Coral Coast Resort

Coral Coast Marina Development Pty Ltd

Report and recommendations
of the Environmental Protection Authority

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Summary and recommendations

Coral Coast Marina Development Pty Ltd (CCMD) has proposed to develop a Coral Coast Resort (CCR), which includes tourist, residential and incidental commercial facilities centred around an inland marina, at the site called Mauds Landing. Mauds Landing is located in the southern portion of the Ningaloo Marine Park, approximately three kilometres north of the existing Coral Bay settlement. The marina and its associated facilities would provide an opportunity for people and boats to be housed and to have access through Bateman Bay into the wider Ningaloo Marine Park. The CCR proposal envisages the establishment, in the first stage, of a marina, a caravan park, an interpretative centre, a back-packers facility, stage one of a resort complex, provision of utilities infrastructure and the preparation of land with services for sale at a later date. The CCR proposal assessed by the EPA in this report envisages a marina, a resort complex, private housing, a variety of short-stay accommodation, basic utilities infrastructure and associated commercial buildings and shops.

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal. Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

This project has generated considerable interest in the community and this was reflected in the large number of submissions received by the EPA. Through the assessment process, the EPA has been provided with a wealth of information in a very professional manner by an array of interested parties, including a number of internationally respected conservation organisations and people with specialist knowledge in the area of coastal development, planning and marine science.

Many members of the public have presented a strong case that the proposal should not proceed on the basis that it is inconsistent with the protection of the wilderness and ecological values of the broader Ningaloo Marine Park and its coastline, as well as impacting on the specific values of the Bateman Bay area. Public submissions focused on matters related to the biophysical impact of the proposal on the environment at Mauds Landing (eg loss of flora and fauna habitat and pollution risks) and the potential effects of increased visitation on the ecological and social values of the Ningaloo Marine Park (eg effects of fishing, boat-related impacts on marine habitats and their associated biota).

The EPA has also considered the CCR proposal in the context of previous reports, planning studies, environmental assessments and decisions of the State Government of the day in relation to development at Mauds Landing.

Context for Assessment

The CCR proposal has a long history. In 1995, the EPA assessed a larger CCR proposal, which included a golf course and a large number of residential properties, finding it environmentally acceptable subject to a number of recommended environmental conditions. Appeals received by the former Minister for the Environment against the EPA's report and recommendations were upheld and the proposal was not granted approval to proceed.

During and since the EPA's original assessment, a number of planning instruments have been initiated and associated government decisions made which are considered to be relevant to the proposal. The EPA understands that the proposal is consistent with the following:

- the land is zoned for the purpose of tourist development;
- a Structure Plan has been developed by the proponent, which has been endorsed by the Shire of Carnarvon for consideration by the Western Australian Planning Commission;
- the proposal is generally in accord with the Gascoyne Coast Regional Strategy prepared by the then Ministry for Planning; and
- the EPA understands that, in April 2000, the Government endorsed an assessment by an inter-agency taskforce, convened to consider the development of a tourist facility at Mauds Landing, that found the development proposal by CCMD met a set of environmental and planning guidelines previously approved by Government for development at Mauds Landing.

The EPA has released its Position Statement No. 1 which provides information about the significant environmental attributes of the Cape Range Province and a set of principles to be applied to development and environmental management with the objective of ensuring that the long-term ability of the area to accommodate human-use pressures is not exceeded. The project site is outside Planning Units 2 and 3 of the Exmouth-Learmonth Structure Plan, prepared by the then Ministry for Planning, and thus the development proposal is not inconsistent with the EPA position in relation to the broad question of location. There are a number of other principles set out in the Position Statement which also need to be considered. These relate mostly to the precautionary principle, best practice and the need to ensure that there is sufficient knowledge for the EPA to be confident that implementation of a development is properly planned and managed to protect or enhance the multiple environmental values.

In a regional context, the proposal is adjacent to the Ningaloo Reef and the Ningaloo Marine Park.

The Ningaloo Reef is the largest fringing coral reef in Australia and is one of the longest fringing barrier reefs in the world. The Ningaloo Reef tract is formed from a series of discontinuous barrier reefs and lagoonal reefs off the west side of North West Cape. In contrast to other Australian coral reefs, such as the Great Barrier Reef and atolls off the north west coast, the Ningaloo Reef is unique in that it is one of only a few places in Australia where luxuriant growth of coral occurs close to the mainland shore.

A considerable portion of the Ningaloo Reef tract has been reserved in the Ningaloo Marine Park to protect the high conservation values whilst allowing compatible use of its resources.

From biogeographical and biodiversity perspectives the Ningaloo Marine Park is important because it is located in an overlap zone between the tropical Indo-West Pacific and the temperate Southern Australian biogeographical zones. Consequently, the waters of the Ningaloo Marine Park support a diverse flora and fauna consisting of assemblages of tropical and temperate species, a number of which are at the limits of their geographical ranges. A number of marine species found in the Ningaloo Marine Park are listed under State and Federal legislation as well as in the International Union for the Conservation of Nature Red List.

The Ningaloo Marine Park (State and Commonwealth Waters) is used by migratory marine species including the humpback whale (*Megaptera novaeangliae*) and the whale shark (*Rhincodon typus*). The conservation status of these species is endangered and rare respectively. A considerable tourism industry has developed around the annual autumn migration of whale sharks through the Marine Park. Other migratory marine mammals, including the endangered blue whale and the vulnerable fin whale, have been observed in the Ningaloo Marine Park. A number of bird species listed under the Japan Australia Migratory Bird Agreement and the China Australia Migratory Bird Agreement also utilise the Ningaloo Marine Park foreshore. The dugong (*Dugong dugong*) is found in the Marine Park. Three species of sea turtle use areas of the Park for breeding, including the green turtle (*Chelonia mydas*), the hawksbill turtle (*Eretmochelys imbricata*) and the loggerhead turtle (*Caretta caretta*). Being important from a biodiversity conservation perspective, these species are listed under State and Federal legislation.

The Ningaloo Marine Park is vested in the Marine Parks and Reserves Authority (MPRA). The MPRA has advised that it considers the proposal should not proceed because the scale of development is too large, it will create a new node of development within the Ningaloo Marine Park and should not precede the current review of the Ningaloo Marine Park Management Plan. The MPRA is also concerned that the proposal will impact on the wilderness quