed most-likely predicted additional rise due to global climate change.*
***Objective 69:*** *Development which will not require, now or in the future, public expenditure on protection of the development or the environment.*
***Objective 70:*** *The protection of the physical and economic resources of the coast from inappropriate development.*
***Objective 71:*** *Development of coastal urban settlements, coastal rural living areas, tourist complexes and marinas only in environmentally acceptable areas.*
***Objective 72:*** *Urban development including housing, holiday houses, tourist accommodation, and rural living, as well as land division for all such purposes, only in the zones specifically created for such developments.*
***Objective 73:*** *Development of coastal urban settlements, coastal rural living, tourist accommodation and marinas in an orderly and economic manner which provides for a range of sites while ensuring the number of locations and the size of the zones do not exceed that which is indicated as being required by a realistic assessment of future demand.*

***Objective 74:*** *To re-design and re-develop coastal living areas which do not satisfy environmental, health or public access standards for coastal areas.*
***Objective 75:*** *Development of the marine environment and in particular the marine aquaculture industry:*
*(a) in an ecologically sustainable way……..*

**The proposal will significantly impact on coastal processes particularly in the immediate locality of the entrance channel, by the development of the breakwaters. The EIS indicates that there will be monitoring and appropriate response actions which are provided in detail in Section 5.2.13. It indicates that this Adaptive Management will ensure that there is a substitution process established for the passage of sand along the coast to overcome the interruption occasioned by the breakwaters.**

**In relation to cultural heritage issues it is proposed to create the opportunity to present a collection of indigenous items and their interpretation to reflect the past use of the land in collaboration with historical information regarding the sites European history.**

**In regard to access to the coast, the proposal incorporates new walkways through the dune area, pedestrian access on the breakwaters, formal carparking areas and a pedestrian only area on the beach. The proposal also allows for sea level rise and erosion by raising relevant parts of the land and locating and designing the development in a manner that separates the development from exposure to erosion. In relation to impacts on the coastal dunes the EIS acknowledges that the vegetated dunes are important for this coast and are recognised for rehabilitation and protection, which will result in benefits to this area as a native vegetation precinct and wildlife habitat. The proposal also complies with the coastal flooding policies in the Development Plan as it provides protection against expected sea level rise to 2100, which exceeds the Plans requirements of to 2050.**

**In relation to the risk of increased public expenditure on protection of the development or the environment, the proposal incorporates ground levels designed to accommodate all sea level rise. Further, provision is made to enable the raising of the wall around the waterways to protect development in the future. A fund is also to be established for the maintenance of the facilities and the environment, to be provided by the proponent as part of the land development In addition, funds from rates collected will be allocated to the long term maintenance fund, which will ensure that the users are responsible for the long term maintenance of this environment. The proposal also provides improved facilities that respond to the needs of the tourist development, residential construction and fishing industry activities.**

**In relation to whether the site is a suitable location for the marina, the EIS concludes that all of the effects identified are manageable and that there are no significant effects considered unacceptable. It indicates that there have been several significant studies, strategies and plans that identify Cape Jaffa as an appropriate location to reinforce the existing settlement and to reinforce the existing aquaculture, fishing and tourist industries.**

**Some of the proposed land uses are not compatible with those envisaged, including the placement of residential uses in zones which currently encourage industrial and primary industry activities. If approval is granted, a Plan Amendment Report will be lodged to seek appropriate zoning commensurate with the proposed land uses.**

**The EIS states that the proposal has been designed having regard to the size of the existing fishing fleet and aquaculture activities and the comments and advice received from the industry members; the anticipated requirements for retail and related commercial facilities given the existence of existing facilities and their sizes at Cape Jaffa and the response from the community in relation to the demand for land in this coastal settlement.**

### 4.1.3 Land Not within a Council Area (Coastal Waters) Development Plan Provisions

A small proportion of the proposed site boundary also extends into the bay to encompass the breakwater structure, entrance channel and marine related navigation facilities, where the policies in the Development Plan for 'Land Not within a Council Area' (Coastal Waters) apply.

The Plan states that tourist development, marinas etc should only be undertaken in zones designated for such development. The Plan also contains strong objectives and development control measures for environmental protection of coastal and marine areas and which aim to maintain public access. The protection of sites of cultural, heritage or scientific significance is also promoted. Development should only be undertaken on land that is not subject to coastal hazards and not require public expenditure on protection of the development or the environment. Adequate financial guarantees for construction, operation, management and maintenance are also prescribed.

**A detailed response to these policies is provided in Appendix 22 of the EIS. The EIS includes a number of relevant statements in response to these policies, including the following:**

- **To address the interruption of the flow of sand along the beach by the breakwaters, a management program has been designed to replace the natural flow by mechanically bypassing the breakwaters.**
- **Given the relatively low quantities of sand to be moved this is a relatively simple process as detailed in 5.2.13. This part of the coast is experiencing an overall accretion trend and in that context the coastal processes assessment concludes that an erosion outcome is not expected and that in any case the adaptive management plan will allow for any erosion and accretion.**
- **The siting of the breakwaters is based on the environmental conditions and practical requirements of the users. The amenity of portion of the beach for pedestrians will be significantly improved and there will be additional facilities for tourists, visitors and residents to enjoy the coast.**
- **With reference to sea or stormwater flooding, the proposed development does not require protection measures against sea or stormwater flooding. The development will generally not require future protection measures against additional sea level rise to 2100 as building site and floor levels will be elevated at the time of land development.**
- **Provision has been made in the design for potential future protection measures, such as the raising of the waterway edge treatment walls.**
- **Sufficient land has been provided to accommodate potential protection measures. Sufficient funds are made available via the Marina Facilities Maintenance Fund, which is seeded from part proceeds of land sales and part proceeds of rates derived from rateable properties within the development.**
- **If the proposal is approved a Plan Amendment Report will be prepared creating new zones and associated boundaries to reflect the proposal**

**<u>Conclusion</u>**

The proposal involves land which is currently located in a range of zones in the Kingston (DC) Development Plan. The consistency of the proposed land use is generally consistent with the existing provisions of the Residential Zone and Rural Coastal Zone. In regard to the Industry (Cape Jaffa), Local Centre, Primary Industry and Urban Coastal Zones, there is substantial variance between what is proposed for the land and what the policies envisage.

The Council Wide and Zone objectives and principles of development control of the Kingston (DC) Development Plan Land Not within a Council Area (Coastal Waters) Development Plan have more general provisions which promote a range of criteria including sustainable development, protection of the environment, provision and maintenance of employment opportunities and the rational distribution of land uses to avoid incompatible development. In relation to the majority of the provisions, the proposal can be considered generally compatible in relation to a range of criteria.

Such criteria include including economic and employment generation, visual impact, provision of services and environmental impacts including those on groundwater resources and the coastal environment.

## 4.2 PLANNING STRATEGY

The appropriate Planning Strategy is the *Planning Strategy for Regional South Australia – January 2003.* This document also falls within the South East Planning and Development Area section of the Planning Strategy.

There are a number of provisions in the Planning Strategy that are relevant to this proposal, including several of the policies listed under the broader strategies relating to Economic Activity, Environment and Resources, People Towns and Housing and Water Resources. The following provisions within these broader strategies are considered particularly relevant:

***ECONOMIC ACTIVITY***

***Aquaculture and Fishing***
***9 Encourage ecologically sustainable growth of the aquaculture industry while managing the resources on which the industry depends.***
*a. Encourage marine-based aquaculture in line with aquaculture management plans.*
*b. Identify sites for specific marine-based aquaculture and establish environmental capability for each area.*
*c. Ensure energy and other infrastructure is provided in a manner that meets the needs of the industry.*
*d. Promote the establishment and growth of land-based aquaculture industries where there is adequate water.*
*e. Manage effluent disposal from land-based aquaculture.*
***10 Encourage the development of land-based facilities and support services in support of the marine fishing and aquaculture industries.***
*a. Improve access*

**The proposal incorporates a safe haven and facilities which will facilitate the growth of the existing marine fishing and aquaculture industries**

***ENVIRONMENT AND RESOURCES***
***6 Protect and manage coastal, marine and estuarine resources.***
*a. Identify and protect ecologically sensitive and vulnerable coastal and marine habitats including native vegetation, estuaries, seagrasses, mangroves, tidal salt marshes, rocky reefs and important fish breeding grounds.…*
*..c. Minimise point and diffuse source pollutants from entering the marine and coastal environments through innovative stormwater management and re-use programs.*
*d. Ensure discharge of water from land and marine-based activities do not cause pollution or pose a threat to biological systems….*
*g. Protect dune vegetation, sea grasses, mangroves, samphire communities and algae in coastal, marine and estuarine areas…..*
*…..i. Manage ports and marinas to prevent the dumping and discharge of waste.*
***7 Base land use planning and location decisions relating to development on coasts, rivers, streams and lakes on performance-based policies.***
*a. Consolidate coastal and river urban settlements, associated industries, rural living areas, tourist complexes, holiday houses and marinas in environmentally acceptable areas.*
*b. Site compact holiday house developments and tourist developments on coasts, rivers, streams and lakes in-line with environmental, performance-based policies including potential sea level rise.*
*c. Increase public access to natural waterfronts where appropriate and provide reasonable public access in new waterfront development.*

*d. Acquire land for public ownership and maintain access for all users.*
*e. Redesign, redevelop or relocate coastal and river living areas that do not satisfy environmental, health or public access standards.*
*f. Restrict development in areas where there is potential for damage to the coast or exposure to hazards such as flooding, sea level rise or coastal erosion.*

**Whilst the proposal will result in an intensification of development in the area, it incorporates some measures which will assist in the protection of foredunes including fencing, creation of walkways and separation from parking areas. It also involves the diversion of stormwater to a treatment facility.**

**The proposal is considered to consolidate an existing coastal settlement with existing industry, through the introduction of new infrastructure and substantial expansion of the residential areas, which meet the sea level rise policies. The proposal incorporates areas where the public can access the waterfront and beaches. There are also limitations on vehicles on the beach in the development area**

*PEOPLE, TOWNS AND HOUSES*
***Town Growth and Business Centres***
***10 When investigating the potential growth of towns and cities consider the effect of regional growth issues.***
*a. Assess the overall demographic impact on regions when considering the provision of public facilities in major towns.*
*b. Ensure towns and settlements have adequate areas for growth.*
*c. Distribute land uses in towns and settlements in a way that avoids conflict between incompatible development.*
*d. Ensure physical and social infrastructure is provided to growing towns and cities according to a coordinated and planned program.*
*e. Assess household and property statistics, public housing stock quality and location to plan and better meet the changing housing and geographic needs and patterns of settlement in regional areas.*
***13 Integrate the planning and management of urban infrastructure in an efficient manner, to conveniently locate facilities and to create an attractive, safe, inclusive and enjoyable place to live.***
*a. Encourage economic and efficient use and development of physical infrastructure and its provision to adequately meet existing and future needs of the community.*
*b. Ensure new housing and other urban development is continuous with and forms compact extensions of existing built-up areas.*
*c. Release areas for urban growth to maintain location choice and economic provision of services.*
*d. Eliminate physical and social barriers to full participation in community activities and services.*
***14 Concentrate shops, offices, services, civic and community activities in towns and business centres.***
*a. Locate retailing in designated centres.*
*b. Reduce conflicts between road traffic, customer parking and pedestrian movement.*
*c. Encourage housing within or adjacent to town and business centres, particularly to accommodate people without access to private transport.*

**The proposal will facilitate both the extension and significant expansion of an existing small settlement, which will include significant amount of new housing with water frontage. It proposes a small component of retail development to cater for local convenience shopping in a central area adjacent the tourist accommodation and industry zone, which should minimise impact on the regional function of Kingston.**

*WATER RESOURCES*

***EFFICIENT USE OF WATER***
***Industry and Town Water Use***
***2 Plan for the sustainable, economic and efficient use of water resources***
*a. Ensure the most efficient and economic use of imported water supplies based on the principles of avoidance, reduction, reuse, recycle and appropriate disposal.*
*b. Conserve water through on-site detention and retention and the re-use of water resources including urban stormwater and treated sewage effluent.*
***3 Protect water resources while allowing sustainable economic development.***
*a. Consider localised water use by rural, industrial, government and domestic users in land use planning.*

***WATER QUALITY AND QUANTITY***
***Environment***
***7 Integrate water resource policies and local water planning with land use planning.***
*……d. Protect underground water supplies from overuse and pollution.*

**The proposal now incorporates accessing an adequate water supply to accommodate the proposed scale of development. Considerable research has been undertaken regarding the potential of the development to impact on existing groundwater resources, and it has been demonstrated that the risk of damage to existing resources is low.**

**SOUTH EAST PLANNING AND DEVELOPMENT AREA**

The following provisions within the South East Planning and Development Area section of the Planning Strategy are also considered relevant:

***Economic Activity Strategies***
*3 Identify and promote new sustainable fishing and aquaculture opportunities utilising coastal and underground water resources that are appropriately located, well managed and contribute to regional development.*
*5 Exploit potential for land-based marine and freshwater aquaculture and freshwater crayfish aquaculture.*
*6 Promote development to support established fish processing and distribution facilities.*
*7 Allow for land-based infrastructure and support services for the marine fishing industry.*
*10 Develop new tourism ventures and products.*
*a. Develop tourism links with significant economic activities of the area including wine, wool,*
*h. Develop holiday accommodation and recreation opportunities.*

**The proposal satisfies the strategies for the South East through the establishment of a safe harbour to support the commercial lobster fishery and to encourage the fledgling aquaculture industry. The development of a 'commercial fishing/aquaculture hub' would provide improved infrastructure and services for the expansion of these industries, especially for value-adding or boating related manufacturing. Regional tourism is also promoted through the provision of accommodation and attractions, with particular emphasis on wine tourism.**

***Environment and Resources***
*14 Maintain and improve public access to the coast while protecting fragile areas, habitats and sites of cultural significance.*

**The EIS indicates that the proposal encourages access to the coast in a sensitive and practical manner by creating separate parking areas behind the dunes, fencing the vegetated areas, and creating defined walkways along and through the vegetated dunes. It also outlines how the**

**vegetated foredunes will be significantly enhanced as a result of this proposal and its conservation value increased accordingly.**
*People, Towns and Houses*
***24 Encourage increased private sector investment in housing in regional areas along with appropriate management structures, infrastructure and supply of land.***
***30 Maintain the coastal townships as important tourist and local service centres and key fishing ports.***
*a. Develop holiday accommodation and recreation opportunities at coastal townships while maintaining residential amenity.……..*

**The residential component will provide a range of housing opportunities not provided elsewhere in the region (and will partly address the shortage of housing in the region), with flow-on economic benefits for local businesses, especially in Kingston.**

**CONCLUSION**

The proposal responds to a need to provide improved facilities and services for the commercial fishing/aquaculture and tourism industries, as identified by the Planning Strategy and is generally considered to be consistent with its relevant provisions.

## 4.3 BUILDING RULES

This AR 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 1of the *Development Act 1993*) 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 1993*

The proposed development involves activities of environmental significance (dredging and earthworks drainage, 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 development, must have regard to the objects of the *Environment Protection Act 1993*, the general environmental duty and any relevant environment protection policies.

The objects of the *Environment Protection Act 1993* 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, and social and equity considerations in deciding all matters relating to environmental protection, restoration and enhancement. The EPA 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(Air Quality) Policy, 1994
- Environment Protection(Industrial Noise) Policy, 1994
- Environment Protection(Machine Noise) Policy, 1994
- Environment Protection(Waste Management) Policy, 1994
- Environment Protection(Water Quality) Policy, 1994

The EPA's comments are provided in section 5 below and discussed in section 6 of this AR.

## 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. 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 Cape Jaffa 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 for, the mooring of vessels and the commercial processing of lobster and fish. 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 facility. On this basis the proposal is consistent with the Strategic Plan aim of "growing prosperity".

The proponent will be providing a sewage treatment facility for the proposed development which will enable connection of existing residences, replacing the existing septic tank system which has the potential to impact groundwater quality. In addition the proponent proposes to provide a reliable water supply. The proposed development will result in the removal of swing moorings that have been causing removal of sea-grass. It is considered that the proposal is consistent with the Strategic Plan objective of 'attaining sustainability'.

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 commercial facilities and safe harbour for the fishing fleet will assist in maintaining regional population levels in the area and, as indicated above, increase jobs in the area. Similarly the improvement of the wastewater treatment facilities for the area and provision of a reliable water supply also enhances community relationships.

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 this AR concludes that the proposed development is reasonably consistent with the thrust of the State Strategic Plan.

## 4.6 OTHER RELEVANT LEGISLATION

### 4.6.1 Harbours 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, Department of Transport, Energy and Infrastructure (DTEI), has considerable experience in design for marina and other boating related facilities and would be responsible for auditing certification processes for such structures on behalf of the Governor (or his/her delegate).

The design of the marina facility should generally be in accordance with the Australian Standard AS 3962 *Guidelines for Design of Marinas* and 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 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 DTEI, 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 (esp. elevated levels of faecal coliforms, odours, algae blooms, mosquitoes and other nuisance organisms). In particular, consultation with the South Australian Health Commission (Waste Water and Control Unit), which administers the *Public and Environmental Health Act 1987*, would be required to ensure suitable standards are adopted for effluent disposal.

The Department of Health has indicated that the effluent disposal system proposed at Cape Jaffa is generally acceptable but will be subject to separate approval prior to implementation.

### 4.6.3 Aboriginal Heritage Act 1988

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

There have been heritage surveys carried out by the proponent . Approval to clear a number of sites has been given by the Department for Aboriginal Affairs under sections 12 and 23 of the *Aboriginal Heritage Act*. There are no Native Title claims.

### 4.6.4 Native Vegetation Act 1991 (and amended Regulations)

Under the Regulations of the *Native Vegetation Management 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 been recently amended and, whilst the proponent is still exempt from having to seek separate approval from the NVC to clear or disturb native vegetation, suitable compensation for such clearance needs to be to the satisfaction of the NVC as an adjunct to the Major Development approval.

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 49 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 may need to negotiate with the NVC a suitable form of compensation for the clearance of native vegetation.

### 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 proposed amendments to Environment Australia for a determination as to whether the EPBC Act applies. Environment Australia notified the proponent that the proposal is not a 'controlled action'.

# 5 CONSULTATION

## 5.1 COMMUNITY

The EIS was placed on exhibition from 23 February 2005 to 7 April 2005. 30 submissions were received from the public (including one non-Government organisation). The main issues raised in public submissions include:

- Impact on bores and water supplies
- Change of character of Cape Jaffa
- Opposition to the re-location of King Drive
- Seaweed management
- Protection of dunes/native vegetation remnants
- Access to the beach (pedestrian and vehicular)

## 5.2 COUNCIL

The Kingston District Council did not provide a submission as it felt this would constitute a conflict of interest.

## 5.3 GOVERNMENT

The key comments provided by Government Agencies are included below:

*Department of Premier and Cabinet*

- No comment

*Environment Protection Authority*

- Further information (ie size, volume and rate of material entering and leaving dam, water quality) should be provided on the construction of the coffer dam to contain and 'treat' dredged material prior to discharge of overflow back to the marine environment.
- Construction Management Plan not provided (since rectified).
- Application of draft Code of Practice for Marinas and Boating Management and also Code of Practice for Materials Handling on Wharves. Need for interception drains.
- Wastewater storage lagoon will need to meet the *Environment Protection (Water Quality) Policy 2003(EPP).*
- A full chemical assessment is likely to be required prior to opening of each channel(s) connecting to the marine environment.
- Impacts of changes to the fresh/saline groundwater interface need to be determined to assess impact of potentially affected groundwater wells.

- Modelling assumptions should be provided

- Pollutant discharge impact on seagrass beds need to be assessed beyond comparison with the EPP criteria.

- Detailed risk management plan and control mechanisms for garden fertiliser and pesticide use needs more work.

- Use of dredged sediments for landforming will need analysis to determine suitability for use (sediments likely to be highly saline).

- Neighbouring sensitive noise receptors be notified prior to operation of noisy and heavy machinery during the hours of 2200 to 0700 hours.

- What systems/ procedures will be put in place for any failure to bunded area? Must comply with EPA guidelines '*Bunding and Spill Management*"EPA 080/04

- Appendix 13 of EIS. This details that the dredge effluent will have different discharge criteria depending on where it discharges, possibly referring to application of a mixing zone under the EPP. However, as stated elsewhere in appendix 13, the region 200m offshore is in dense seagrass, so it is unlikely that a mixing zone would be supported at these locations.

- A monitoring program including seagrass coverage (by markers or photo points) and health, together with water chemistry in the marina and receiving coastal waters is likely to be required during construction and following commissioning. The program could be scaled back if no impact found.

- Listed matters for licensing and required management plans detailed.

*Department for Environment and Heritage*

- Need acknowledgement of the Commonwealth's *Historic Shipwrecks Act 1976*.

- The *Victoria* shipwreck may be located in the vicinity of Cape Jaffa. If any evidence of a shipwreck is found it must be reported to the Manager of the Heritage Branch. A 500m buffer zone of no development applies around a known shipwreck site.

- Raised issues related to the possible interpretation of European and Indigenous history in terms of who would operate such a facility and who would be responsible for the research.

- Crown Land (including Native Title) extent and availability have not yet been determined.

- Foredune vegetation will be destroyed for the channel and revegetation of degraded areas should occur.

- Loss of degraded seasonal saline wetland.

- Impact on groundwater resources important.

- Suitable floor levels and site levels will be applied within the development area.

- Council will need to accept responsibility for any coastal damage resulting from the development as the Coast Protection Board will not fund grants to repair any storm damage.

- Any acid sulfate soils need to be dealt with in a Management Plan.
- Seagrass wrack management is an issue and should be dealt with in a management plan along with water circulation issues.
- Seagrass impacts addressed adequately.
- A Dredging Management Plan will be required.
- Marine pests could be a hazard and a management and monitoring plan is required.
- Public access should be managed to avoid undue impacts on the vegetation whilst still allowing access to car parks, breakwaters and boat ramp facilities.
- Visual amenity of the coast will be diminished by breakwaters.

*Department for Water, Land and Biodiversity Conservation*

- EIS does not state who has liability for the development both in short and long term.
- Need further investigations on the unconfined aquifer.
- Need to detail assessment of assumptions used in the models of both the confined and unconfined aquifer.
- A groundwater management plan should be prepared, including investigations to determine the direct salinity impacts of increased groundwater use.
- Clarification requested on clearance of scattered trees in Area 'C".
- Concerns raised on direct and indirect impact on seagrasses.
- Impact on Hooded Plover- consideration of a closed season on the beach for main breeding season.
- Detail requested on method of cat and dog control to be adopted.
- Commitment to weed control needed.
- Scattered trees in reserve areas should be retained.
- Establishment of monitoring sites in Bernouilli Conservation Reserve and a monitoring plan should be prepared.
- Need to demonstrate "Significant Environmental Benefit" within project area.

*Department of Primary Industries and Resources*

- Seagrass wrack removal needs discussion with PIRSA
- Marine pest incursion in the marina
- Support from Aquaculture Division of PIRSA
-

*Department of Aboriginal Affairs and Reconciliation*

- The Department indicated that there are no entries in the Register of Aboriginal Sites and Objects and the Central Archive for Aboriginal Heritage sites within the location of the proposed development.(However this is incorrect, see section 5.8.1 of the EIS. Approval to clear sites has been given under section 23 of the *Aboriginal Heritage Act, 1988*)

- As owner/occupier of private land, or an employee or agent of such an owner or agent, must report the discovery on the land of any Aboriginal sites, objects and remains to the Minister for Aboriginal Affairs and Reconciliation as soon as practicable, giving the particulars of the nature and location of the Aboriginal sites, objects or remains.

*Department of Health*

- Safe anchorage and safe work practices for fishing industry acknowledged.

- Employment opportunities increased.

- Reticulation of water and communal wastewater treatment system should improve well-being.

- Impact of cost of water supply to existing residents an issue.

- Uncertainty over exact numbers of allotments.

- Further information about the wastewater treatment system will be needed before Environmental Health Service is able to support it.

- Pressure will be placed upon existing health services in the region.

- Lack of public transport options for a potentially aging population.

- Water quality in the marina for swimming should follow recommended Australian guidelines.

- Application of World Health Organisation guidelines on noise impacts.

*Department for Trade and Economic Development*

- Support for the proposal.

- Concern that the designated commercial/ industrial areas will not be flexible/large enough.

- Questions raised about adequacy of car parking.

*Department of Transport, Energy and Infrastructure (formerly OFID).*

- Support for proposal, delivers improvements for the fishing fleet as well as tourism.

- Funding issues through the SA Boating Facilities Advisory Committee yet to be determined.

*Department For Families and Communities*

- Access to public transport.

- Support services (community and health) for ageing population.

- Referral to the State Housing Plan for affordable housing.

# 6 ASSESSMENT OF THE MAIN ISSUES

## 6.1 NEED FOR THE PROPOSAL

The proposal for a marina at Cape Jaffa was developed by the Kingston Council in conjunction with the Cape Jaffa Development Company (a local company). They resolved to be joint proponents of the development and to isolate any costs from the ratepayers in the district.

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

- provide an enhanced range of facilities and services to support and grow the local fishing, acquaculture, tourism, recreational boating activities and residents.

- Provision of safe convenient and orderly services and facilities for business, tourism, recreation and residential purposes.

- Well planned and integrated facilities for residents, tourists and the fishing and aquaculture enterprises of the district.

- Facilities established in an environmentally sensitive and balanced manner to ensure an enduring environment for the 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,
- altered hydrology, especially for wetlands and other groundwater dependent ecosystems,
- discharges to the marine environment, especially pollutants or fresh water,
- pest plant and animal species, especially marine pests.

The EIS proposes to alleviate many of the existing environmental problems in the area, including:

- seagrass loss associated with offshore swing moorings,
- pollution from commercial boating, leaking of nutrients from residential sewerage (septic) systems,

- erosion and weed invasion of the coastal dunes.

However, 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 these measures or by others that are 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 that direct impacts on the site itself. On balance it is considered that the benefits of the proposal in economic and social terms will offset the environmental impacts. These impacts should still be managed sensitively by the proponent in consultation with relevant Government agencies.

### 6.2.1 Native Vegetation (including Sea grasses)

The proposal has the potential to detrimentally affect a small area of terrestrial native vegetation communities through direct clearance, indirect clearance (ie a progressive loss of vegetation, due to sea level rise or through changes to groundwater hydrology, that could primarily affect dune and wetland ecosystems), competition from weed species and trampling (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.

The proposed site is largely cleared of remnant native vegetation, as a result of past agricultural pursuits. Some of the land used for primary production still supports small isolated stands and scattered patches and isolated individuals of native species, but is largely weed infested pasture. The coastal dune system and a low lying wetland still support significant remnant stands, but are affected by weed invasion and grazing. Bridal Creeper (*Asparagus asparagoides*) seriously infests parts of the coastal dune and poses a significant threat to biodiversity (especially within close proximity of the Cape Jaffa settlement).

The EIS (Sections 4.6 & 4.6.1) provides a detailed description of the type, extent and conservation value of the native vegetation on the site. Whilst dune vegetation is described as being degraded by weed invasion, it should be noted that this mainly applies to the dunes west of the proposed entrance channel, which are affected by urban encroachment. The dunes to the east are in relatively good condition. The RD (Section 5.5.11) provides additional information on particular vegetation types (ie Paperbark swamp and open pasture areas) and management measures. Baseline data was sourced from existing databases, site inspections (May 2003 and September 2004) and anecdotal evidence.

Only a small amount of native vegetation would need to be cleared for the proposed development, with the majority of intact remnants retained. The majority of the indigenous vegetation comprises coastal dune communities and would be conserved as a buffer along the coast, to minimise the visual impact of the development and for amenity, recreation and conservation purposes. Existing areas of cleared coastal vegetation that are currently used for beach access and parking would be used for the entrance channel and a pedestrian path to the beach, which minimises the total area of clearance required.

The proposed clearance comprises:

- scattered individual trees/shrubs, mainly Coastal Wattle (*Acacia longifolia* var. *sophorae*) and Drooping Sheaok (*Allocasuarina verticillata*)
- small, isolated remnant stands of low species diversity , including a small patch of regenerating coastal scrub (ie for stage 3 waterfront allotments)
- scattered patches of sedge lands, comprising *Isolepis nodosa* and *Gahnia* spp
- intact coastal heath (ie for pedestrian access to the beach)

Whilst there would be no widespread clearance of native vegetation, there would be numerous small losses and an increase in impacts that could potentially degrade existing on-site and nearby vegetation

communities. The loss of vegetation would be compensated for by protecting and improving the habitat value of the stands that are to remain. In particular, the EIS states that converting the ownership of the remnant dune vegetation from private to community ownership would result in better management (ie through revegetation and the control of weeds, erosion, pedestrian and vehicular traffic). The coastal vegetation would be incorporated into the existing coastal reserve system that is managed by Council.

During construction, the EIS (Section 5.2.16) states that construction vehicles, equipment and machinery would not traverse or enter the dunes and that vegetation clearance would be undertaken to ensure minimal disturbance. It is suggested that the necessary clearance be undertaken during the initial construction stage and that the remaining vegetation be fenced immediately to prevent further damage. The fencing would need to incorporate measures to protect the dunes from wind erosion. Cleared vegetation should be spread over bare areas within the remaining vegetation to control erosion, encourage natural regeneration and provide habitat.

The impacts of urban encroachment would be mitigated by creating a 6 metre buffer between residential allotments and the dune vegetation. The buffer would comprise a pedestrian walkway and landscaped area, with fencing used to prevent access. Fenced walkways would be provided for access the beach. Beach access should be provided by raised board walks to reduce soil erosion and to enable the passage of native fauna and the re-establishment of native vegetation.

The Department for Environment & Heritage has expressed concern regarding access and encroachment issues (ie from domestic plants and landscaping) and considers that there should be increased setbacks. However, this could only be achieved by reducing the size of the proposed residential allotments

Coastal dune communities are also at a risk from sea level rise and increase storm surge activity and from erosion. The ability to cope with such long-term changes depends upon the ability of vegetation communities to regress inland. The EIS states that a 50 metre wide public reserve would be established along the coast, plus an additional erosion buffer. The Department for Environment & Heritage considers that this is adequate to satisfy coastal erosion concerns and to maintain adequate beach areas should long-term coastal recession occur. It is considered, however, that vegetation communities would have a restricted capacity for inland migration, which could lead to a small long-term loss.

The RD (Section 4) clarifies that the vegetation between the eastern breakwater and the entrance channel retaining wall will be cleared for the purposes of creating residential allotments. Whilst there is value in retaining this vegetation as a continuation of the coastal buffer (ie as a measure for reducing the visual impact of the development and for habitat and as open space as per adjacent stands), the prime coastal location of the site provides an ideal opportunity for residential development.

Whilst community (ie Council) ownership and improved management would improve the habitat value of remnant coastal vegetation, this will be necessary to compensate for increased impacts from ‘people pressure’. In addition, the dunes would be further fragmented by pedestrian access to the beach.

Native vegetation associated with the wetland (Paperbark swamp) to the east of the site is unlikely to be significantly affected by minor changes to local groundwater resulting from the establishment of the residential canal waterways. This is discussed further below.

### 6.2.2 Native Fauna

The majority of the proposed site is devoid of native vegetation cover and hence habitat. The coastal dunes still contain a narrow strip of habitat, comprising coastal shrubland vegetation communities that extend east along the coast to Kingston. A small Paperbark swamp on the south-eastern boundary of the site provides wetland habitat and fringing vegetation, however, it is isolated within cleared land that comprises pasture and scattered individual native species. The wetland is at the western end of a series of seasonal coastal wetlands (namely Hog Lake, Salt Lake and Butchers Lake) and seasonally inundated

pasture that stretch to Kingston. The Bernoulli Conservation Reserve is located near the south-western boundary of the site and contains a large area of habitat comprising coastal shrubland and Messmate Stringybark woodland vegetation communities.

Due to available remnant 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 (Section 4.6.2) provides a description of the likely fauna to inhabit the site, based upon a interpretation of existing literature/databases and visual inspections. Native species, such as the Western Grey Kangaroo, Common Wombat and Short-beaked Echidna occur in the nearby Bernoulli Conservation Reserve, but are unlikely to inhabit the site. Evidence indicates that the dune and wetland habitats are used by Western Grey Kangaroos. A low number of common reptile and frog species occur in the dune and wetland habitats.

The remnant wetland contains the highest diversity of bird species, as it supports a dense woodland and fringing vegetation and is seasonally inundated. The Paperbark swamp is part of a series of fragmented wetlands that extend to the east as far as Kingston. A minor loss of habitat for migratory species may occur due to human disturbance (especially cats and dogs) and potential groundwater impacts on wetland hydrology. Bird species that utilise wetland habitat include the Black-winged Stilt, Australian Spotted Crake, Whiskered Tern, Australian Shoveler, Australian Shelduck, Chestnut Teal, Pacific Black Duck, Grey Shrike-thrush, Silvereye, White-fronted Chat and Superb Fairy Wren. The Musk Duck (*Biziura lobata*), which is a Rare species in SA, has also been recorded at the wetland site and may also be an occasional visitor offshore.

Two species of conservation significance that could also be detrimentally be affected by the proposal are the Hooded Plover (*Charadrius rubricollis*) and the Beautiful Firetail (*Stagonopleura bella*), which are both listed as Vulnerable species in South Australia. The Hooded Plover could be detrimentally affected by vehicle and pedestrian access along the beach, whilst the Beautiful Firetail could be affected by changes to dune and wetland habitat. The Rufus Bristlebird (*Dasyornis broadbenti*), which is Vulnerable in SA, would also be affected by changes to coastal dune habitat. The Blue-winged Parrot (*Neophema chrysostomer*) is also likely to use habitat on and around the site. These species are sensitive to human disturbance, especially cats and dogs. These impacts could be mitigated by improving the habitat value of remnant vegetation communities, pest (ie domestic) animal control, limiting access to the beach to pedestrians only and public education.

Whilst the nearby Bernoulli Conservation Reserve and the Butchers & Salt Lakes wetlend complex have recorded occurrences of the Orange Bellied Parrot (*Neophema chrysogaster*), which a State and Nationally Endangered species, is unlikely that this species would occur in the area due to a lack of extensive suitable habitat. Thus, it's population is unlikely to be significantly affected. The statement in the EIS (Section 5.2.15) that the proposal would result in *slightly increased "people pressure"* (and hence this species is unlikely to be affected) is incorrect, as the current population of 30-40 residents in Cape Jaffa could be increased by up to 1000 residents in the long term. The main concern for this species (and others) 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. The Southern Emu Wren (*Stipiturus malachurus*), which is Vulnerable in SA, is also unlikely to inhabit the site, but could be affected in a similar manner.

Thus, whilst there is a low probability that State and Nationally threatened bird species would inhabit the site, there is still the possibility that they could occasionally visit the site and be affected by the proposed development or avoid using local habitat. The surveys undertaken by the proponent are not comprehensive enough to conclude that threatened species do not occur on or near the site and would not be detrimentally affected.

With such a large number of residences being established, a considerable cat population is likely to develop (ie greater than 500 residential allotments could result in a minimum number of 200 cats overall). Thus, a cat trapping and destruction program would need to be instigated for land around the site and the

Bernoulli Conservation Reserve to mitigate this risk. Autopsies on feral cats could be undertaken to monitor whether threatened species are being predated upon. The use of fencing to prevent cats entering habitat areas would be ineffective and a waste of resources that would be better used for a trapping program.

The EIS (Section 5.2.15) identifies increased predatory pressure from domestic cats/dogs and possible habitat destruction from increased human activities as the main threats to native fauna. The main mitigation measure for impacts on native fauna is the control of domestic cats and dogs. It is proposed to implement a regional fox and feral cat control program, in conjunction with the Department for Environment & Heritage (Parks & Wildlife), which undertakes similar programs in the Bernoulli Conservation Reserve.

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 winter when the Orange Bellied Parrot is most likely to visit the area. Whilst the EIS considers that the proposal would pose a 'nil' risk to threatened species, such as the Orange Bellied Parrot, there is the possibility that it could pose a low-moderate risk due to off-site impacts (especially from a precautionary approach perspective).

In general, this AR concludes that the proposal may have a detrimental impact on local avifauna, mainly due to human disturbance, but is unlikely to affect the conservation status of regional populations. Local populations of the Beautiful Firetail and Rufus Bristlebird may avoid using habitat near the site or could face local extinction. The proposed mitigation measure, mainly environmental improvements to the dune habitat, would alleviate any negative impacts. The implementation of measures for the control of cats and dogs would be a high priority. It is suggested that vegetated buffers be established around the Infrastructure Area and along the eastern site boundary to provide additional habitat and hence compensation.

### 6.2.3 Wetland Ecosystems

**On-site Wetland Area**

A small wetland (Paperbark swamp) is located on the south-eastern boundary of the site and supports a remnant stand of native vegetation, predominantly comprising Swamp Paperbark (*Melaleuca halmaturorum*) and fringing Thatching Grass (*Ghania filum*), Cutting Grass (*Gahnia trifida*) and Knobby Club-rush (*Isolepis nodosa*). The wetland, and an adjacent smaller patch of Swamp Paperbark on the edge of the site, is surrounded by pasture and is currently grazed. Some of the fringing tussock grassland (Gahnia spp) has recently been burnt and cultivated, presumably to improve its pasture value. The small swamp is part of a larger fragmented wetland complex that extends in an easterly direction to Kingston.

The Department for Environment & Heritage consider that, whilst the wetland is of limited biological value, is does complement less degraded habitat in the district.

The wetland is very close to the residential component (ie a main road and houses, including a possible future extension of residential allotments to the eastern site boundary) and the Infrastructure Area (ie sewage treatment plant, electricity sub-station and works compound). It would be affected by human disturbance (especially weed invasion, dogs and cats) and be at risk from effluent spills and fire. The main eastern access road will be located on the edge of the wetland and would not only affect it due to disturbance (ie a high volume of vehicle and possibly pedestrian traffic), but there could also be adverse impacts from stormwater run-off (pollutant load and erosion) and encroachment from land reclamation to achieve built levels, road verge and fencing. Thus, native fauna is likely to avoid using this habitat.

The EIS (Section 5.2.6) predicts that the after the construction of waterways groundwater levels would drop between 0.6 – 0.8m in the vicinity of the adjacent wetland over a 10 – 15 year period. This would be as a result of water levels in the canals being at sea level, which is lower than existing groundwater levels. Local groundwater levels would be influenced by the height of seawater in the canals. The effect of the expected groundwater depression would vary depending upon the level of winter rainfall recharge of the shallow unconfined aquifer, which ranges from 0.5 – 1.0m. The level and duration of surface inundation of the wetland is influenced by the height of the aquifer. Therefore, it is likely that the wetland would dry out more quickly each year due to the impact of the development. This impact could modify the hydrological regime of the wetland and may result in less favourable conditions for *M. halmaturorum*, but more favourable conditions for *Gahnia* spp.

The EIS (Appendices) predicts that site dewatering would have a negligible effect on groundwater levels during construction.

The EIS initially proposed to establish a potable water supply by extracting groundwater from the locality. This could have lowered groundwater levels around the site, with potentially detrimental effects on the nearby wetland (Paperbark swamp). This was predicted to reduce the period of inundation, which may have an effect on bird habitat, especially for migratory species. The RD states that, following further groundwater investigations, this water supply is no longer a viable option and that a groundwater bore further from the site would be required. Thus, the nearby wetland systems (including the groundwater dependent Hog Lake) would not be affected by the groundwater extraction depression predicted in the EIS.

Native vegetation associated with the wetland (and also the coastal dune) may also be affected by potential groundwater mounding around the proposed waste water irrigation area, particularly during winter and spring when crop water requirements are low, local soils are saturated and low-lying areas inundated by surface drainage. The wetland could be inundated for longer periods. Whilst waterbird and wader habitat may remain for a longer time, raised watertables may be detrimental for fringing vegetation.

**Wetlands Adjacent the Site**

The wetland that encroaches onto the eastern boundary of the site is part of a larger wetland system that extends to the east. A fragmented wetland complex extends to Kingston and provides supplementary habitat for fauna (especially migratory waders) that is concentrated around the Butchers Lake Conservation Park and Hog Lake.

The area contains the Butchers and Salt Lakes wetlands, which are listed in the Directory of Important Wetlands in Australia (Australian Government Department for the Environment). The mixture of seasonal saline lakes, saltmarshes and sand beaches are important ecological features, as they contain some of the last remaining significant stands of coastal scrub between the Coorong and Robe. In particular, it is one of the few known habitats of the Orange-bellied Parrot. The freshwater coastal wetland habitat also acts as a refuge for waterbirds in summer or during drought. Migratory birds that use the wetlands include the Red-necked Stint (*Calidris ruficollis*) and Curlew Sandpiper (*Calidris ferruginea*). Increased uncontrolled visitor access may be a threat to the conservation value of the wetlands.

The coastal lakes, some of which are groundwater dependent and/or fed by the Butcher Gap Drain, and low-lying interdunal swales are seasonally inundated. Apart from the coastal strip and scattered stands of wetland vegetation, most of the coastal plain has been cleared for grazing. However, the low-lying areas usually support scattered patches of saltmarsh, sedgeland and tussock grassland communities amongst (or intermixed) with improved pasture. The sandy ridges provide the best grazing land and are devoid of native vegetation, but often infested by False Caper and other weed species.

A smaller stand of Swamp Paperbark and a large seasonal wetland area (‘flooded pasture’) are in close proximity of the site, especially the proposed irrigation area. The large seasonal wetland supports native

saltmarsh vegetation comprising Salt Couch (*Sporobolus virginicus*), Red Milfoil (*Myriophyllum verrucosum*) and Samphire (*Sarcocornia and Halosarcia* spp). The wetland is fringed by sedges and tussock grasses, especially *Gahnia* spp. The wetland is used by waterbirds (ie Herons, Ibis, Shellducks and Black Swans) and potentially migratory waders. Two small Silky Tea Tree (*Leptospermum lanigerum*) stands are also located east of the site in close proximity to the road, which may indicate the presence of freshwater soaks.

Communities of *Gahnia* sedgeland provide critical habitat for butterfly species that play a key role in the pollination of many native plant species. Butterfly populations have generally been significantly reduced through the clearance of coastal vegetation and their conservation has become recognised as an important part of the holistic management of habitat.

**Impact Mitigation**

The EIS proposes that part of the Paperbark swamp that is within the site boundary would be fenced (ie to provide a minimum five metre buffer) to prevent access by stock. The proposed removal of grazing would provide wider environmental benefits to the wetland that would assist in mitigating the impacts of the development. In addition, it is proposed that the impact of a groundwater depression could be offset by directing stormwater run-off to retention basins in close proximity to the wetland. Monitoring and adaptive management (ie as part of the Vegetation Management Plan) would be essential to minimising impacts on the wetland.

Whilst the EIS proposes measures to mitigate impacts on the Paperbark swamp, the wider impact of human disturbance on nearby wetlands has not been addressed. All of the wetlands in close proximity of the development would be detrimentally affected by human disturbance (especially increased cat predation) and possibly groundwater impacts from the irrigation area.

The potential impacts could be mitigated by establishing suitable vegetated buffers around the two remnant stands and adjoining low-lying wetland basins. Although these basins are outside the declared area, it is something the proponents may wish to pursue. The EIS (Section 5.2.15) proposes to fence around the fringe of a small part of the wetland complex (ie the terminal end comprising only that part of the paperbark swamp that encroaches into the site) to protect it from grazing. Whilst the RD proposes to marginally increase the area to be fenced, this measure is not considered to be an effective way of protecting wetland habitat from the effects of the proposal as a suitable buffer would not be provided.

It is suggested that a wider buffer area be established for coastal and wetland habitat adjacent the eastern boundary of the site comprising the following:

- fencing along the northern boundary of the Works Compound/Effluent Treatment Plant, the road reserve and the eastern boundary of the future residential area (and extending along the pedestrian walkway to the beach)
- the establishment of native vegetation between the fence and the wetland areas
- the establishment of native vegetation around the irrigation area (ie to separate it from the coastal dunes, residential development and wetlands). The proposed irrigation area may need to be reduced in width and increased in length to achieve suitable separation distances. The establishment and management of a vegetated buffer around the irrigation area would need to be further addressed in the Irrigation Management Plan
- the incorporation of stormwater management features (such as retention basins and/or vegetated swales)
- the creation of vegetated bunds around the irrigation area and effluent treatment plant

The details of this needs to be negotiated with DWLBC and accordingly it is appropriate that it is a reserved matter in any approval that may be granted.

The Conservation Council of SA has called for the coast between Cape Jaffa and Kingston to be revegetated to form a wildlife corridor utilising the chain of wetlands. This objective has previously been suggested in the *Wetland Resources of the South East of South Australia (1984)* and the *Directory of Important Wetlands in Australia (Australian Nature Conservation Agency, 1996).* Whilst this is beyond the scope of the proposal, it highlights the value of the adjoining wetlands (and coastal dunes) and the need for a more effective buffer along the eastern boundary of the proposed development. Negotiations with the land owner, in regard to the establishment of the works compound and irrigation area, provides an opportunity for a greater area of land to made available for the buffer. An increase in the amount of vegetation (and habitat) would assist in adequately mitigating the detrimental effects on the environment from urban expansion and encroachment. It would also link with roadside vegetation, which is proposed to be supplemented by revegetation, provide a wildlife corridor with the coast.

This assessment recommends that this issue be a 'reserved matter' should the proposal be approved.

### 6.2.4 Marine Ecosystems

The main impacts on the marine environment would be seagrass loss associated with the construction of the breakwaters and entrance channel, discharges from the waterways (that may have low levels of contaminants, including sediment) and increased boating activity. The expansion of aquaculture operations 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.

The EIS (Section 5.2.15) predicts that the effects associated with the construction stage 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 would result in a short term increase in turbidity and sedimentation of near shore waters. Only a small volume would be excavated (~ 4,000$m^3$) over a short period (~ 14 days). The coarse nature of the material to be excavated and good tidal flushing ensure that impacts on water quality and seagrass are likely to be minimal.

The proposed use of a cutter suction dredge and inland disposal of sediment to a coffer dam is considered the most effective measure of minimising marine turbidity during construction. Testing of sediments for potential contaminants (including Acid Sulphate Soils) would be undertaken prior to dredging. 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.

The EIS (Section 5.2.15) calculates that approximately 3 hectares of seagrass would be cleared and that the loss of seagrass would be compensated for by the regeneration of bare patches around existing swing moorings (ie following the removal of boats) and the recolonisation of the channel.

There is a concern that this compensation measure may not be achieved as the proponent has no direct control over the use or decommissioning of swing moorings, which are the responsibility of the Minister for Transport (through DTEI). This issue was raised in the submission from the DEH. Whilst, the proponent has the ability to encourage the relocation of commercial fishing boats into better facilities within the marina, the actual rate of removal would be dependent upon the perceived financial and operational benefits of such facilities and the cost of securing a berth. There is no guarantee that the existing swing moorings would be decommissioned or their use discontinued (ie by other commercial or recreational boats) to enable seagrass communities to regenerate or recolonise the eroded areas. However,

it is reasonable to expect that commercial boats would relocate to the marina, as has occurred at the Port Lincoln marina (despite concerns at the time that this would not eventuate). The buoys used to access the mooring chains would need to be removed to prevent their continued use.

The EIS (Section 5.2.14) states that the entrance channel would be recolonised by seagrass communities, resulting in only a temporary loss of habitat. It is uncertain whether boating movements (especially by large commercial vessels) would result in increased turbulence that would hinder seagrass recovery. The flushing of the waterways may also result in flow velocities that may affect seagrass recolonisation. In addition, future maintenance dredging may compromise the long-term recovery of seagrass. The EIS (Section 5.2.28) predicts that maintenance dredging would occur every 10 – 25 years, which is likely to be the timescale for successful regeneration of seagrass communities. In addition, the establishment of the channel may lead to an erosion scarp forming that would result in further seagrass loss either side of the channel. These potential impacts would need to be monitored and contingencies put in place for mitigation (such as erosion control measures).

It should be noted that existing swing moorings in the bay show that scouring of seagrass is a result of the physical action of mooring chains and that further erosion due to coastal forces (ie 'blow outs') has not occurred. This anecdotal evidence indicates that the risk of scouring along the edges of the entrance channel is likely to be low.

Natural recovery of seagrass associated with swing mooring sites and the entrance channel is likely to occur over a long period (ie up to 50 years), during which time there will be an overall loss of marine habitat in the area. In addition, the existing Posidonia community is likely to be replaced by the colonising species *Amphibolis Antarctica*, until a climax Posidonia community is established in the long-term. Thus, long term seagrass loss has the potential to be greater that predicted in the EIS.

The EIS (Section 5.2.26) considers that the provision of an effluent treatment scheme (ie full sewer system) for the development and Cape Jaffa township will enable existing septic systems (ie disposal trenches) to be connected to the new scheme. This would eliminate or significantly reduce the current diffuse discharge of nutrients into the bay. This would consequently lead to improved marine water quality and the condition of local marine ecosystems, especially the adjacent Margaret Brock Reef Lobster Sanctuary.

As with the rehabilitation of swing mooring sites, this environmental improvement outcome may not be fully achieved, as the proponent has no direct control over the conversion rate of septic tanks. Existing residents would need an economic incentive to connect to the new sewer infrastructure.

The greatest impact on the marine environment is likely to arise from a substantially greater level of human disturbance, especially increased use of the surrounding bay for recreational purposes. A significant 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 (sea lions and seals) and cetaceans (whales). The nearby Margaret Brock Reef is also likely to experience greater fishing pressure and disturbance from diving activities, which could impact on the threatened Leafy Sea Dragon and other 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.

**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, from the residential land and from the boating, commercial, semi-industrial, 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 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 (ie as proposed in Section 5.2.7 and 5.2.9 of the EIS).

An upgrade of the town sewerage system could potentially lead to a reduction in the diffuse discharge of nutrients from existing residences, which would compensate for any nutrient discharges from the marina development. The possible relocation of both the commercial fishing boats in the bay and the refuelling facility on the jetty into the marina could also reduce potential pollution sources.

The EIS (Section 5.2.22) modelled the dispersion, mixing and flushing characteristics of the waterways and entrance channel design for various tidal exchange rates and water quality scenarios. 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 6 – 8 days is expected. A flushing period of 3 - 4 days is calculated to result in water quality being close to that in the ocean. The south western canal has the lowest flushing rate and careful management would be needed to minimise the input of contaminants (especially nutrients from residential allotments) in this area of the development.

The EIS recognises that 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 groundwater inflows, the leaching of fertilizer through the sandy soils of domestic gardens and the decay of accumulated seagrass wrack.

The modelling was based upon the assumptions that 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).

Thus, it is considered that the waterways would be adequately flushed to avoid any build up of contaminants that could be discharged to the marine environment.

The EIS (Section 5.2.6) predicts that the waterways would only result in a local redistribution of groundwater outflows to the marine environment and not an overall increase. Consequently, there would be no increase in the discharge of nutrients, pollutants or dissolved compounds found in local groundwater. Thus, the proposal would result in a concentration of existing groundwater and associated contaminants which would be discharged at one point rather diffusely along this stretch of the coast.

The EIS predicts that pollutant loads, even under a worst case tidal regime, would be well below the EPP Marine Criteria (EPA 2003) for suitable water quality. However, it is noted that the modelling did not include the effect of other pollutant inputs, especially from boating sources. Contaminated run-off from roads, car parks, reserves (especially grassed areas) and residential, commercial and semi-industrial allotments could also have been modelled, although it is expected such discharges would be avoided or minimised through suitable management.

In this regard, the EIS (Section 5.2.15) proposes to treat stormwater through water sensitive urban design measures/devices, manage discharges from vessels, provide appropriate waste disposal facilities (ie for oil, bilge water, wastewater etc) and to equip hardstand areas with pollutant traps.

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. Coupled with the concentrated discharge of a low level of existing pollutants in groundwater, the channel is likely to be a

discharge point for a pollutant load into Lacepede Bay. 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 of whether nutrient inputs from leaking septic systems has encouraged such growth.

The establishment of the proposed waste water irrigation area could have implications for local hydrogeology and the coast (including adjacent wetlands). The application of water in excess of the capacity of the crop to uptake the water could lead to a raising of the unconfined aquifer or affect local perched watertables and/or freshwater lenses under the coastal dune system. In the long-term, this could lead to greater groundwater discharges to the marine environment. The potential nutrient load of such discharges could have implications for marine ecosystems, especially seagrass communities (ie epiphytic growth). The impact of the irrigation area would need to be suitably monitored.

***Human Activities ('People Pressure')***

The proposal would result in a significant increase in the residential population and number of visitors to the Cape Jaffa area. This would lead to greater 'people pressure' on the local environment, including beaches, coastal dune and wetland ecosystems and Lacapede Bay. Nearby Cape Bernoulli Conservation Park and Butchers Gap Conservation Park are likely to 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 and animals (especially garden plant escapees). The marine environment can also suffer problems such as disturbance of marine fauna from boating movements (especially marine mammals such as whales, dolphins and seals), increased fishing pressure, recreational use of local reefs and litter.

The EIS (Sections 5.2.15, 5.2.16 & 5.2.26) proposes to minimise the impact of 'people pressure' on the remaining coastal dunes by establishing a 6.0 metre buffer zone between the vegetation and residential allotments. The vegetation and allotment boundaries would be fenced, with a 3.0 metre wide public walkway (constructed from compacted crushed limestone) between the two. The residential allotments will be separated from the track by a 3.0 metre wide vegetated buffer (with retaining walls required, due to the raised level of the allotments). The proposed public access ways to the beach, which would be fenced and have boardwalks, would minimise further erosion and damage to native vegetation. Revegetation, weed and feral animal control within the dunes system would not only address existing environmental threats, but would also compensate for the impacts associated with urban encroachment. It is considered that any improvement of the conservation value of the dune ecosystem would be negated by the substantial increase in human disturbance.

The EIS (Section 5.2.16) states that the removal of the current boat launching and car parking area would relieve some of the people pressure in this area. It is further stated (in Section 5.2.26) that the proposed purpose built boat ramp and associated facilities would remove this activity from the beach and prevent erosion of the dune. However, it is also proposed to relocate this activity to the beach on the eastern boundary of the site, which will simply transfer the impact further down the coast (and affect better quality vegetation). The EIS (Section 5.2.27) also states that the relocation of the existing beach access eastward would enable the creation of a vehicle free beach zone, which would result in an improvement to pedestrian safety in this zone. Again, this is simply transferring an exiting impact further down the beach, and, with a significant increase in the number of beach users (both residents and visitors), is likely to increase the risk to public safety.

The proposed beach access point in the north-eastern corner of the site is likely to lead to increased vehicle movements onto and along the beach, especially by four-wheel drives and motorbikes. It is

currently possible for vehicles to drive from Cape Jaffa to Kingston, except when flows from the Butchers Gap Drain prevent access along the beach near Pinks Beach. This would pose a threat to native fauna and possibly the conservation value of the Butchers Gap Conservation Park and coastal dune and wetland communities to the east of the site. Increased vehicle access for residents and visitors has the potential to disturb or harm fauna and allow an increased number of people to have access to these habitats.

In particular, populations of Hooded Plover (a threatened bird species) could be significantly affected due to damage to nesting sites (including the death of chicks) or disturbance from nesting and 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 east of the site are also likely to be used by other significant bird species, including the Orange-bellied Parrot, Blue-winged Parrot, Pied Oystercatcher, Rudy Turnstone and other migratory waders.

Allowing boats to be launched from the beach would have localised impacts on beach erosion and potential damage of coastal vegetation (ie if vehicles and trailers are parked towards the back of the beach). Vehicles parked on the beach could also be a potential pollutant source (especially due to oil, transmission, brake and radiator fluid leaks). There is the potential that a significant number of recreational and commercial aquaculture boats could be launched from the beach in an effort to avoid paying ramp fees at the marina. In addition to environmental, amenity and public safety concerns, beach launching should be avoided to maximise the benefits arising from the investment made in the proposed higher standard and better managed boat launching facility.

Whilst there are mitigation measures that could be employed to manage potential impacts, such as beach closures during the nesting season and public education, the threats are considered too great for sensitive fauna communities. It is unlikely that prohibiting access during the breeding season would be enforced on a regular basis and drivers that are caught may still cause significant damage. Public education may only have limited effectiveness. A ban on dogs on the beach would be difficult to enforce. Restricting vehicular access to this part of the coast is considered the most sensible and environmentally sustainable option. Enforcement of illegal vehicle access would be required. The proponent considers that access to the beach would most likely be provided elsewhere along the coast. However, the land between the development and Kingston is mostly under private ownership. Thus, there would be no real opportunity for alternative access to be established.

It is suggested that the proposed beach access point be for pedestrian traffic only, which would maintain public access to the coast and ensure public safety and minimise environmental harm. During the construction stage, boat launching should be allowed to continue from the existing eastern most access point, until the boat ramp is completed (ie as part of Stage 1 construction). The proposed carparks that would be provided near the beach would maintain public access to the coast in a formalised manner.

Any condition of approval should include the statement that vehicular access to the beach will not be provided once the boat ramp is constructed and operational.

**Recreational Boating**

The EIS (Section 5.2.18) predicts that the proposed development would result in some additional boating use. Currently the existing beach can be used for the launching of up to 80 recreational boats in peak periods. The EIS calculates that an additional 240 boats (total of 320) would be launched in the area. To state that there would only be a minor increase in boating activity is clearly incorrect, as there would be a four-fold increase in the number of boat that could be launched. Based upon the expected use of boats (ie mainly during summer), the EIS conservatively estimates that 48 vessels would be launched per day (or an average of one boat movement every 4.6 minutes through a ten hour day). Whilst these numbers are the maximum peaks that could occur when the development is fully completed, they do indicate that there would be a substantial increase in boating activity than this part of the coast currently experiences.

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

The EIS also calculates that there would be an additional eight boat movement per day related to aquaculture. 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 Robe or Kingston) or if existing fisheries expand or new fisheries develop (such as for pilchard or shark).

**Aquaculture and Commercial Fishing**

The *Lacepede Bay Aquaculture Management Policy* (Department for Primary Industries & Resources, 2004) has established zones in the bay for the potential expansion of the aquaculture industry in a carefully managed way. The Plan considers that the exposed nature of the coast and flushing rates would enable aquaculture to be undertaken in an ecologically sustainable manner, in accordance with policies to minimise and manage impacts. In particular, minimising the impact on seagrass beds and ensuring areas with appropriate water depths for finfish farming are used.

Small scale Atlantic Salmon and Ocean Trout aquaculture has been established in Lacepede Bay and the development of a commercial marina is likely to lead to a substantial expansion of salmon farming. The bay also has the potential for the sea cage farming of other finfish species, such as Yellow-tailed Kingfish, Trevally and Snapper.

An indirect impact of the proposal on the marine environment could be the potential increase in aquaculture operations in Lacapede 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. Nutrient loads in the bay are currently influenced by summer upwellings events and human derived nutrient inputs (ie from agricultural and domestic run-off). The current aquaculture policy states that eutrophication should not pose a problem. However, 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 Lacepede 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.

Finfish aquaculture farms are known to pose a risk to seals, in terms of entanglements, and their interactions with farms (damage to gear and stock predation) can also pose significant economic costs to operators (Department for Environment & Heritage, 2005). 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 carcases are not recovered.

In the Lacepede 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. Sea lions and seals could be affected by diseases introduced by imported feed.

The current commercial Southern Rock Lobster fishery is unlikely to expand, due to a quota system controlling the industry. The region includes major scale fisheries, including School Shark, Tommy Ruff, King George Whiting, Garfish, Mulloway and Australian Salmon. The offshore waters also support Orange Roughy, Blue Eye Trevally, Gemfish and Grenadier fisheries. There is a potential that some of the existing commercial fishers could use the marina as a permanent base or temporary mooring, especially if infrastructure is developed (including that used for the storage, processing or value adding of catch). Aquaculture could also encourage additional fishing activity for feed stock.

The EIS (Section 5.2.27) states that there would only be a limited number of additional aquaculture operators resulting from the marina development. Thus, it considers that there would only be a minimal effect of increased boat movements. In addition, it is not proposed to attract new vessels from elsewhere, but to satisfy the needs of the existing rock lobster fishing fleet. Some minor increase in movements is possible if new vessels are attracted. The EIS considers that, with the relocation of the existing fleet to the marina, there would be fewer vessel movements in and around the reef habitat close to the jetty, which would minimise effects in this sensitive environment.

**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 5.2.15) 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 Lacepede Bay (and the South East region 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.

Both DEH and PIRSA consider that there is potential for the introduction of marine pests into the marina and have raised concerns that this issue has not been adequately addressed in the EIS and RD documents.

A marine Pests management plan would need to be considered as part of the ongoing Operational Management and Monitoring Plan (OEMMP).

**Implications for Biodiversity**

This AR concludes that, it is expected that the proposal would directly result in a relatively low loss of terrestrial and marine native vegetation. The clearance of coastal vegetation can easily be compensated for by landscaping/revegetation and the protection and environmental improvement of retained remnant stands. Existing coastal dune and wetland 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. Groundwater implications from the establishment of waterways and waste water irrigation may also affect nearby wetlands. Similarly, the marine environment of Lacepede 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 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 (ie from Cape Jaffa – Kingston and the hinterland). 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 eastern end of the site abuts an intact coastal dune system and a wetland system that stretch east to Kingston and provide a habitat corridor from the Bernouilli Conservation Reserve to the Butchers Gap Conservation Park. 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 significant increase the level of threatening processes on the surrounding environment.

Whilst on site impacts (ie vegetation clearance) can be adequately compensated for, the off-site impacts are more difficult for the proponent to manage. Providing resources to improve the management of the Bernouilli Conservation Reserve would help mitigate the effects of the proposal to the west of the site, however, additional mitigation and/or compensation is required for habitat found east of the site. Thus, it is suggested that a suitable buffer be created on adjoining land in the vicinity of the coastal wetlands and dunes. The detailed design and management of the buffer would need to be addressed in the Native Vegetation Management Plan.

The direct impacts on the marine environment (ie seagrass loss) can be partly compensated for by the long-term rehabilitation of existing swing moorings and possibly regeneration of the entrance channel. However, a net loss of seagrass will occur due to the construction of breakwaters. 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 and an expansion of aquaculture and/or commercial fishing) would significantly increase the level of threatening processes on marine flora and fauna and would be difficult for the proponent to adequately mitigate.

Increased human disturbance and aquaculture could have a significant long-term effect on marine mammal species, especially endangered Southern Right Wales and Australian Sea Lions. Collisions with boats, entanglements in sea cages and the shooting of wildlife could have a detrimental impact on species with low population numbers, potentially reducing recovery rates.

From a broader perspective, the establishment of a commercial/recreational marina and residential waterfront development could erode the conservation values of the area, which may reduce its potential for Marine Protected Area status.

## 6.3 EFFECTS ON COMMUNITIES

**Impact on existing township**

*Access to beach, foreshore and reserve areas*

Access to the beach at the main existing boat ramp will be maintained for pedestrian access and car parking. A new vehicular beach access will be created at the eastern end of the development. It is proposed that there is no car traffic on beach (at least between the breakwaters and eastern end of the development) which will improve amenity and safety in this area. The creation of public walkways and access ways to beach with carparking will segregate pedestrian linkages from the road network. There is an interruption to access along the beach where the construction of channel and breakwaters will prevent access across the channel.

*Town character*

The proposal leads to a change in the focal point of the settlement through the creation of a central boat harbour and introduction of facilities which have the potential to rejuvenate the fish processing activity area, although the character of the coast near the breakwaters will be altered in the process. The creation of a larger settlement will result in an increase in housing numbers and choice and the EIS considers that Cape Jaffa will remain as a coastal fishing village which will have a more comprehensive, contemporary, managed and ordered township. The existing jetty will also have more of a recreational focus and potentially improves safety by reducing risk of conflict. There will be improved boat launching facilities for recreational users

### 6.3.1 Construction workforce

Section 5.3.1 of the EIS outlines the number of construction workers that are likely to be required. Up to 222 positions would be created by year 2 with most years (over 15 years) averaging about 150 jobs. It is expected that the labour force would be contracted from a variety of sources including locally and nearby western districts of Victoria plus the proponents' staff members. Accommodation would be available either from existing rental housing stock, the caravan park cabins or an on-site construction camp. This would be provided in the services area on the eastern side of the development.

### 6.3.2 Public and Private Service providers

The Department of Health has indicated that there may be a need to enhance health and community services at Kingston to accommodate the significant population increase at Cape Jaffa. There is land available to expand the aged care facility attached to the hospital at Kingston. There may also be an increase in emergency retrieval services (Royal Flying Doctor) required.

There is unlikely to be an adverse impact of the provision of educational services or child care services. In general the target population for this development would be older retirees.

There may also be some impact on existing Non Government Organisation's such as domicillary care or the district nursing service. It is likely there would be some increase in demand on these services.

In terms of impact on existing businesses in Kingston, the effect of the population increase at Cape Jaffa should benefit these enterprises.

### 6.3.3 Land use impacts

Section 6.3.10 of the EIS discusses the potential impacts the development may have on local and regional land uses. The dominant land use in the area is agriculture with forestry, viticulture and horticulture also occurring in the wider region.

The Cape Jaffa settlement incorporates residential development, tourist accommodation in the caravan park and commercial activities relating to the sea food industry. Land located to the east and south of the site is generally low lying and prone to flooding. The proponent has indicated that as a result of the proposed development, the low lying land is less likely to be subject to inundation an there is likely to be an improvement in the agricultural productivity.

On the basis of the groundwater modelling (refer to section 6.2 of the AR) the proponent has indicated that there would be no impacts on horticultural activities as a result of changes in groundwater levels caused by the proposed development. The proponent has concluded that there would be no impacts on viticulture and forestry activities as they are well away from the groundwater zone of influence of the proposed activities. In addition the EIS concluded that the dune vegetation would not be affected by the changes to groundwater levels as the vegetation was not dependent on the groundwater.

### 6.3.4 Noise

A preliminary environmental noise assessment was conducted by the proponent to obtain qualitative information on existing noise levels and potential impacts of the proposed commercial activities on the residential component of the proposed development. The testing indicated that on a calm day the ambient noise levels was approximately 55 dB(A) and noise levels associated with the existing commercial activities ranged between 65 to 75 dB(A). The proponent concluded that the proposed development would produce noise levels similar to the existing operations.

In section 5.2.31 the proponent has identified the components of the proposed development that have the potential to generate 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

The proponent has indicated in section 5.5.4 of the EIS that site access, construction traffic and staging of the construction works would be controlled to ensure that no adverse impacts occur. 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, which 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 proponent has indicated that generally, the activities associated with the fishing vessels would be undertaken between 7am and 7 pm, fishing boat loading may occur between 3.30am and 7am and will be governed by operational requirements incorporated into Marina Rules. Vessels with rigging will be required to use spar and rigging separators to eliminate as far as is practicable rigging impact noise. In addition the use of fishing vessels with diesel engines and wet exhaust systems will minimise early morning noise. Any entertainment activities will be required to incorporate noise prevention and abatement measures. The wastewater treatment plant and water supply infrastructure are proposed to be located in the southeast portion of the site and buildings with mechanical equipment that generate noise will be have acoustic treatment to minimise the potential for noise levels to impact the residential areas.

The potential for conflict to arise between noise sensitive uses (residences) and marine operations (recreational and commercial boating activities) was outlined by the DH in its submission on the EIS. In addition the DH recommended that noise levels from fixed sources should not exceed the EPA level of 40 dB(A) at the residential property boundary. This has been accepted by the proponent in its RD. Subsequently the DH indicated that all developments of a residential nature should be sited, designed and constructed so that World Health Organisation guideline values for community noise are attained, to ensure no “critical health effects”.

The public submissions raised concerns that noise levels during construction would be intrusive to the existing residents and that the early departure of fishing vessels would also cause impacts. In the RD the proponent indicated that the site would be managed in accordance with EPA guidelines and Australian Standard AS 2436, Guide to Noise Control on Construction Maintenance and Demolition Sites and a Construction Monitoring and Management Plan. In terms of vessels the proponent indicated that fishing vessels currently operated in the area and on this basis noise levels would be no different while the ships were at sea. The establishment of the harbour as part of the marina development would result in boats being further away from the existing Cape Jaffa settlement. Impacts would therefore be expected to be less. The proponent has indicated in the RD that residential buildings facing the main basin would be required to incorporate design and building materials that reduce the potential impacts.

The EPA has further advised that the proposed development should comply with World Health organisations recommended noise limits for sleep disturbance within the bedrooms of dwellings when exposed to noise from operations within the marina. This is expected to result in specific design of either the façade of the bedrooms or the locations of the bedrooms relative to the noise sources to ensure EPA guidelines are met and an Lmax of 60dB(A) is not exceeded. In terms of day time operations the development should include an outdoor area that is protected from major noise sources such that day time noise levels should not exceed and Leq of 50 dB(A). This will need to be balanced in terms of the objectives of future residents, in that they are seeking to be involved in the whole precinct, where future

residents would be interested in the overall 'charm' of viewing the marina operations and being able to see what is happening.

**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.**

### 6.3.5 Air Quality

According to the proponent (section 5.2.30 of the EIS), the only significant potential source of air emissions is related to construction activities. In addition there is potential for odour emissions from the wastewater treatment plant and seagrass wrack.

*Dust Emissions*

The potential for dust emissions arise mainly during the construction phase of the proposed development, and can be generated from excavation and establishment of finished platform levels for the residential development, the transport of soil to and from stockpile areas and from the site access roads and haul roads. The proponent has acknowledged that site management measures will be required during construction to ensure that potential impacts are minimal. In addition to potential environmental harm associated with uncontrolled dust emissions to the adjacent marine environment and reserve area, dust can also have social implications, not only in terms of the 'nuisance' factor, but by also posing a potential health risk to adjacent residents/landowners and employees/contractors, with the possible exacerbation of respiratory illnesses (e.g. asthma, bronchitis) (EPA, *Handbook for Pollution Avoidance on Commercial and Residential Building Sites*, 2004).

Nonetheless, 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
- Provision of separation between the existing settlement and the proposed development area as far as practicable to minimise the potential for dust impacts
- Staging to reduce the overall impact and to minimise interaction between stages

**It is concluded that the proposed development will not be a source of dust pollution, once completed (if approved). There is potential for dust emission during construction, but these should be manageable, provided that the mitigation and management measures are implemented in accordance with a final approved CMMP 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, 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 odorous emissions will be manageable. The selected effluent treatment plant uses an aerobic treatment system, which, according to the proponent, is effective in controlling odour generation. Mechanical aerators would be provided to ensure that the wastewater is maintained in an aerated condition.

In its submission on the EIS, PIRSA indicated that the removal of seagrass wrack was an activity that was managed by PIRSA Fisheries and that the proponent should have discussions with PIRSA. Public submissions raised the concerns that seagrass wrack accumulation would occur on the western side of the breakwater and lead to significant odours during decomposition. In the RD the proponent has re-iterated that the design and orientation of the breakwaters are such that they should minimise the potential for seagrass wrack to accumulate in the long-term and to allow as much as possible of the wrack to be seasonally removed by prevailing currents. DEH has indicated that further information is required on the management and monitoring of seargrass wrack.

While odours are expected to be negligible, it is still important that the proponent 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. The proponent has indicated that this would be provided in a final Seaweed Wrack Management Plan.

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'.

### 6.3.6 Residential Character

It is likely that the residential character of the development would be mostly single storey detached dwellings. Some two storey dwellings may be permitted under the proposed PAR.There may be some medium density housing especially in latter stages of the development. The PAR to be prepared by the Council will help define the housing styles that will be permitted in the marina.

The proponent has indicated that housing at the back of the existing town area and which do not have waterfront views could be considered ‘affordable housing’ although there is no real detail on this. This area would not be developed until the latter stages of the development and it is not known if these blocks would be ‘affordable’ at the time they are developed.

There are a number of recreational reserves and open spaces some of which provide access to the waters of the marina. These would seem to be adequate for the expected resident population. Management issues for the reserves should be considered in the monitoring and management plans that the proponent is required to undertake and has committed to doing.

It is likely that the development will have a motor vehicle focus especially as most services and supplies will need to be sourced from Kingston. Walking paths and bike paths have been provided in appropriate locations.

### 6.3.7 Adjoining/Adjacent Land Uses

The proposal should have no direct effect on the land uses in the immediate vicinity of the development. These are mostly rural and horticultural enterprises. The possible impact on local bores has been discussed in the groundwater section of this report.

## 6.4 VISUAL AMENITY

The visual amenity of the area will be changed by the development of the marina. The form and presentation of the waterways is shown in Figures 3.17 – 3.21 in the EIS. The proposed marina will also change the existing character of Cape Jaffa. Views of the marina and coast will change the views which can currently be seen in and around the small township of Cape Jaffa. Visual impact and amenity is a very subjective assessment and the marina views will appeal to some people and not to others. In general, however coastal marinas are considered to add interest and activity to the South Australian coast and the levels of boat ownership are continuing to rise to add to the demand for boating facilities.

***The Breakwaters***

The breakwaters will be developed to a height of approximately 2.5mAHD which is the same height as the platform on the existing jetty. Although the breakwaters will change the views along the coast from the beach in particular, the breakwaters should not be overly intrusive in the environment and will add interest to the coastline in allowing access to the breakwaters for the public.

***The residential development***

Residential development would have been permitted under the existing Development Plan for the area at the rear of the existing town. The level of the land will need to be levelled in order to achieve the required floor levels for protection from sea level rise. The maximum height of built form in the residential area is 15.9mAHD based on maximum design building platform height of 7.5mAHD adjacent to the coastal reserves. In all other parts of the residential area the proponent intends a top of roof design level of 8.4m above the design ground level. The building form to be adopted and developed for the area will be determined through the Plan Amendment Report (PAR) process to be led by the Kingston Council. The declaration for the Major Development at Cape Jaffa did not capture residential dwellings. Accordingly, it is appropriate that the Council define the type of acceptable development through the provisions of the PAR.

The RD clarifies that the land between the eastern breakwater and the retaining wall would be developed for residential purposes. However, the nature of such development is not clarified and may result in 2-3 storey buildings that could have a significant visual impact. There would be limited opportunities to screen such building development, such as retaining the existing dune vegetation or providing a vegetated buffer, as is proposed for adjoining residential development. Council would need to consider height restrictions and design guidelines for the appearance of buildings. This AR recommends that final use of this area be a ‘reserved matter’ should the development be approved.

***The commercial, industrial, retail and tourist accommodation development***

The building heights in the industrial/commercial areas of the development are not specified but would need to reflect the needs of the fishing fleet and aquaculture industries., It is not expected that these areas would be prominent from Cape Jaffa Road as is outlined in section 3.6 of the EIS. Landscaped buffers will be provided to help screen these areas. To some extent views of the fishing fleet and attendant activities will form a focus to the development and attract visitors to the area to watch proceedings as is the case with Lincoln Cove, on South Australia’s West Coast.

The form that might be taken for the tourist accommodation is not specified but would be unlikely to more than 2-3 stories in height. Assessment of building development on the site is within the ambit of the Major Developments declaration and would be assessed by the Council in the normal manner for development applications for houses and buildings.

**The PAR proposed to be prepared by the Council should address issues relating to the scale and appearance of the built form on the site. The visual amenity of the site will be changed by the development but would be an interesting addition to the landscape in the area and a more orderly and organised development than a normal town extension would provide in the same area.**

## 6.5 ECONOMIC ISSUES

The proposed Cape Jaffa Marina proposal has the potential to provide some significant economic benefits to the local area, broader region and State.

The EIS outlines a number of these potential benefits which includes the developments' capacity to improve the efficiency and economy of the aquaculture industry and allow its expansion through the provision of a safe haven for vessels and an area which can accommodate the required associated infrastructure. The proposal also provides opportunity for the expansion and enhancement of tourism facilities. The EIS identifies a number of potential opportunities including expansion of the existing caravan park and introduction of new facilities and services ie motel/serviced apartments, tourism information centre and fishing charters.

The EIS also states that the marina will generate new employment and investment opportunities which will provide benefit for both Kingston and SE region which will lead to economic growth and more beneficial social indicators. In particular the proposal will generate:

- approximately 222 jobs and $21 million expenditure per annum during the construction phase, over 15 years based on construction of major infrastructure and houses and roll out capital and maintenance
- approximately 215 jobs and $12.4 million expenditure per annum once operational, including that associated with the new and expanded facilities that would provide local goods and services, tourism facilities, recreational boating and fishing charters
- opportunities for growth in the aquaculture and fishing industries with benefit for downstream industries. Potential growth is predicted in particular for the Atlantic salmon and rock lobster industries and associated businesses such as chandlery, shipwrights, hardstand, storage and mechanics.

The proposal also has the potential to attract and enhance other allied industry and has value adding potential through demand for increased regional activities including wineries. It is also predicted that 50% of the estimated construction workforce will come from outside the region, which will both stimulate the local economy and have multiplier effects .

The EIS also indicates that there are savings to Government on infrastructure expansion and maintenance as the new commercial facilities will reduce maintenance requirements for the existing jetty. In relation to water and sewerage, a contribution will be sought from the Government to assist with the costs associated with head works, treatment, connection and supply. However, the contribution would be sought on the basis of accessing funds already committed to water and wastewater infrastructure development in the region and not new funding. Apart from this, all internal infrastructure including sewerage, to service the development will be installed by the proponent as part of the normal arrangements with the construction of a development or subdivision.

The EIS acknowledges a number of potential economic impacts associated with the proposal and either provides explanation or suggests mitigation strategies to address each of them.

One concern raised in a number of the submissions relates to the ongoing management and maintenance costs to Council and the potential for theses costs to impact on ratepayers outside the development area. The EIS argues that this will not occur for the following reasons:

- Kingston Council has prepared a Local Government Act Section 48 report which identifies risk management strategies to minimise financial risks to Council.
- An Infrastructure agreement between CJDC & Council has been entered into which clearly specifies roles and responsibilities for both parties. Council responsibilities include: land purchase, seeking assistance from Government for power and water supply and upgrade of fishing facilities, maintenance of public infrastructure and the preparation of a Plan Amendment Report to achieve appropriate zoning. The CJDC responsibilities include obtaining approval for the plans, construction of the development including residential infrastructure and waterways and financing of residential development.

Orderly and economic progression of the development will be facilitated by a project control group which will manage the development and ensure infrastructure is in place for each stage of the project. Council and the CJDC will also establish marina maintenance funds for infrastructure related remedial costs, with money raised from sales and rates. The EIS also outlines land tenure arrangements for each stage of the development including the residential allotments, marina berths, basin and infrastructure, water channels and public infrastructure including roads.

Consideration is also given to compensation or amelioration measures for loss of groundwater resources. The EIS proposes amelioration measures including ongoing monitoring but no compensation is proposed as the proponent argues that a more orderly development in this area, which already has zones which would allow some development, will result in less potential contamination that would have otherwise occurred anyway. Measuring, metering and charging groundwater flows to sea has determined that there will be no increase in net flow (only redistribution) of groundwater from land to sea, despite the introduction of channels. Implications for the rock lobster industry from groundwater flows to sea has been considered and it is considered that there will be no economic impact as the redistribution of groundwater flow will result in less groundwater flow to the lobster sanctuary. No adverse economic implications anticipated either for groundwater users from drawdown or contamination.

DTED reviewed the EIS and commented that there are obvious economic benefits from the proposal including increased employment during construction and operation, benefits to tourism industry and potential growth in fishing and aquaculture through improved infrastructure. It suggests that some flexibility in the zone boundaries may be required to ensure the commercial/industrial element of the development is adequate size.

PIRSA Aquaculture has also indicated support for the proposal and believes it will both provide for expansion of the industry in the South East whilst contributing to the state-wide growth of the industry. A number of public submissions also indicated support for the project on the basis that it has the potential to increase employment opportunity and assist economic growth.

## 6.6 TRAFFIC, PARKING AND CIRCULATION

King Drive

The closure of part of the existing King Drive will occur as a result of the development of the commercial area and marina basin. A section of the road will also be realigned south to facilitate additional residential allotments adjacent the foreshore reserve. Commercial related vehicles will enter the commercial areas directly from the major roads that enter the development area, whilst travel distances to the existing town area remain similar.

Issues relating to parking provision should be dealt with as part of the PAR process to be instigated by the Council.

## 6.7 EFFECTS ON INFRASTRUCTURE

The EIS indicates that the proposal incorporates provision of telecommunication services, potable water, electricity and sewer as part of the development and that all services would be installed in such a manner that would satisfy relevant standards and service provider requirements.

An infrastructure reserve is also incorporated into the development to accommodate machinery and plants for each service eg water & wastewater storage, pumping and treatment and an electricity substation.

*Power*

A new power supply will be introduced with underground wiring. The new supply will lead to removal of existing generators around the existing settlement.

*Water*

A public water supply will be introduced and reduce the current reliance on ground water and rainwater.

In section 5.2.21 of the EIS the proponent indicated that a potable water supply would be obtained from bore (s) located in the confined aquifer at the proposed marina site. The proposed development will require 250 megalitres of potable water, based on 550 new residential connections.

DWLBC advised the proponent (Appendix 7 of the EIS) that under the existing Water Allocation Plan for the area it was not possible to grant a water allocation from the confined aquifer. However, DWLBC indicated that the Minister for Environment and Conservation had approved the taking of water on a temporary basis for a public water supply, pursuant to section 11 of the Water Resources Act 1997. On the basis of available information DWLBC indicated that the maximum sustainable extraction rate from one bore located at the proposed marina site would be 43 megalitres per year. DWLBC also indicated that the Water Allocation Plan was to be revised in 2006 and provision could then be made to allow a water allocation and licence for the proposed development. DWLBC further advised that hydrogeological investigations should be undertaken by the proponent to better define the characteristics of the aquifer below the proposed marina site.

A preliminary assessment was made by the proponent and included the drilling of a single well into the confined aquifer and logging of the soil/rock encountered. The proponent indicated in its EIS that it would undertake specific pumping tests to determine the aquifer parameters and possible extraction rates for the confined aquifer at a later date, subject to obtaining development approval from the Governor.

In its response to the EIS the DH indicated that the provision of a reticulated water supply would provide benefits to the community. The DWLBC sought additional information on the number of existing residents that would seek to connect to the new infrastructure when available and likely costs associated with connection, as opposed to continued use of groundwater extraction wells. In addition the DWLBC requested that additional investigations were to be undertaken by the proponent to confirm the suitability of the confined aquifer as a water supply and potential impacts as a result of increased use and development of a groundwater management plan. Public submissions also indicated there was insufficient information provided on the quality and quantity of water required and available. The South East Natural Reseources Conservation Committee (SENRCC) pointed out errors in the proponent's definition of geological conditions and the need for a standby bore. Public submissions also questioned the availability of a sustainable water supply and the inadequate information provided. DWLBC subsequently advised that it did not require this information in advance of a decision, but it will be necessary before a commitment could be given to enable extraction of groundwater beyond Stage 3 of the proposed development.

Investigations by the proponent, subsequent to the release of the EIS, indicated that groundwater located below the site would not be suitable as a source of potable water. Additional investigations undertaken by the proponent has indicated that water for the proposal could be sourced from a bore approximately 17kms to the north east of the development. The details of this are outlined in a letter from the proponent dated 29 September 2005 appended to this AR. The DWLBC indicated that on the basis of the information provided by the proponent the proposed water supply would be suitable for all stages of the proposed development in terms of water quality, volume, and impacts on the resource and other users of the resource (letter dated 24 October 2005).

The DWLBC has indicated that the water allocation plan for the Lacepede Kongorong Prescribed Wells Area is currently under review and the amended plan will contain provisions to enable the allocation of water for the proposed development. Following amendment of the plan the proponent will need to make an application for a water allocation. The DWLBC has also indicated that further technical assessment may be required in relation to the application. Not withstanding this advice the DWLBC has reiterated its previous position (letter dated 29 December 2003) that a temporary allocation of water could be made (until such time as the water allocation plan is amended), pursuant to section 128 of the Natural Resources Management Act 2004.

It is proposed that the pipeline to connect the water supply to the bore will follow the route marked alternative source (see letter of 4 November 2005 from proponent attached). Kingston Council has agreed to establish the pipeline within the road reserve of the Limestone Coast Road (letter dated 27 October 2005).

The proponent has indicated (letter dated 4 November 2005) that the pipeline would be located in the area between the guide posts and the road surface, avoiding the need for disturbance of native vegetation. The location of additional sites in which to install groundwater extraction bores are proposed to be investigated in order to provide back up to the proposed water supply well. The proponent expects that the bores would be located along the proposed pipeline route alignment. The establishment of any new bores would be in accordance with the Water Allocation Plan and would require appropriate investigation to confirm its suitability.

The proponent has confirmed in the RD that it would provide a connection point at the boundary to individual allotments at the time the water main is installed. Those not choosing to connect at this time would not be charged for the main while the main is in private ownership. The proponent has indicated that charges may apply (as normally applies in other areas) if ownership of the main reverts to Council or SA Water. Those wishing to connect at a later date would incur a charge relating to the cost of works and materials for the connection. The Department of Health was of the view that existing Cape Jaffa residents should not be disadvantaged in terms of water costs, as a result of the proposed development. The proponent is of the view that the effects of the proposed development are unlikely to disadvantage existing groundwater users in most areas. However, the proponent believes it is reasonable for the user to pay for water that is supplied by the project.

**This AR concludes that, on the basis of advice from the DWLBC that a water supply to service the needs of the proposed development is available, initially from an existing well located about 17 kilometres from the proposed marina site. Additional investigation are likely to be required as part of a water allocation application and in the establishment of additional wells. Existing residents may face increased costs for water supplied through the project's water supply provisions.**

*Effluent treatment*

A full sewer system is proposed which has the potential to serve the existing settlement. Collection and treatment of effluent will lead to reduced risks to public health and the coastal environment. Use of reclaimed water may occur on farming land or reserve areas.

*Telecommunications*

An improvement in services is predicted based on the increase in population.

*Safe haven and harbour*

The proposal includes provision of facilities to launch, retrieve, moor and operate commercial and recreational vessels. Emergency service arrangements are expected to continue as they are with reliance on Kingston for a range of services including the Police, Country Fire Service, Ambulance and Sea Rescue. Potential exists for some of the sea rescue facilities to be relocated to Cape Jaffa, where they could be suitably accommodated.

### 6.7.1 Recreational and Commercial Boating

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.

## 6.8 WASTE AND EFFLUENT MANAGEMENT

### 6.8.1 Waste Management

The proponent has indicated that the following waste management procedures would be adopted for recreational and commercial vessels and other general solid waste from domestic premises (section 5.2.24 and 5.7.6 of EIS):

- Wastewater pump-out facilities to be provided in accordance with current best practice guidelines for use by both recreational and commercial vessels. The facilities will be able to receive both grey and black water. The pump out facility will be connected to the dedicated sewage treatment and disposal system.

- A waste oil reception station will be provided in the commercial area.

- A designated secure receptacle for the disposal of quarantine wastes from overseas vessels will be provided, although the proponent is of the opinion that the facility will not be used by these vessels.

- Solid waste receptacles with self-closing lids will 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 will be encouraged to segregate waste types to enable recycling. The waste will be collected for disposal by a licensed contractor.

- General solid waste from the proposed residential areas and commercial precinct will be collected by a licensed waste contractor for recycling or disposal at a licensed landfill.

The establishment of a larger community in the area is likely to require an upgrade of Council facilities and waste management practices. The EPA and Zero Waste had no comments on the requirements for additional infrastructure in the area. In its RD the proponent indicated that the Kingston Council was developing a waste strategy and is seeking approval from the EPA to establish a waste transfer station at Kingston.

### 6.8.2 Wastewater Management from Domestic and Commercial Premises

The EIS proposed that a package wastewater treatment plant would be designed specifically to treat the sewage and wastewater form the residential and commercial areas of the proposed development.

**This AR concludes that the proponent has adequately addressed issues relating to waste management.**

## 6.9 CONSTRUCTION AND OPERATIONAL EFFECTS

*Construction*

The proponent has indicated that construction is expected over a 5-10 year period with the most intensive phase occurring during Stage 1 when the breakwaters, channel, main basin and major infrastructure will be developed. The main construction periods will be summer through to early winter with activity typically occurring between 7.00 am and 7.00 pm based on a 6 day working week. unless construction activities require it. The EPA has recommended that neighbouring sensitive receptors be notified prior to operation of noisy machines between 2200 and 0700 hours.

*Traffic generation*

Approximately 50 truck movements a day, including standard semi and B double tippers, are anticipated during the main construction periods with most traffic travelling along Cape Jaffa Rd and Limestone Coast Road. Once the development is operational limited potential conflict is anticipated through the logical and practical separation of activities. Noise from the commercial marina is likely to be within acceptable limits due to the separation distances from residential lots and the provision of a buffer between commercial and residential through provision of a retail area and reserve.

One potential area of conflict could occur as a result of having some waterfront residences adjacent vessel passage areas. The EIS suggests that this is acceptable in the context of a working port, and would be limited by seasonal activities. The Operational Management Plan would however include a requirement that properties with basin frontage would have noise attenuation measures and be provided with information about port activities and operating hours on the title.

### 6.9.1 Dredging Works and Re-Use of Material

A description of the dredging works required for the development and disposal options was provided in section 5.2.28 and 5.5.10 of the EIS.

The proponent has indicated that construction of the channel will include the use of a cutter suction dredge and an excavator for removal of hard limestone. Some 4,000 $m^3$ of material is proposed to be excavated from the channel and 15,000 $m^3$ from the breakwater area with the material expected to be predominantly fine to medium sand (with minor silt and clay).

Excavated limestone will be placed in trucks located on barges and transported to the shore for subsequent use in mounds forming part of the proposed development. Dredged material will be pumped to land based settling ponds and the drainage water will be allowed to discharge to sea between the breakwater. The proponent is of the opinion that turbidity will be low and the return water will not result in an adverse impact on the receiving environment. The proponent has indicated, 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. Dredged material that is sandy and comparable to the existing beach sand would be stockpiled on the eastern side of the breakwater as a buffer for potential sand loss.

Maintenance dredging is expected to be required every 10 to 25 years and will involve pumping of sand that has accumulated on the western side of the breakwater to the eastern side. The material will be removed with a cutter suction dredge and is expected to result in a lesser impact than conventional excavation and haulage.

The EPA will require a licence for dredging operations and the preparation of water quality management and monitoring plan. The proponent has indicated that additional investigations would be undertaken (if development approval is granted by the Governor) to determine soil characteristics and water quality of dredged or excavated material.

Submissions on the EIS from DEH, DWLBC, SENRCC, EPA and the public raised concerns of the likely impact on existing soils of using saline soils from the dredging and excavation works as fill material. The proponent has indicated that soil from dredging activities will be allowed to drain and any saline soil would be placed at depth in the fill profile to limit the impacts of residual saline material. In addition the material would be classified to determine its appropriate use.

Other submissions in the EIS sought clarification of the excavation/dredging methods and the EPA sought additional information on the settlement ponds. These issues were adequately covered by the proponent in the EIS. The settlement pond is proposed to have a volume of 200 cubic metres, with a storage capacity for about 2 days to enable settlement of the fine particles. Drainage water is expected to be pumped back to the marine environment (subject to acceptable water quality) at a rate of 2,500 cubic metres/day. The proponent has indicated that the design would be finalised as part of a licence application to the EPA and management and monitoring measures incorporated in a Dredging Environmental Management Plan. The EPA has advised that a Dredging Environmental Management Plan should be a condition of approval (if the Governor grants provisional development approval).

### 6.9.2 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 recreational 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 and repairs, especially hull cleaning
- spills from refuelling
- wash down water
- sewage from larger vessels
- fish cleaning

Additional impacts from commercial fishing and/or aquaculture boats could result from:

- bilge water
- waste oil
- boat repair/maintenance
- washing down of boats
- hard refuse (especially bait/feed packaging) and litter
- unloading of fish/crustaceans

- loading/unloading of bait and feed
- fish/crustacean wastes
- aquaculture cage and net cleaning

Associated car and trailer parking areas can also be a source of pollutants that would need to be managed.

The proposed sewage pump-out facility would need to meet the *Best Practice Guidelines for Waste Reception Facilities at Ports, Marinas and Boat Harbours in Australian and New Zealand (*ANZECC,1997). It is suggested that all waste sources should 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* ( in draft form).

A development approval for the proposal by the Governor would not apply to buildings related to the marina (ie boating related businesses) and semi-industrial, commercial or retail uses. Accordingly, mechanisms would need to be put in place to ensure the ongoing development of the various components 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 and Waste Source Management Plan as part of the Operational Environmental Management and monitoring plan (OEMMP) be prepared and implemented for the whole of the development to guide ongoing construction and operation.

**Boat Washdown and Maintenance Facilities**

Facilities will 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 will 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 will occur in workshops or purpose built facilities. Facilities will be run in accordance with the relevant codes of practice.

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

Wastewater generated by the proposed commercial activities will be collected and treated at the wastewater treatment plant. Wastewater and residues from hull cleaning activities and oil and fuel residues are proposed to be diverted and collected in dedicated systems in accordance with EPA requirements and collected for off-site disposal by licensed contractors.

**Stormwater Management**

The EIS (Section 5.2.19) proposed the adoption of Water Sensitive Design measures, as outlined in the Good Residential Design Guide (Planning SA, 1999).

The main sources of pollutants are regional and local groundwater and the users and occupiers of the development. Maximum nutrient loads discharged from groundwater will occur in Spring, which will also coincide with much, if not all, of the nutrient load from domestic fertiliers used by householders.

An extended period of elevated oxidised nitrogen (NOx) on seagrasses and potential algal blooms during Spring could result in impacts on seagrass health.

The option of routing of treated stormwater through the marina may reduce concentrations of pollutants but not total loads received into the marine environment.

Averaging of loads in the impact assessment modelling may obscure the impacts of peak events.

Controlling problems such as algal blooms after the event, is likely to be difficult and expensive, so effective and continuous monitoring and response to pollution events is important. Adaptive management protocols and rapid identification of pollution sources, once detected , are required.

Interception drains across the waterside boundary of each property should divert surface flows containing fertilisers and pesticides as well as any other pollutants, into the stormwater system.

Currently the proponent is suggesting unspecified on-site residential infiltration features, where direction of stormwater into established drains is not an option. Surface or subsurface infiltration methods are suitable where sufficient filtering or biodegradation occurs before discharge to the marina. They do not work where the soil is saturated or if there is rapid soil transmission to the nearest waterway.

It is recommended that the proponent provide more details on the methods to be used to prevent movement of pollutants generated from residential gardens and other uses into the marina (perhaps in the Stormwater Management Plan).

A contingency plan outlining end uses for wastewater on the site should be considered.

Any wastewater storage lagoons (including treated wastewater) will need to meet the *Environment Protection (Water Quality) Policy 2003 (EPP).*

A full chemical assessment is required prior to the opening of each channel(s) connecting to the marine environment in order to confirm that the channel water quality meets the marine water quality.

### 6.9.3 Impacts on Groundwater

**Groundwater Modelling**

In order to assess the potential impacts of the proposed development on groundwater resources the proponent undertook groundwater modelling (section 5.2.2 of EIS). MODFLOW a three dimensional finite difference groundwater model was used as it is capable of modelling multi-layered groundwater flow systems. This model was developed by the US Geological Survey and is used extensively by consultants within Australia and overseas.

The following conditions were investigated by the proponent:

- Establishment of the model and calibration using existing water levels and permeability data obtained from the 34 bores drilled on the site.
- Change in water levels and the aerial extent of changes as a result of dewatering during construction of Stage 1.
- Post Stage 1 effects on groundwater levels and potential impacts on existing groundwater users.
- Effects on groundwater levels, impacts on existing groundwater users and groundwater outflow from the proposed marina waterways following completion of the development.

The following assumptions and aquifer parameters were used in the model:

- The unconfined aquifer extends from the surface to -40 m AHD.
- The clay layer between the unconfined and confined aquifers extends from -40 m AHD to -60 m AHD.
- The confined aquifer extends from -60 m AHD to -75 m AHD.
- Groundwater is in a steady state condition resulting in modelling of the long term conditions associated with the proposed development.
- Allowance for recharge of the unconfined aquifer from precipitation.
- The hydraulic conductivity of the unconfined aquifer has been based on the results of in-situ permeability tests in the bores (as adjusted by calibration of the model) and aquifer properties for the confined aquifer were based on PIRSA published information and regional data.

**Results of Modelling**

Section 5.2.3 of the EIS provides the groundwater modelling results. Dewatering during construction of Stage 1 will result in a lowering of groundwater levels by 1 metre adjacent to the excavation and by 0.2 metres up to 250 m from the excavation, with the exception that in the south it has a lateral extent of 500 m. The modelling indicates that there should be no impact on existing groundwater users during construction of Stage 1.

At the completion of Stage 1 and opening of the channel to the sea the modelling indicates there is a negligible effect on groundwater elevations to the existing users.

Modelling of groundwater levels following completion of all stages of the development indicates that groundwater levels will decrease by about 0.6 m around the proposed development and 0.2 m adjacent to the Cape Jaffa settlement (and existing users). The proponent has concluded that these changes are small when compared to the existing seasonal variation of groundwater levels.

The proponent has indicated that the staged construction of the proposed development will allow for ongoing monitoring of groundwater levels and if required the implementation of mitigation measures (refer to section 7 of this AR).

Several government submissions sought additional information on the hydrogeological parameters used by the proponent in its assessment. Particularly, the DWLBC was of the view that additional investigations should be undertaken. In particular a detailed assessment of the assumptions of the hydrogeological and groundwater flow models and more detailed investigations of the confined aquifer. This view was supported by the SECWMB. The SENRCC queried the some of the modelling parameters (recharge rates and hydrostatic data) and considered that transient modelling to assess seasonal variations would have some merit (a view that was expressed by Planning SA). Public submissions also expressed concerns that, the development would have an impact on groundwater use, that modelling was flawed and that little was known about groundwater flow in the area. As indicated in section 3.7 of the AR some public submissions were concerned of incorrect information on the location of bores that were obtaining water from the confined aquifer.

In its RD the proponent referred back to the details provided in the EIS and the validity of this data and indicated that the potential effects would be further assessed by monitoring of water levels and quality during construction as part of a Construction and Operational Management Plan. The proponent also clarified the aquifer and hydrogeological parameters used in the modelling and also indicated that transient modelling was not necessary. DWLBC has indicated that it is satisfied with the response to its submission.

As indicated in section 2.8 the proponent will not be obtaining water from the confined aquifer located below the proposed marina site but will be using a bore located about 17 kilometres away. This new source is located approximately 8 kilometres from the bore located on section 98. DWLBC has advised that on the basis of initial information provided by the proponent, extraction of water from the confined aquifer at the new proposed site will not impact existing users. The proponent will be required to undertake further testing as part of a water allocation permit.

**Impact of Saltwater Intrusion**

The potential impacts of saltwater intrusion have been discussed in section 5.2.3. The proponent has indicated that on the basis of measured salinity levels in the investigation bores there is no evidence that seawater intrusion has occurred to date and that the saltwater/fresh water interface is likely to be located out to sea.

The proponent has indicated that, during construction dewatering, it is unlikely that there would be significant widespread saltwater intrusion and the staged construction would minimise potential impacts to the immediate area of the excavations.

In addition, the EIS concluded that the eastern part of the Cape Jaffa settlement, which would be located on a peninsula between the waterways and the coast, is likely to be affected by saltwater intrusion over time as water quality equilibrates to the internal and external saline environment. Existing groundwater wells in the western portion of the Cape Jaffa settlement may be subject to saltwater influence as the salt water interface moves up and closer to the coast. However, this will be dependent on the depth of the pumps in the bores and rate of extraction.

The EIS concluded that the investigations and modelling has provided sufficient information from which to assess the potential impacts of the development. This coupled with the proposed staged development and monitoring should enable any management and mitigation measures to be implemented.

The EIS has indicated that it would be providing an alternative water supply that could be accessed by the existing residences (refer to section 6.2 of this AR). In addition, the proponent would deepen bores and lower pumps for any existing groundwater wells that were affected by water level drops as a result of its development.

Submissions from the Department of Health (DH), SENRCC, Planning SA and some public submissions sought additional information on compensation for existing users affected by saline intrusion into the groundwater wells. Public submissions also raised concerns relating to loss of domestic water, the effect pumping of the aquifer would have on local farmers, the expense of buying water and connection fees, effect on quality of water and impacts on existing vegetation. Some public submissions reserved the right to seek compensation if their water supply was affected by the development. It should be noted that the project water supply is no longer to be sought from within the site ( refer to section 6.2 of this report).

In its RD the proponent acknowledged the concerns of the submitters but reiterated that its modelling had indicated that the in most areas the bores would not be affected. The proponent has proposed that affected bores would be replaced, relocated, modified or otherwise refurbished in order to allow continued operation with its existing function, at no cost to the owner. If it is not practical to replace or refurbish the bore then access to the water supply would be provided at no connection fee for the existing township, however normal water charges would apply (refer to section 6.2 of this AR). The proponent also indicated that the proposed ongoing monitoring would be undertaken to assess potential impacts if any, and these would be detailed in a Groundwater Monitoring and Management Plan.

**This AR concluded that the potential impacts of saline water intrusion into the groundwater and associated groundwater extraction bores has been adequately addressed and the proposed management measures to mitigate these impacts are reasonable. Ongoing monitoring will be**

**required to confirm the results of the modelling and these would be detailed in a Groundwater Monitoring and Management Plan.**

**Housing and Commercial Development Impacts**

In addition to the impacts of construction of the waterways and post construction impacts discussed above the proponent has indicated that establishment of the housing and commercial activities have the potential to impact groundwater quality.

The proponent has indicated (section 5.2.9 of the EIS) that the development will have a positive impact on groundwater quality as a packaged wastewater treatment plant will be included as part of the development to deal with the residential wastewater and the existing settlement will also be connected, thereby reducing the current practice of septic tank system and improve groundwater quality.

Wastewater generated by the proposed commercial activities will be collected and treated at the wastewater treatment plant. Wastewater and residues from hull cleaning activities and oil and fuel residues are proposed to be diverted and collected in dedicated systems in accordance with EPA requirements and collected for off-site disposal be licensed contractors.

Stormwater from the development is proposed to be directed to dedicated holding basins via swales. There is a potential for nutrients associated with gardening activities and reserves in the residential component of the proposed development to have an impact on groundwater. The proponent has indicated that the net effect will be an 'irrigated area', which is currently not the case.

In its submission the EPA sought additional information on the potential impacts of nutrients on the marine environment associated with increased nutrients from fertilisers and pesticides that may be used by residents. The Response included a sensitivity assessment of the potential impacts and concluded that the levels of nitrate were unlikely to result in algal blooms and that concentration would be reduced to negligible levels as a result of the dilution/water exchange. It was also concluded that discharge at the mouth of the breakwater is likely to contain nutrient levels that are below the EPA Environment Protection (Water Quality) Policy levels. The EPA comments on the Response Document indicated that while the assessment was based on conservative estimates, the modelling was based on average loads across the year, whereas the maximum discharge would occur in spring, and the proposed mitigation options would not reduce regionally or locally generated groundwater loads. In terms of fertiliser and pesticide use, the EPA reiterated its earlier submission on the EIS, namely that potential impacts of fertilisers and pesticides from residential area were generally underestimated and higher than from agricultural sources. The EPA also reiterated that the proponent should consider conducting a more detailed risk assessment and supporting management strategy as opposed to engineering solution, which may be complex and expensive. These issues will be dealt with more comprehensively in the proposed management and monitoring plans for the marina.

**Site Contamination**

Modelling was undertaken by the proponent to assess the potential impacts of contaminants in the groundwater on the marine environment. This modelling indicated that as a result of mixing with the seawater the concentration are expected to be well below the guideline levels.

The investigations have indicated that the groundwater is contaminated with nutrients and has elevated concentrations of some heavy metals. The proponent will be providing a town water supply to mitigate against the potential risk to the health of domestic users.

The investigations by the proponent have indicated that groundwater at bores CJ15 and CJ15A are contaminated with arsenic, cyanide and phosphorus, possibly due to the historical disposal of piggery effluent. The lateral extent of groundwater contamination or the actual sources had not been determined at the EIS stage.

The proponent undertook additional investigations to determine if a source of the contamination was present that could have resulted in the elevated groundwater concentrations of arsenic, cyanide and phosphorus. The investigations included the collection of surface soil samples in the vicinity of wells CJ15 and CJ15A. The samples were assessed for a range of chemical, including heavy metals, total cyanide, nutrients, soil pH and one sample for the full Victorian EPA inorganic and organic screen. The proponent indicated that none of the test results exceeded the commonly adopted soil chemical levels used to assess if there is a risk to human health or the environment (NEPM 1999). On this basis the proponent concluded there was no indication of a specific source of contamination and that the elevated groundwater test results may be related to the effects of evapo-concentration of naturally occurring compounds and that there would be a low risk to the health of future users of the land.

**Acid Sulphate Soils**

The report prepared by Tonkin Engineering suggests there is a probable risk (i.e greater than 60%) for the presence of Coastal Acid Sulphate Soils (CASS) to adjoining land directly south of the subject site.

With the lowering of the water table in the proximity of the development acid sulphate soils may be drained resulting in localised acidification of groundwater. The risk of this happening is regarded as low.

DEH advises that any works associated with the proposal should comply with the Coast Protection Boards' Policies on CASS [Policies 1.3, 2.1, 2.2, 2.3]. The Board has released a set of guidelines that should be followed in areas where acid sulphate soils may be likely to occur, which have been referred to in the EIS.

It is recommended, therefore that all steps to manage CASS, as stated in the Management Plan, including compliance with the Coast Protection Board's Policies on Coastal Acid Sulphate Soils, be followed,. In particular the proponent should seek expert advice on 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).

**The proponent has prepared an Acid Sulphate Soils Monitoring Plan, this should be accepted by DEH and comply with the Coast Protection Board policies, as a condition of approval.**

**Other Impacts**

The EIS (section 5.2.8) considered the potential impacts that seasonal variation on groundwater levels would have on the design of the marina and off-site operations. The lower groundwater levels that occur during the drier summer months were considered to be beneficial by the proponent in that there would be a lesser requirement for dewatering,

In addition the proponent was of the view that there would be little or no effect on the design and operation of the marina as a result of seasonal and tidal influences on groundwater levels as the measured changes were low. The design and maintenance requirement for edge treatment of the waterways is also not influenced by the groundwater level changes.

### 6.9.4 Feral Animals, Dog and Cat Control

Apart from the issue of existing feral animals, primarily foxes, cats and rabbits, there exists the issue of roaming domestic pets.

The proponents comment that the population of cats within the development should not be significant can not be substantiated. The proponents' proposal to compulsorily enclose their cats is not described, and there is no information on who will manage and police this programme.

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.

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, dogs being restricted to leads when outside properties and an extensive and frequent poisoning programme outside the development and within the coastal dunes, should control the impacts of both existing feral and uncontrolled domestic pets.

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

Alternatives such as cat proof fencing would require a heavy management burden.

## 6.10 RISK/HAZARD MANAGEMENT

Details on potential risks and hazards associated with the proposed development were addressed in section 5.6 of the EIS. In addition the proponent has provided a draft Site Construction Management Plan in Appendix 8 of the EIS.

**Wastewater and Hazardous Chemicals Risks**

The proponent intends to install a dedicated sewage collection and management system that includes the installation of sewer mains within the road reserves and avoiding the construction of sewer mains below the waterways as far as is practicable. An alarm system will also be installed at all pumping station control points to provide an early warning of spills.

The EIA indicates that hazardous chemicals that may be required in the commercial area of the proposed development will be stored in bunded areas (designed in accordance with EPA Guidelines), subject to approval by the Marina Manager, and if required, approval from the EPA. Waste oils will be collected by a licensed contractor for recycling. Emergency response procedures will be incorporated in a marina Operational Management Plan. Emergency spill kits will be located in the commercial wharf area and clean-up and disposal is proposed to be undertaken by an appropriately licensed contractor. The proponent has indicated that clean up of any sewerage spills (if they occur) would be undertaken by the operator of the wastewater treatment plant following notification by the Marina Manager.

In its comments on the EIS the EPA indicated that a detailed risk assessment and toxic spill management plan should be prepared and include issues raised by the proponent and the risks associated with household chemicals and fertilisers. In the RD the proponent indicated that a risk management plan would be prepared as part of the EPA licence application documentation. In addition the proposed Waterways Monitoring and Management Plan would incorporate management measures to ensure there is responsible use of fertilisers and chemicals to minimise the risks to the marine environment.

The proponent has indicated that refuelling facilities will be designed in accordance with the Transport SA Guidelines and these would be supported by specific refuelling provisions in the Marina Rules. Flammable or potentially explosive chemicals that may be required for use in the commercial area would 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. In its response to the EIS Planning SA indicated that any installed underground fuel

storage systems would require the installation of monitoring wells to ensure that any leakages were detected. In its RD the proponent indicated that details would be provided in the 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 proponent has indicated that the commercial berth area will be serviced by a fire main and hose real and signage providing emergency services contact numbers will also be installed.

Additional activities that may be undertaken in the commercial area of the proposed development may include maintenance services for the fishing fleet, such as, spray painting, steel fabrication, welding and anti-fouling treatment.

The proponent has assessed the risks of fire, explosion or toxic spills using the methodology in Australian Standard AS 4360. Refuelling activities were determined to be an "extreme risk", with the proponent indicating that the facilities would be designed to ensure there is adequate protection from spillage (by incorporating bunding and spill containment equipment and the storage tanks in accordance with AS 1940 "Storage and Handling of Flammable and Combustible Liquids" and the Petroleum Regulation Act 1995.

Workshop activities in the commercial area have been assessed by the proponent as having a "high risk" and would be managed by the relevant provisions of the Building Code of Australia. The storage of hazardous chemicals (solvents, paint and degreasers) has been assessed in the EIS as being a low risk. Nevertheless there will be a requirement to comply with relevant provisions of the Dangerous Substances Act and Harbours and Navigation Act.

It is recommended that the GWMMP incorporate provisions in the relevant Australian Standard, DAIS requirements and EPA Guidelines for Bunding and Spill Management, as appropriate.

**Breakwater Design and Safety**

Section 5.6.16 of the EIS indicates that the breakwater has been designed to:

- provide for safe mooring
- ensure a navigable entrance under all weather conditions
- allow for operation of commercial vessels
- protection for harbour facilities

Section 5.6.9 of the EIS indicates that two breakwaters (extending approximately 300 m off-shore) will be constructed. The breakwaters have been designed as earthfill structures obtained from local sources and protected with limestone rock armouring obtained from stormwater channel excavation stockpiles. The orientation of the breakwater protects the entrance from the prevailing ocean swell, typically west to north.

The design has incorporated principles of the US Army Corps Shore Protection Manual, and includes provision for a 1 in 100 year high tide in combination with the 1 in 100 year significant sea swell wave and a wave period of 5-10 seconds. The proponent has indicated that the breakwater will have side slopes of 1:1.5 (vertical:horizontal), a height of 2.5 m AHD and a crest width of 3 m. Analysis undertaken by the proponent has indicated that under a high tide of 1.43 m AHD and a wave height of 1 metre the transmitted wave within the breakwater is less than 0.4 m. This would be equivalent to a 1:50 year return event and is consistent with AS 3962 "Guidelines for Design of Marinas". On this basis there should be no overtopping of the structure.

Public foot access to the breakwater will be provided for recreational activities and restricted vehicle access is also provided for emergency services and for maintenance.

The DEH indicated in its submission that the maximum level of breakwater (2.5 m) AHD should be adopted as a condition of development approval. This recommendation was accepted by the proponent in the RD.

**Risk to Proclaimed Water Resource**

Details on the aquifer characteristics and proposed source of water supply for the development are provided in sections 6.2.1 and 6.2.4 of this AR.

DWLBC has advised the proponent during preparation of the EIS that there would be acceptable quantities of water to supply Stage1 to 3 of the proposed development. Additional investigations would be required by the proponent to confirm the availability of water from the confined aquifer for subsequent stages. As indicated in section 2.8 of the AR the proponent is proposing to obtain water from an alternative source in the confined aquifer.

The DWLBC has subsequently provided advice that the proposed water supply would be suitable for all stages of the proposed development in terms of water quality, volume, and impacts on the resource and other users of the resource (Letter dated 24 October 2005).

The DWLBC has indicated that the water allocation plan for the Lacepede Kongorong Prescribed Wells Area is currently under review and the amended plan will contain provisions to enable the allocation of water for the proposed development. Following amendment of the plan the proponent will need to make an application for a water allocation. The DWLBC has also indicated that further technical assessment may be required in relation to the application. Not withstanding this advice the DWLBC has reiterated its previous position (Letter dated 29 December 2003) that a temporary allocation of water could be made (until such time as the water allocation plan is amended), pursuant to section 128 of the Natural Resources Management Act 2004.

Modelling undertaken by the proponent has indicated that the proposed development could cause a lowering of the water level in the unconfined aquifer by between 0.2 m and 0.6 m and a change to salt water conditions in the peninsula area near the coast and eastern part of the existing settlement. The proponent has committed to replacing the pumps at a lower level (if required) and to provide an alternative water supply for bores that are affected by saline intrusion.

**Flooding Risk**

A discussion of the risk of flooding is covered in section 5.6.13 of the EIS. The proponent has indicated that flooding risk has been taken into consideration when developing the design components for the marina, site levels, floor levels, seawall heights and breakwater heights, also taking into consideration the potential sea level rise associated with climate change. Provision has also been made to increase the height of the revetments in the waterways if this became necessary.

The following design components for the stormwater system are proposed by the proponent to reduce the risk of flooding in the proposed development:

- Grassed swales design to convey flows up to the 1:100 year ARI to detention basins
- Detention basins to retain all runoff from a 20 mm rainfall event (equivalent to 1 year ARI, 4 hour rainfall event or 5 year ARI, 1 hour rainfall event or 20 year ARI, 20 minute rainfall event or 100 year ARI, 10 minute rainfall event)
- Storms in excess of the detention basin capacity would overflow into the marina waterways.

- There will be no flushing basins incorporated in the design

The proposed setbacks of residential allotments, proposed coastal reserve and buffers proposed by the proponent are acceptable to DEH. DEH further advised that its policy did not support the provision of grants for repair or damage to the facility or the adjacent coastline, as a result of the construction of the marina development. The proponent has indicated in its RD that it accepts this responsibility.

The DEH has advised that the EIS and RD have satisfactorily addressed its concerns relating to coastal flooding, and coastal erosion and that stormwater management practices are considered satisfactory.

**Safety on Waterways**

The proponent has considered public safety issues relating to the use of the waterways in section 5.6.17 of the EIS. These include the following:

- Boating speeds restricted to a maximum of 4 knots
- Swimming and wading to be only undertaken in designated/signposted areas
- 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 Transport SA requirements
- Non-powered vessels less than 3m (canoes and kayaks) will be allowed in recreational areas but not the commercial areas, wharfs and berths
- Diving, scuba diving, snorkelling and similar activities will not be allowed from the revetment wall
- Commercial diving will be allowed within the marina waterways for maintenance and repair activities
- Public areas and boat ramps will be unde the control of Kingston District Council
- The commercial and recreational berthing area will be managed under the community title provisions
- Approval from Transport SA, the Council and the developer will be required for the conduct of water based special events
- Navigational markers will be placed in from the channel to the breakwaters to define the navigation areas

The proponent has committed to the installation of appropriate signage to ensure that safety issues are adhered to for the issues detailed above.

In its submission on the EIS the DH supported the proponent's measures to ensure public risk and safety related to use of the marina water, but did not support swimming and wading in the waterways. DH also indicated that areas intended for primary contact (eg swimming, wading, bathing, and direct contact water sports) and secondary contact (boating and fishing) should comply with relevant guidelines, such as, ANZECC National Water Quality Management Strategy 1992 and the Australian Guidelines for Recreational Use of Water Published by the NH & MRC in 1990. In its RD the proponent acknowledged

the DH reference documents and indicated that the management and monitoring provisions would be included in the Waterways Water Quality Monitoring and Management Plan.

**Earthquake Risk**

The southeast region of South Australia has had a history of earthquakes (magnitude 6.5 in 1897 and 5.6 in 1948). In its submission on the EIS, Planning SA requested that an assessment be undertaken to determine the potential impact an earthquake could have on the on the slopes of the waterways, building foundations, breakwater foundations, and wastewater storage ponds and what implications this could have on the design requirements for buildings and other structures.

The proponent undertook a preliminary assessment of the potential effects of earthquakes and the risk of liquefaction of foundation soils for the buildings, revetments, wastewater storage pond and breakwaters. The results indicated the following:

- 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.

**This AR concludes that the potential hazards and risks of the proposed development have been adequately considered by the proponent. The proponent must prepare Management Plans for further assessment and approval by relevant government agencies before construction commences.**

# 7 PROPOSED MANAGEMENT AND MONITORING OF ISSUES

A multi-component proposal that is of large scale and magnitude and 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 plant and waste water irrigation area
- water supply to the development site (ie extraction bores and supply pipeline)
- road network and public carparks
- works compound

Environmental Management

- coastal reserves (ie public access, pest plant & animal control, erosion control, revegetation, buffer maintenance etc)
- water quality of waterways and marina basin
- buffer zones (ie between the residential development boundary, works compound and irrigation area and the coastal dunes and wetland areas)
- 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 the Major Development approval

- residential (single dwelling and medium density)
- marine precinct (boat repair/maintenance, commercial fishing/aquaculture processing and maintenance, administration, boating retail etc)
- tourist accommodation and facilities
- commercial and retail

Design controls and guidelines need to be considered for maintaining the visual amenity of the development (ie to establish a ‘theme’ or ‘look’), 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, amenity plantings and revegetation
- 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, by-laws, 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.

The EIS (Section 5.5.8) describes the management agreements with the District Council of Kingston that have been, or will be, put in place for the project during and after construction. A Project Control Group has been formed by the proponent and Council (and to include any relevant infrastructure development consultants or contractors) to provide a regular forum to address any infrastructure related aspects of the development.

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. The EIS (Section 5.4.8) describes the land tenure arrangements that would apply after the construction of each stage.

Following the practical completion of construction of each stage or component, a 'hand over' period would commence during which the proponent would be responsible for the maintenance, repair, cleaning and upkeep of the and division infrastructure for 2 years and the marine infrastructure and waterways for the first 4 years. The proponent would also maintain the marine infrastructure and waterways in a clean and navigable condition for 8 years after the completion of Stage 1 marine infrastructure.

To ensure the long-term maintenance and management of the development, a marina maintenance fund would be established comprising a financial contribution for the proponent ($2,000 from each allotment sold) and 50% of Council rates for 5 years after each allotment is sold. An actuarial analysis calculated that there would be sufficient funds generated for perpetual maintenance.

## 7.1 CONSTRUCTION AND OPERATIONAL ENVIRONMENTAL MANAGEMENT PLANS

The construction contractor should be responsible for preparing an Environmental Management Implementation Plan (EMIP) that would document how the management requirements and environmental standards specified in the CEMMP would be implemented during construction. An Operational Environmental Management and Monitoring Plan (OEMMP) would also be prepared by the proponent, to maintain environmental standards and to undertake corrective actions (based on monitoring)

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

Groundwater Management and Monitoring Plan

Irrigation (Reclaimed Water) Monitoring and Management Plan;

Dredging Monitoring and Management Plan;

Marine Construction Monitoring and Management Plan;

Vegetation Monitoring and Management Plan;

Site Construction Monitoring and Management Plan;

Acid Sulphate Soils Monitoring and Management Plan; and

Stormwater Monitoring and Management Plan.

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

Waste and Pollutant Source Management and Monitoring Plan – to address all waste streams and pollutants, including building waste, hard waste, litter, floating debris, organic waste, 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.

Aboriginal Heritage Monitoring and Management Plan – for monitoring of excavations for the potential discovery for items of Aboriginal Heritage significance and the management of any identified sites.

Adaptive Coastal Monitoring and Management Plan – to address the potential future need for sand management or further coastal protection works.

Pest Plant and Animal Management and Monitoring Plan – to address proclaimed species, nuisance species, feral species, domestic animals, garden plant escapees and marine pest species.

## 7.2 MANAGEMENT, MAINTENANCE AND MONITORING AGREEMENT

A Management, Maintenance and Monitoring Agreement (MMM) between the proponent and the Kingston Council should 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 or each party are clearly defined for both the whole of the proposed development and for off-site impacts.

It is suggested that the MMM agreeement 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 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 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 MEMORANDUM OF ENCUMBRANCE AND/OR LAND MANAGEMENT AGREEMENT

The EIS (Section 5.5.9) proposes that all titled property would have an encumbrance or agreement registered on the title that sets out the various requirements or obligations for the development form, land use, occupation and activities appropriate to the property, together with a record of recognition in relation to activities essential to the operation of a working fishing port. There is also proposed to be a set of marina rules that apply to the use and development of the waterways. The marina manager and the Council would be responsible for enforcement. The types of matters addressed are detailed in the EIS.

For consistency purposes, it is considered that the above mentioned matters should be included in a LMA rather than an encumbrance. This LMA could be between the Council and allotment owners.

Provisions are required for the Council to access and maintain poorly managed edges/moorings, or those structures that Council has been handed responsibility for. It is considered, therefore, that an access easement and suitable set-back distance should be included in a LMA to enable maintenance of edge treatments and the installation of future coastal protection works if needed in the future. Standards for maintenance by owners should also be specified to ensure a consistent approach and appearance. In addition, stormwater management devices (such as swales or infiltration trenches) would also need to be included in easements on a LMA (especially to ensure they are maintained in a working order. A 2 metre easement will be required from the top of the revetment in order to allow access for maintenance.

The LMA should include requirements in regard to the management of stormwater, including the collection of stormwater for irrigating gardens (if not used for drinking 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 stormwater pollution on waterways and the existence of the EPA *Code of Practice for the Prevention of Stormwater Pollution for the Community*.

It is suggested that the following aspects should also be considered for inclusion in a LMA:

- Allotment owners obligations for submitting suitable building plans and for the design and appearance of structures and landscaping.
- Types of vessels that may be moored and boat maintenance.
- Disturbances and disorderly behaviour.
- Emergency access.
- By-laws.

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.

## 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

Kingston Council will need to prepare a Plan Amendment Report (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 Lacepede Bay, to incorporate the breakwaters. The potential changes that will need to be made to the zoning of the site if approved are identified in Section 5.9.2 of the EIS and include the following:

- inclusion of the coastal waters section of the scheme, ie to the end of the breakwaters in the Kingston Development Plan (after amendment to the Local Government boundary);
- minor realignment of the landward boundary of the Urban Coastal and Rural Coastal Zones to reflect the approved plan;
- rezoning of the Rural Coastal Zone in the eastern part of the area to Urban Coastal Zone to provide consistent coastal policy adjacent to the proposed development area;
- rezoning of the Residential, Industry (Cape Jaffa) and the affected part of the Primary Industry Zones within the study area to an appropriate zone to reflect the uses in the approved scheme; and
- the creation of new policies for each of the identified functional areas

Figure 5.59 in the EIS shows one potential approach to set out separate zones within the marina area, for example Residential (Cape Jaffa) and Commercial (Cape Jaffa) etc similar to the existing arrangements and the Port Vincent example. Another approach would be to establish a Marina Zone with various policy areas, ie Residential, Commercial, Boat Haven and Tourist Accommodation, similar to North Haven. The final outcome will be determined after appropriate investigations in the PAR process and may include elements deriving from the Better Development Plan Program.

# 8 CONCLUSIONS

The assessment of the Cape Jaffa 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 February 2005 EIS prepared by the Cape Jaffa Development Company, public comments on the EIS and the Response Document prepared in July 2005. 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:

- Groundwater impacts including draw down on local bores
- Water supply source
- Change of character of Cape Jaffa
- Environmental impacts of development and 'people pressure'.
- Water quality in the marina

This assessment makes the following conclusions in relation to issues required to be addressed by the Major Developments Panel and as set out in the published Guidelines.

## 8.1 ENVIRONMENTAL ISSUES

### 8.1.1 Implications for Biodiversity

In conclusion, it is expected that the proposal would directly result in a relatively low loss of terrestrial and marine native vegetation. The clearance of coastal vegetation can easily be compensated for by landscaping/revegetation and the protection and environmental improvement of retained remnant stands. Existing coastal dune and wetland 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. Groundwater implications from the establishment of waterways and waste water irrigation may also affect nearby wetlands. Similarly, the marine environment of Lacepede 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 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 (ie from Cape Jaffa – Kingston and the hinterland). 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 eastern end of the site abuts an intact coastal dune system and a wetland system that stretch east to Kingston and provide a habitat corridor from the Bernouilli Conservation Reserve to the Butchers Gap Conservation Park. 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 significant increase the level of threatening processes on the surrounding environment.

Whilst on site impacts (ie vegetation clearance) can be adequately compensated for, the off-site impacts are more difficult for the proponent to manage. Providing resources to improve the management of the Bernouilli Conservation Reserve would help mitigate the effects of the proposal to the west of the site, however, additional mitigation and/or compensation is required for habitat found east of the site. Thus, it is suggested that a suitable buffer be created on adjoining land in the vicinity of the coastal wetlands and dunes (as illustrated in Figure). The detailed design and management of the buffer would need to be addressed in the Native Vegetation Management Plan.

The direct impacts on the marine environment (ie seagrass loss) can be partly compensated for by the long-term rehabilitation of existing swing moorings and possibly regeneration of the entrance channel. However, a net loss of seagrass will occur due to the construction of breakwaters. 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 and an expansion of aquaculture and/or commercial fishing) would significantly increase the level of threatening processes on marine flora and fauna and would be difficult for the proponent to adequately mitigate.

Increased human disturbance and aquaculture could have a significant long-term effect on marine mammal species, especially endangered Southern Right Wales and Australian Sea Lions. Collisions with boats, entanglements in sea cages and the shooting of wildlife could have a detrimental impact on species with low population numbers, potentially reducing recovery rates.

From a broader perspective, the establishment of a commercial/recreational marina and residential waterfront development could erode the conservation values of the area, which may reduce its potential for Marine Protected Area status.

Overall, however, the environmental impact is, subject to ongoing management as recommended in this AR, acceptable.

## 8.2 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 growth in the fishing and aquaculture sectors as a result of the development. Tourism will also benefit from the provision of new services and accommodation in the region.

The full economic benefit would largely be contingent upon the demand for residential allotments. Indications are that there would be a strong demand for the allotments at Cape Jaffa.

It is likely that the marina development would capture some passing tourist trade, especially those tourists who travel to Melbourne via the Great Ocean Road and those visitors to the South East region. The provision of higher quality tourist accommodation (as proposed) would help achieve this.

Economic benefits could also be delivered through the potential expansion of the commercial fishing and aquaculture industries. The finfish aquaculture industry would be boosted by the safe and efficient facilities provided in the marina, especially in such a windy environment.

Limited economic opportunities would be provided through retail and commercial services for the boating fraternity, residents and tourists.

## 8.3 SOCIAL ISSUES

The proposal has the potential to significantly expand the township of Cape Jaffa, with a substantial increase in resident population (i.e. from 30-40 people up to 1500-2,000 people approximately). A quiet undeveloped part of the coast and hinterland will be transformed into a commercial/ recreational marina, with a large residential and tourist development. General activity and noise will increase significantly around what should be a busy harbour, which could attract high tourist numbers (especially during summer, school holidays and special days like the Cape Jaffa food and wine event).

It is envisaged that the development would create a significant tourist destination, which would complement existing attractions.

Significant employment opportunities would be created during the construction period, both for the major earthworks/infrastructure works and for the ongoing construction of housing and buildings. In the long-term, the operation of the proposal would encourage employment in the commercial fishing/aquaculture, tourist and service industries. Increased economic growth and employment in Cape Jaffa would benefit the local community (including Kingston). Council's rate base is likely to increase, providing greater funds for the provision of infrastructure, services and amenity.

As the number of residents increases, there will be greater levels of traffic and general people pressure affecting the (currently very small) township. The Kingston health service is currently at capacity. Monitoring will be required in order to determine further provision of health services as demand increases.

**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.

**Air Quality**

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

While odours are expected to be negligible, it is still important that the proponent 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 final Seaweed Wrack Management Plan.

**Visual Effects**

The proposal will change the visual impact and amenity of the area that is now Cape Jaffa. In general, however, coastal marinas are considered to add interest and activity to the South Australian coastline.

**Aboriginal Heritage and Native Title**

This AR accepts that consultation has occurred (and will continue to occur) with local Aboriginal communities. An archaelogical survey of the site identified few sites of significance. Native Title implications have also been addressed.

## 8.4 TRANSPORT ISSUES

The closure of part of the existing King Drive will occur as a result of the development of the commercial are and marina basin. A section of road will also be realigned south to facilitate additional residential lots adjacent to the foreshore reserve. Commercial related vehicles will enter the commercial areas directly, whilst travel distances to the existing town area remain similar.

## 8.5 ENVIRONMENTAL ISSUES AND MITIGATION MEASURES

**Wastewater Management**

The proponent proposes to use a package wastewater treatment plant to the satisfaction of the EPA and Department of Health for the proposed development.

**Waste Management**

The establishment of a larger community in the area is likely to require an upgrade of Council facilities and waste management practices. Kingston Council is developing a waste strategy and is seeking approval from the EPA to establish a waste transfer station at Kingston. This AR concludes that the proponent has adequately addressed issues relating to waste management.

**Surface Water 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 should have rainwater tanks fitted. Residential buildings shall be able to use collected rainwater for hot water systems and toilets.

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

**Groundwater**

This AR concludes that the issue of groundwater pollution and saline water intrusion into the groundwater and associated groundwater extraction bores have been adequately dealt with in the EIS, but continued monitoring of groundwater levels and quality will be required to ensure that impacts on existing groundwater users are picked up early and if required appropriate mitigation measures are implemented.

**Hazard Risk Assessment and Management**

This AR concludes that the potential hazards and risks of the proposed development have been adequately considered by the proponent. The proponent must prepare Management Plans for further assessment and approval by relevant government agencies before construction commences.

## 8.6 INFRASTRUCTURE

The proponent has indicated that, with the exception of sewerage, all required infrastructure services (including power, water and telecommunications) could be established on the site of the proposed development.

This AR concludes that there are adequate services in place or that can be provided to the site should the Governor grant development authorisation.

In terms of water supply DWLBC has advised that a water supply to service the needs of the proposed development is available, initially form an existing well located about 17 kilometres from the proposed marina site. Additional investigation are likely to be required as part of a water allocation application and in the establishment of additional wells. Existing residents may face increased costs for water supplied through the project's water supply provisions.

## 8.7 MANAGEMENT AND MONITORING

This AR concludes that that adoption of the proposed management and monitoring measures should not result in unacceptable human and environmental impacts. It is also concluded that there is merit in having a consolidated Environmental Management and Monitoring Plan (EMMP) that addresses the different stages of the project's lifecycle (pre-construction, construction and post-construction/operation.

## 8.8 DEVELOPMENT PLAN AND PLANNING STRATEGY

The proposal involves land which is currently located in a range of Zones in the Kingston (DC) Development Plan. The consistency of the proposed land use is generally consistent with the existing provisions of the Residential Zone and Rural Coastal Zone. In regards to the Industry (Cape Jaffa), Local Centre, Primary Industry and Urban Coastal Zones, there is substantial variance between what is proposed for the land and what the policies envisage.

The Council Wide and Zone objectives and principles of development control of the Kingston (DC) Development Plan Land Not within a Council Area (Coastal Waters) Development Plan have more general provisions which promote a range of criteria including sustainable development, protection of the environment, provision and maintenance of employment opportunities and the rational distribution of land uses to avoid incompatible development. In relation to the majority of the provisions, the proposal can be considered generally compatible in relation to a range of criteria.

Such criteria include including economic and employment generation, visual impact, provision of services and environmental impacts including those on groundwater resources and the coastal environment.

A PAR will be required to zone the land suitably, should the project proceed.

*Planning Strategy*

The proposal responds to a need to provide improved facilities and services for the commercial fishing/aquaculture and tourism industries, as identified by the Planning Strategy and is generally consistent with its relevant provisions.

# 9 RECOMMENDATIONS

This Assessment Report concludes that the environmental, social and economical impacts of the proposed Cape Jaffa Marina are acceptable, based on the proposed design, mitigation and management measures.

Should the Governor grant a provisional development authorisation, the conditions 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 (refer to Conditions and Notes to the applicant below).

2. Proposed use of the site between the breakwaters shown as 'Future Development' on Figure 3.6 in the EIS until a Vegetation Management Plan has been approved by the Native Vegetation Council.

3. Proposed size and extent of the buffer area of the wetland vegetation on the eastern side of the development to be negotiated with DWLBC and to the satisfaction of Primary Industries and Resources SA (Planning SA).

4. Specify all matters relating to this provisional development authorisation as matters in respect of which conditions of this authorisation may be varied or revoked, or new conditions attached;

5. Specify for the purposes of section 48(11)(b) the period of two years from the date hereof as the time within which substantial work must be commenced on site failing which I may cancel this authorisation.

**CONDITIONS**

1. No building works on any part of the development may commence until a favourable decision has been notified to the applicant by the Governor or the Governor's delegate in respect of these reserved matters referred to in subparagraphs I to iii, in paragraph (b) of the Decision section above.

2. No building works shall commence on a stage of the development (within the ambit of the declaration), however, until a favourable decision in relation to building rules compliance in respect of that stage has been notified in writing to the applicant by the Governor or the Governor's delegate.

3. A decision on building rules compliance (refer reserved matter i. in paragraph (b) of the Decision section above) will only be made after a Building Rules assessment and certification has been undertaken and issued by the Kingston Council or a private certifier, in accordance with the provisions of the Development Act 1993 and after the Minister for Urban Development and 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).

4. A Management, Maintenance and Monitoring(MMM) Agreement between the Kingston District Council and the Cape Jaffa Anchorage Marina Development Company shall be drafted and finalised, prior to being submitted to me or my delegate (refer to Conditions and Notes below).

5. Before any works commence, a Construction Environmental Management and Monitoring Plan (CEMMP) to cover the pre-construction and construction phases shall be prepared in consultation

with and approved by the Environment Protection Authority and Planning SA, to address management issues during construction.

6. An Operational Environmental Management and Monitoring Plan (OEMMP) for the operational phase of the development shall be prepared to the reasonable satisfaction of the Environment Protection Authority, other government agencies and the Kingston District Council, prior to it being submitted to me or my delegate (refer to Conditions and Notes to Applicant below).

7. All works and site activities shall be undertaken in accordance with the approved Construction Environmental Management and Monitoring Plan.

8. Stockpiled soils shall be suitably managed to control dust emissions, erosion and weed infestation.

9. Armour rock used for breakwaters and revetments shall not be contaminated by fine sediment.

10. 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.

11. The proponent shall provide underground public lighting, power supply, water supply 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.

12. The applicant shall ensure that there is no discharge of stormwater into the marina basins, waterways or marine environment for rainfall less than, and including, 1:20year ARI events.

13. The land to be used for land-based allotments shall be formed to prevent stormwater flows entering into the waterways.

14. Water-sensitive urban design measures and practices shall be adopted for the management of run-off, including stormwater capture and reuse.

15. Undeveloped allotments shall be left in a neat and tidy condition, with soil surfaces stabilised to minimise erosion.

16. Roads, drainage, footpath and intersection designs (i.e. engineering construction plans) shall be finalised in accordance with the requirements of the Department of Transport, Energy & Infrastructure and the Kingston Council, prior to construction commencing. Road and drainage designs shall include water table levels, drainage inverts and pavement details. The roads and drainage works shall be built according to these designs.

17. Road designs shall not affect existing natural lines in such a way as to cause flooding.

18. A set-back distance of 2 metres from the top of the waterway edge treatment shall be provided for the construction of further coastal protection works if required in the future.

19. Appropriate navigational aids shall be erected in prominent locations, in consultation with the Department of Transport, Energy & Infrastructure, prior to use of the facility for boating purposes.

20. 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, 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 and 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.

21. 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 AS 3962-1991 Guidelines for Design of Marinas.

22. The public boat ramp facility shall be designed in accordance with the South Australian Boating Advisory Committee's Guidelines for Planning, Design and Construction of Boat Launching Facilities.

23. Vehicular access to the beach will not be provided once the boat ramp is constructed and operational in the marina (as this relates to the Major Developments declared area).

24. The boat refuelling area and marine toilet pump-out facility shall be designed to meet the requirements of the Environment Protection Authority, the Department for Transport, Energy & Infrastructure and the Country Fire Service (CFS) respectively, and shall be in place prior to commencement of operation of the marina.

25. The water contained in the marina basin shall 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.

26. Normal operating hours for construction activities and truck movements to and from the site shall be from 7.00am to 7pm, Monday to Saturday inclusive. If it is considered necessary for construction to be undertaken on Sundays, construction hours shall be from 9.00 am to 6.00pm on Sundays (refer to Notes to Applicant relating to Environment Protection Authority noise emission policies).

27. Landscaping and street scaping 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.

28. The Kingston 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 co-ordinating site works 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, hard stand, boat maintenance facilities and car park areas;
    - The boat refuelling and boat effluent disposal facility;

- Installation of navigational aids;
- All residential, commercial, retail, tourist related and other buildings.

2. Pursuant to *Development Regulation 64*, the applicant is advised that the Kingston Council or private certifier conducting a Building Rules assessment must-

   (a) provide 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.

3. The Kingston District Council or private certifier undertaking Building Rules assessments must ensure that the assessment and certification are consistent with this provisional development authorisation (including Conditions or Notes that apply in relation to this provisional development authorisation).

4. 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 for variation involves substantial changes to the proposal, it will be processed pursuant to Section 47 of the *Development Act 1993*

5. The applicant should liaise with the Department of Water, Land and Biodiversity Conservation in relation to any further testing of the proposed water supply and negotiate with DWLBC for provision of the already agreed water supply.

6. Pursuant to the *Harbors and Navigation Act 1993*, the Council may need to enter into a licence agreement with the Minister for Transport over the seabed on terms acceptable to the Minister prior to the commencement of construction.

7. The applicant's CEMMP and OEMMP should be prepared taking into consideration, and with explicit reference to, relevant Environment Protection Authority 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.

   The following management and monitoring plans may be incorporated into the CEMMP or OEMMP as appropriate.

   - Groundwater Management and Monitoring Plan

- Irrigation (Reclaimed Water) Monitoring and Management Plan;
- Dredging Monitoring and Management Plan;
- Marine Construction Monitoring and Management Plan;
- Vegetation Monitoring and Management Plan;
- Site Construction Monitoring and Management Plan;
- Acid Sulphate Soils Monitoring and Management Plan; and
- Stormwater Monitoring and Management Plan.

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 or 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 Environment Protection and Authorisation 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 A*boriginal 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 the Council after hand-over, 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 Department of Transport, Energy and Infrastructure (Marine Safety Section) to address any requirements of the Australian Quarantine Service (AQIS) and the Australian Customs Service.

19. It is recommended that the applicant approach the Kingston 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 ways and hard stand
- Refuelling facility and marine toilet pump-out facility
- The residential development and reserves (including stormwater management devices)

20. The Kingston District Council will need to review and amend the zoning 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 provisional development authorisation.

21. Noise generated from the non-residential components of the development should not exceed:

(a) 52dB(A) between the hours of 7am and 10pm measured and adjusted at the nearest existing residential property in accordance with the *Environmental Protection (Industrial Noise) Policy 1994.*
(b) 45dB(A) between the hours of 10pm and 7am measured and adjusted at the nearest residential property in accordance with the *Environment Protection (Industrial Noise) Policy 1994.*
(c) A short term typical maximum noise level of 60dB(A) when measured at the nearest existing residential property.

22. In a land division provision shall be 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.

23. 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.

24. Binding legal arrangements (e.g. 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.

25. 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.

Department for Environment & Heritage. 2005. *Population Status, Threats and Impediments in Growth to Australian Sea Lion Populations (Neophoca cinerea) – Issues Paper*. Commonwealth of Australia.

EPA, *Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry, 1999.*

EPA, *Handbook for Pollution Avoidance on Commercial and Residential Building Sites, Second Edition, 2004.*

Kelleher & Kenchington. 1991. *Guidelines for Establishing Marina Protected Areas*, International Union for Conservation of Nature and Natural Resources (IUCN)

Major Developments Panel, South Australia, *Issues Paper – Cape Jaffa Marina, January 2004.*

Major Developments Panel, South Australia, *Guidelines for the preparation of an EIS for the Cape Jaffa Marina, February 2005.*

Planning Strategy for Regional South Australia, 2003.

The Kingston District Council – Development Plan.

Biodiversity Plan for the South East of South Australia (1999)

Laut et al, 1977

*Wetland Resources of the South East of South Australia (1984)*

*Directory of Important Wetlands in Australia (Australian Nature Conservation Agency, 1996).*

*Lacepede Bay Aquaculture Management Policy* (Department for Primary Industries & Resources, 2004)

# 11 GLOSSARY

| | |
|---|---|
| The ‘Act’ | *Development Act 1993* and *Regulations* |
| AR | Assessment Report |
| DR | Development Report |
| DAARE | Department of Aboriginal Affairs and Reconciliation |
| DAC | Development Assessment Commission |
| EPA | Environment Protection Authority |
| DWLBC | Department of Water, Land and Biodiversity Conservation |
| Panel | Major Developments Panel |
| RD | Response Document |
| WHO | World Health Organisation |
| SENRCC | South East Natural Resources Conservation committee |

**APPENDIX 1**

**PROPONENT'S LETTER WITH ADDITIONAL INFORMATION 4 NOVEMBER 2005**

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MasterPlan
Town & Country Planners



4 November 2005

Our Ref: af:9399LET07.doc

Ms Karen Ferguson
Planning SA
GPO Box 1815
ADELAIDE SA 5001

Dear Karen

Re: Cape Jaffa Anchorage Marina Assessment

In accordance with your request for further information and clarification of various aspects of the Cape Jaffa Anchorage Marina Proposal, on behalf of the proponents we provide commentary, plans and references to assist your office as it finalises the assessment of this Major Development.

Changes to the Proposal During the Consultation Process

Although there have not been major changes to the proposal during the consultation and assessment process, there have been improvements, clarification and evolution. For the purposes of assessment and determination, it is the proponent's intention that where documents present a point of difference, the most recent of the documents should take precedence, unless specifically stated to the contrary.

Public Water Supply

The proposed town water supply has been revised in order to utilise an existing bore to meet the initial needs at Cape Jaffa. Details of the location of the existing bore and the proposed pipeline route are shown in Figure 1 titled Water Supply dated October 2005.

A detailed engineering assessment of the sustainability and productivity of the supply has been undertaken in accordance with the requirements of the Department of Water, Land and Biodiversity Conservation (DWLCB) and is attached. It clearly indicates that the proposed supply meets all of the criteria set out in the Water Allocation Plan for the Lacepede Kongorong Prescribed Wells Area and this has been confirmed by correspondence from DWLCB, which concludes that:

- The construction of the well is adequate for the proposed purpose of use;
- The flow testing of the well was conducted in accordance with the guidelines provided by DWLCB. Estimates of the potentiometric drawdown of the confined aquifer under different flow rates from the well were derived using hydrogeological parameters estimated as a result of the flow test. These indicate that a flow rate of up to 7 L/s can be sustained without resulting in a potentiometric drawdown which would exceed the maximum allowable in the water allocation plan - two meters at two kilometers form the point of extraction;

- A flow rate of 7 L/s equates to an annual extraction rate of 220 ML, which would be sufficient to meet the needs for the full proposed development (Stages 1 - 8). This rate of extraction would not significantly impact on other users of the resource, as indicated by the drawdown analysis; and

- The analysis of water quality from the well carried out by the proponents indicates that the water is suitable for domestic purposes for the parameters tested for.

DWLCB states that it:

> *"is satisfied that the proposed water supply will be suitable for all stages of the development in terms of water quality, volume, impacts on the resource and other users of the resource. "*

Further, DWLCB has reconfirmed the Minister's commitment, made in December 2003, that authorisation for the allocation of water and granting of a license would be issued. DWLCB correspondence stated:

> *"The amended water allocation will contain the necessary provisions to be able to allocate water for this development, following an application and subject to a number of conditions relating to the taking of water."*

An application will be made by the proponent for the allocation of water for the public water supply in accordance with these requirements.

The route of the pipeline is depicted on Figure 1. This route traverses open farmland until it reaches Flint Lane then travels westerly and crosses the Southern Ports Highway to join Cape Jaffa Road. The pipe will be located between the road pavement and the white road posts which defines the graded rubble shoulder of the road, thus avoiding any disturbance to the vegetation on the remainder of this wide road reserve. The shoulder of the road is maintained by Council and this alignment is readily delineated. Kingston District Council has reviewed these plans and has granted permission for this pipeline route and the associated public water supply infrastructure within the road reserve. Maintenance and operation of the public water supply facilities is the responsibility of the proponent.

Locations for the development of additional public water supply bores will be investigated in order to provide a backup and redundancy in the supply system, in accordance with normal water supply engineering practices. The locations are expected to be on or near the alignment of the pipeline route depicted on Figure 1 and the bores will be established in accordance with the requirements defined in the Water Allocation Plan.

Commitments to Nearby Groundwater Users

The proponent's commitment in relation to potential effects on existing groundwater users is set out in Section 5.2.3 of the Response Document and is hereby reconfirmed. Although the effects of the development are unlikely to disadvantage existing groundwater users in almost all areas, this commitment, together with the groundwater monitoring and management commitments, provide improved water supply services at Cape Jaffa and addresses potential undue adverse effects on the groundwater resource and its existing users.

Vegetation Buffer

In order to provide additional protection of the *Melaleuca halmaturorum* and associated vegetation located in the south-eastern corner of the Major Development Area, an additional buffer with a minimum width of 5 metres will be provided and defined using rural post and wire fencing, as shown on Figure 2 titled Vegetation Area B Buffer and Fencing Plan.

Management Plans

A family of management plans are being developed to define the monitoring and management commitments in relation to the construction and operation of the facilities. Each of the management plans include the following :

- introduction;
- relevant standards, codes and conditions;
- objectives;
- infrastructure and development commitments;
- management commitments;
- monitoring commitments;
- definition of the actions required and criteria thresholds that trigger management actions; and
- definition of roles and responsibilities responsibilities.

The following management plans are under development:

- Groundwater Monitoring and Management Plan;
- Wastewater Monitoring and Management Plan;
- Irrigation (Reclaimed Water) Monitoring and Management Plan;
- Waterways Water Quality Monitoring and Management Plan;
- Dredging Monitoring and Management Plan;
- Marine Construction Monitoring and Management Plan;

- Marina Facilities Monitoring and Management Plan;
- Vegetation Monitoring and Management Plan;
- Aboriginal Heritage Monitoring and Management Plan;
- Marine Vegetation (Seagrass) Monitoring and Management Plan;
- Adaptive Coastal (Sand Bypass) Monitoring and Management Plan;
- Seagrass Wrack Monitoring and Management Plan;
- Site Construction Monitoring and Management Plan;
- Acid Sulphate Soils Monitoring and Management Plan; and
- Stormwater Monitoring and Management Plan.

Health

Domestic Water Use

It is agreed and acknowledged that the provision of a water supply and communal wastewater system should result in better control of risks to health, as stated by Department of Health. Other agencies have stated that:

> *"...existing urban development at Cape Jaffa is likely to be causing adverse impacts on the groundwater quality of the unconfined aquifer in the area through the use of individual septic disposal trenches...".*

The proponent is not aware of any misinterpretation of submissions made in relation to potential contamination of domestic bore water by onsite disposal of effluent.

Cost of Access to Public Water Supply

As stated in Section 5.2.3 of the Response Document, in certain circumstances access to the town water supply by existing Cape Jaffa residents will be provided and no cost of connection will apply. It is reasonable that the user pay for water in the normal manner and thus it is not appropriate to provide "end of pipe water" free of usage charges.

Health Services and Access/transport to Services

Changes in population in the region, both in relation to this development and other demographic changes have effects on the level of service provision of various government and non-government agencies, including the Department of Health. The proponent has provided information and demographic assessment to assist agencies plan and manage these changes. It is noteworthy that Kingston District Council, the Kingston Community Hospital and the private sector are about to embark on the development of expanded facilities at the hospital in recognition of the changing needs of the community. This process of review is typical of the anticipated mechanism for progressive development of these services into the future.

It is acknowledged that transport to regional services is required. This applies to any community that does not have these services and is dependant on regional services. Nearby examples include Robe and Lucindale. The proponent has provided information and demographic assessment to assist service providers and the community plan for the future access/transport requirements.

Council currently facilitates a transportation service to provide access to medical and health related services for the whole of the Council area, including Cape Jaffa. It is Council's desire to continue this service and to monitor and review future needs of the community.

It should also be acknowledged that this development will allow orderly and progressive growth in the region in a planned and coordinated manner, in accordance with the State Strategic Plan for the development of regional areas. Accordingly, there is a significant lead time for planning future needs and the proponent is happy to provide ongoing information to assist the relevant agencies plan for these changes. Kingston District Council has a role to play in facilitating this communication.

Noise from Operations

The proponent acknowledges the need for adequate noise management within this environment and accordingly the community will be explicitly informed about the noise associated with the operation of commercial facilities within the development, as has been described in the EIS and Response Document.

We trust this information satisfies your requirements and enables you to finalise your assessment for submission to the Minister at the earliest opportunity. Should you require any further information please do not hesitate to contact the writer.

Yours sincerely
MASTERPLAN SA PTY LTD

SP TONKIN

enc: Tonkin Consulting correspondence
Figure 1 Water Supply
Figure 2 Vegetation Area B Buffer and Fencing Plan

cc: Kingston District Council
Cape Jaffa Development Company

50 Years of Engineering Excellence

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20030318LA7/GP/GP

29 September 2005

Department of Water, Land and Biodiversity Conservation
Mount Gambier Office
SGIC Building
11 Helen Street
MOUNT GAMBIER SA 5290

Attention: Ludovic Schmidt

Dear Sir

**CAPE JAFFA ANCHORAGE – WATER SUPPLY**

Further to recent correspondence from Planning SA and subsequent discussions with Glenn Harrington of your office, please find below details of the existing well proposed to provide the public water supply for the existing Cape Jaffa township and the initial stages of the Cape Jaffa Anchorage development. This letter provides details of:

- The existing well;
- The outcomes of the recent flow testing and drawdown estimates;
- The ability of the well to supply the development in terms of quality and volume; and
- The impact on nearby groundwater users.

The information below has been prepared with the assistance of Michael Cobb, Principal Geologist of WaterSearch Pty Ltd.

**Well Details**

The well is located approximately 17 km north-east from the proposed marina site. The Unit Number of the well is 6824-1411 and is also a salinity and pressure monitoring well as part of the Obswell Database since 1989, reference MTB17. The well is located in Section 113, Hundred of Mount Benson as shown on Figure 1.

The well was constructed in 1985 with pressure cemented casing and an 3 m sand screen installed in the confined aquifer interval from 97-100m (the DWLBC database of latest well data does not indicate depth). The well is completed in the Mepunga Formation, but not over the full thickness of the aquifer (the base of the Mepunga Formation was not identified in the drill log).

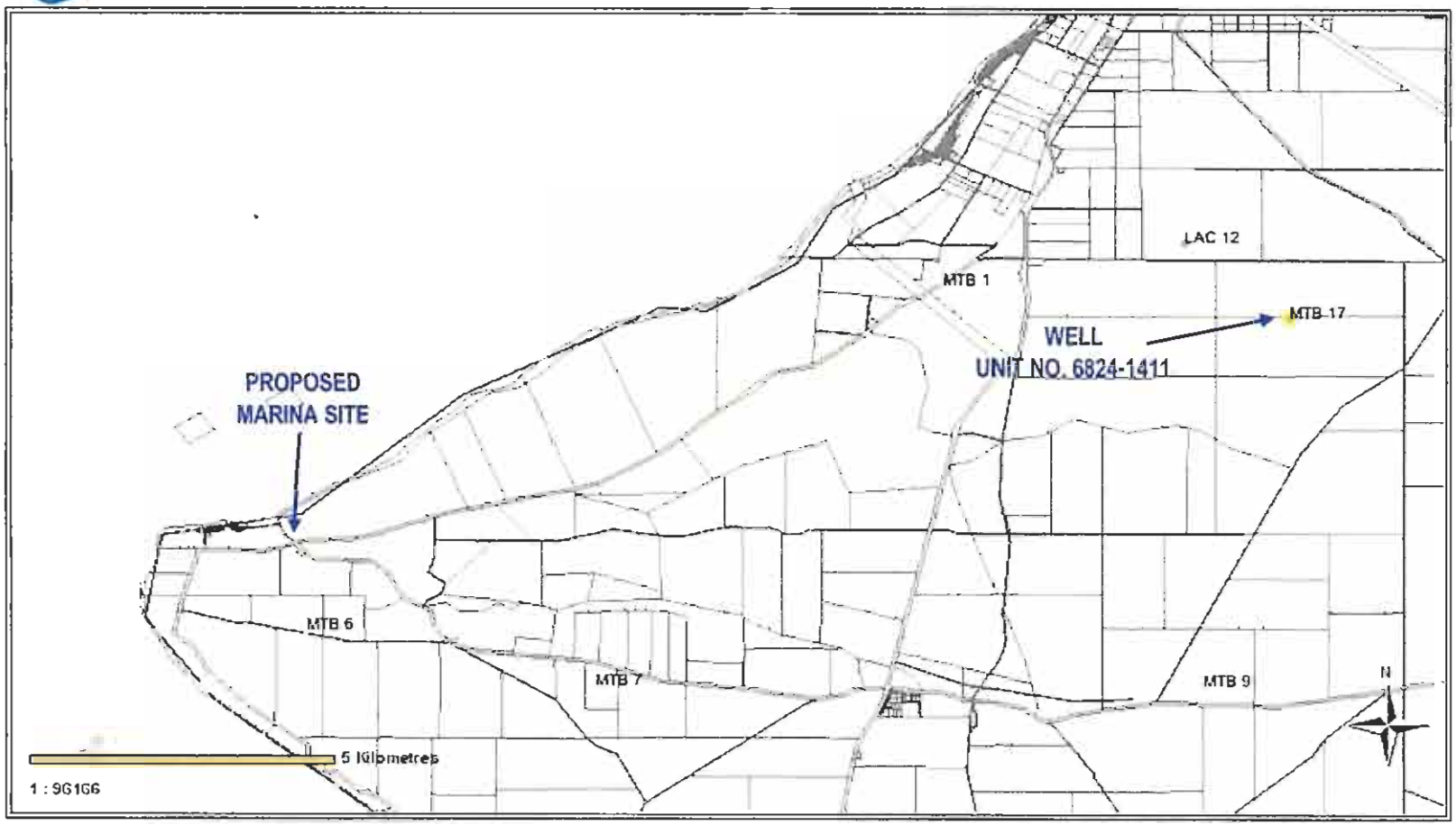


Figure 1 Location Plan.

During the monitoring period 1989 to present, well pressure has varied between approximately 10.5 and 19.5 mAHD. The well is artesian with a general increase in pressure evident since about 1996. Pressure monitoring data collected from the well is summarised in Figure 2 and a shut in pressure of - 13.1 metres was observed during the recent testing.

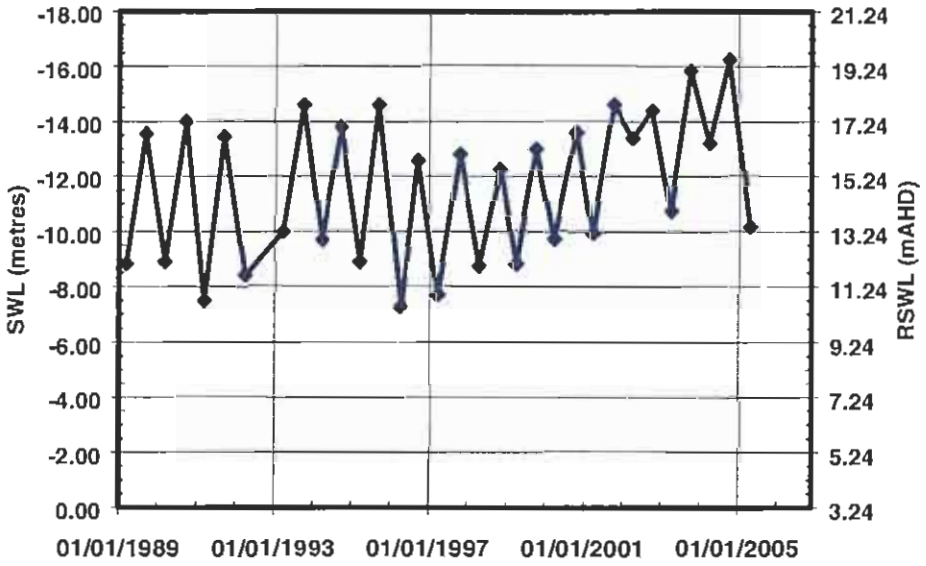


**Figure 2 Pressure Monitoring for Proposed Water Supply Well 6824-1411.**

Salinity monitoring over the same period indicates Total Dissolved Solids (TDS) has varied between 683 and 797 mg/L, with no recognisable upward trend. Salinity monitoring data is summarised in Figure 3.

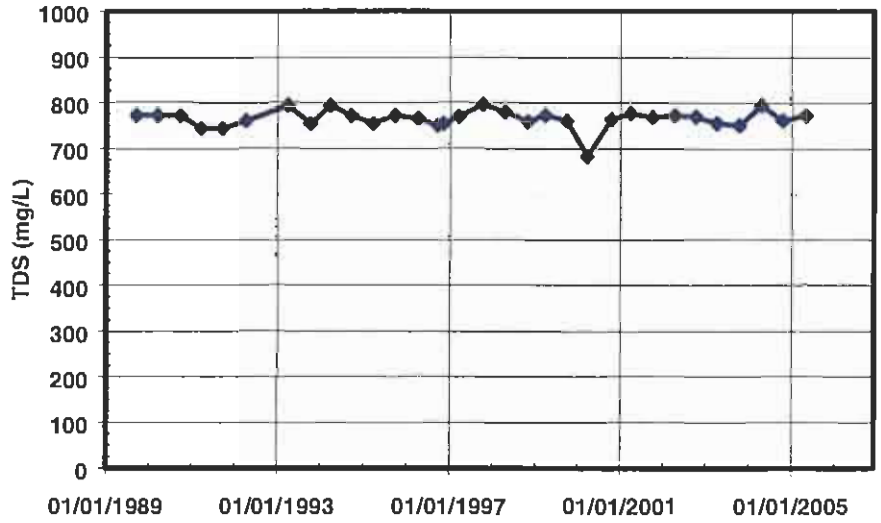


**Figure 3 Salinity Monitoring for Proposed Water Supply Well 6824-1411.**

The well has been in use since construction and anecdotal evidence suggests that it has not been producing sand (and none was seen during the testing). Hence, the well is considered to be stable with extraction not impacting on the structural integrity of the aquifer.

Based on the screen details, the safe flow rate for the well is about 8.6-8.7 L/s in order to maintain entrance velocities below the recommended 3 cm/s to prevent scour of the sand screen.

### Flow Testing and Drawdown Estimates

*Flow Testing*

Flow testing of the well was undertaken by Walsh Bore Testing from 12 to 16 September 2005. The test consisted of flowing the well at 5 L/s for 69 hours followed by 4 by 1 hour increasing steps at 5.5, 6, 6.5 and 7.2 L/s. This was followed by 15 hours of recovery measurements. The test was undertaken by flowing the well naturally, without the assistance of a pump. The shut in pressure prior to commencement of the test was 13.1 m above the top of the well casing.

The drawdown and recovery of the well recorded in the field during the test is shown on Figure 4. A best fit estimation has been made of the drawdown to determine the well equation using the Hazel (1975) method. The pressure in the well stabilised after a relatively short period into each test step (approximately 1.5 hours for the initial step and <5 minutes for the subsequent test steps). Following initial stabilisation, the values calculated using the well equation closely mimics the values recorded in the field.

Water samples for salinity testing were collected throughout the flow testing and delivered to DWLBC. A final water sample for a comprehensive test was submitted to the AWQC laboratory at Bolivar.

*Drawdown Simulation in the Well*

Analysis of the simulation gives a well equation of:

$$s(t) = (0.0207 + 0.000478 \log t)Q + 1.09E - 30Q^2$$

Where s(t) = drawdown at time t;
t = time in days; and
Q = flow rate in m³/day.

Based on this equation, the predicted drawdown for 365 days of constant use for three different flow rates (5, 7 and 9 L/s) is given in Figure 5.

*Estimate of Transmissivity*

Analysis of the test data using Hazel (1975) gives an aquifer Transmissivity of 140 m³/day/m. This compares favourably with that from flow testing of Kingston No. 10 town water supply well to the south of Kingston which was estimated to be 53 m³/day/m with a 6 m screen.

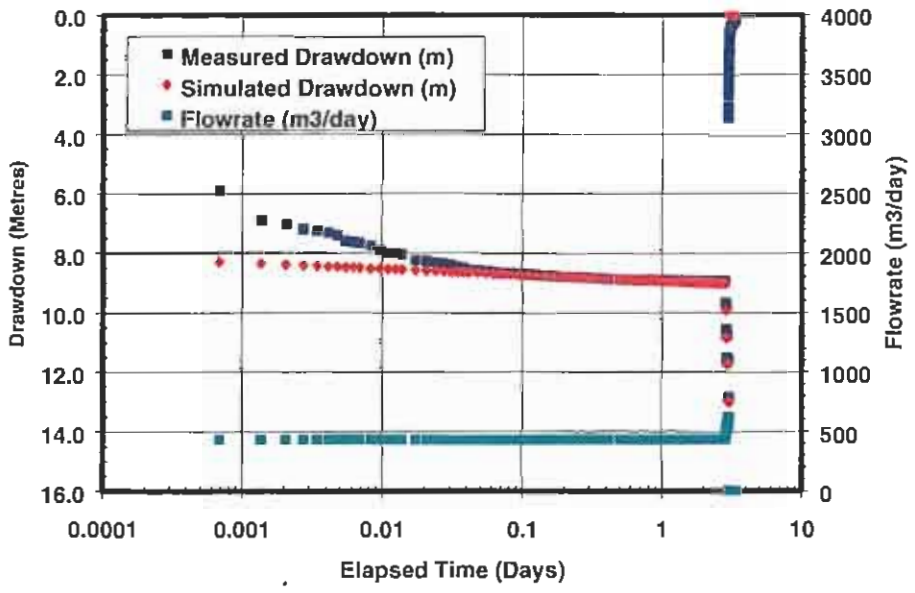


**Figure 4** **Flow Testing of Proposed Water Supply Well 6824-1411, Field and Simulated Data.**

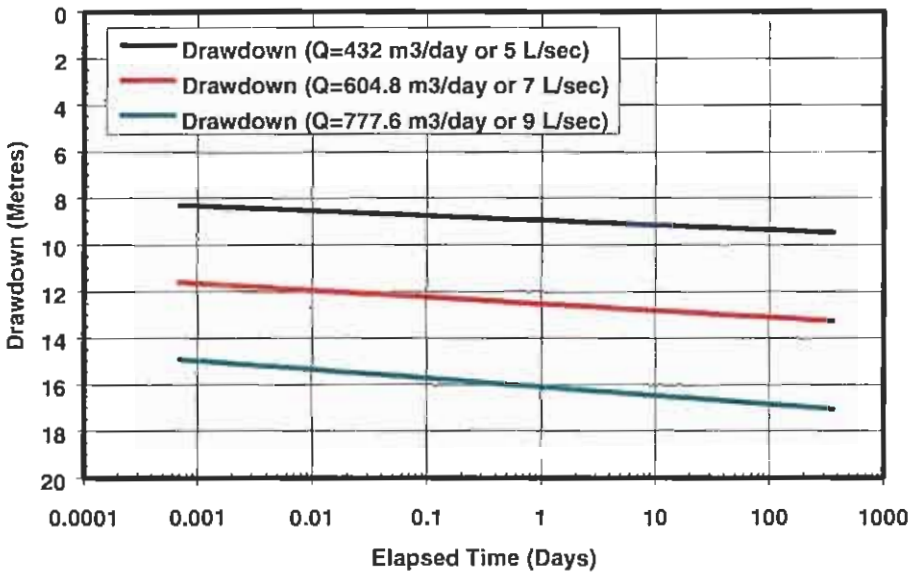


**Figure 5** **Flow Testing of Proposed Water Supply Well 6824-1411, Predicted Drawdown in Well.**

*Drawdown Estimates for Different Distances from the Well*

Drawdown was estimated at different pumping rates and distance from the well for a pumping period of 1 year using the Theis equation. The results are presented in Table 1. There is little documented information on values for the Storage Coefficient, however Shepherd (1983) quotes a value of 0.00012 near Millicent. A Storage Coefficient of 0.0001 has been used for this analysis.

Table 1 **Estimated Confined Aquifer Drawdown.**

| Pumping Rate ($m^3$/day) | Distance From Pumping (m) | | |
|---|---|---|---|
| | 500 | 1000 | 2000 |
| | Drawdown (m) | | |
| 432 (5 L/sec) | 2.07 | 1.73 | 1.39 |
| 604.8 (7 L/sec) | 2.9 | 2.42 | 1.95 |
| 777.6 (9 L/sec) | 3.73 | 3.11 | 2.5 |

Clause 22 of the Water Allocation Plan for the Lacepede Kongorong Prescribed Wells Area requires that the extraction does not result in a seasonal drawdown of greater than 2m at a distance of 2,000 m from the well and this criterion is achieved at 604.8 $m^3$/day (7 L/s).

**Ability to Supply the Development**

*Water Quality*

Total dissolved solids (TDS) measured at well 6824-1411 during the flow test was 770 mg/L, which is consistent with the monitoring data presented in Figure 3. Salinity monitoring for the well indicates that the water is suitable as a potable water source.

The salinity of the well is consistent with regional information and has not shown an increasing trend nor has the monitoring well LAC 12 to the north (Cobb & Brown, 2000). In addition, the drawdown simulation of the well indicates that the well is unlikely to be depressurised below the level of the unconfined aquifer. Both of these factors suggest that the salinity of the well is likely to remain stable as it is unlikely to draw in more saline water from elsewhere within the confined aquifer or within the unconfined aquifer.

Comprehensive chemical analysis of a sample collected during testing is being undertaken and the initial results are summarised in Table 2. The concentration of the parameters analysed are below the Environment Protection (Water Quality) Policy and Australian Drinking Water Guidelines for potable supplies. It is noted that the TDS is greater than the aesthetic (taste) recommendation, however this is not anticipated to limit the use of the water for potable supply.

**Table 2 Comprehensive Water Quality Results.**

| Parameter | Concentration (mg/L) | | |
|---|---|---|---|
| | Result | EPP Potable | ADWG |
| Total Dissolved Solids | 770 | | (500 – aesthetic) |
| **Cations** | | | |
| Calcium | 53.4 | | |
| Magnesium | 14.9 | | |
| Potassium | 11.3 | | |
| Sodium | 231 | | |
| **Anions** | | | |
| Bicarbonate | 360 | | |
| Chloride | 250 | | (250 – aesthetic) |
| Sulphate | 50.9 | 500 | 500 (250 – aesthetic) |
| **Nutrients** | | | |
| Nitrate (as N) | <0.005 | 10 | 50 |
| Nitrite (as N) | <0.005 | 1 | 3 |
| Nitrate + Nitrite (as N) | <0.005 | | |
| **Metals** | | | |
| Arsenic – Soluble | <0.001 | 0.007 | 0.007 |
| Cadmium – Soluble | <0.0005 | 0.002 | 0.002 |
| Chromium – Soluble | 0.005 | 0.05 (Cr VI) | 0.05 (Cr VI) |
| Copper – Soluble | 0.006 | 2 | 2 |
| Iron – Total | 0.169 | | (0.3 – aesthetic) |
| Lead – Soluble | <0.0005 | 0.01 | 0.01 |
| Manganese - Total | 0.0246 | 0.5 | 0.5 (0.1 – aesthetic) |
| Mercury – Soluble | <0.0003 | 0.001 | 0.001 |
| Nickel – Total | <0.0005 | 0.02 | 0.02 |
| Selenium – Soluble | <0.003 | 0.01 | 0.01 |
| Zinc - Soluble | 0.007 | | (3 – aesthetic) |

EPP Potable – *Environment Protection (Water Quality) Policy 2003*, Scedhule 2 – Water quality criteria, Potable
ADWG – NHMRC & NRMMC (2004), *National Water Quality Management Strategy – Australian Drinking Water Guidelines 2004*, National Health and Medical Research Council and Natural Resource Management Ministerial Council.

*Volume*

A flow rate of 604.8 m³/day (7 L/s) is considered appropriate for extraction from this well. This equates to approximately 220 ML/year, which is similar to the ultimate requirements of the Cape Jaffa township. In order to provide some level of redundancy and to manage seasonal variation in water usage, it is proposed to establish a second well nearby in the near future. The ultimate water usage is expected to require 2 operating wells with a third well as a standby.

**Impact on Nearby Users**

In accordance with the criteria defined in the Water Allocation Plan, extraction at the proposed rate identified above should not adversely impact on other confined aquifer users in the area as no other confined aquifer well exists within a radius of 2,000m of the well (based on the DWLBC database).

**References**

Cobb M.A. & Brown K. (2000), *Water Resource Assessment: Lacepede - Kongorong Prescribed Wells Area for the South East Catchment Water Management Board*, PIRSA RB 2000/00049.

Hazel, C.P. (1975), *Groundwater Hydraulics*, Lectures presented to the Groundwater School, Australian Water Resources Council, Adelaide, August 1975.

Shepherd, R.G. (1983), *Underground Water Resources of South Australia*, Dept. Mines and Energy, Bulletin 48.

We trust that the above information meets your requirements at this time. Should you have any queries, please contact the undersigned on (08) 8273 3100.

Yours faithfully
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Major Project Boundary

Water Supply Route

Bore Site

**Figure 1**
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**WATER SUPPLY**
CAPE JAFFA ANCHORAGE


Scale 1:1500 @ A4

0 25m



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**Figure 2**
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# VEGETATION AREA B BUFFER & FENCING PLAN

CAPE JAFFA ANCHORAGE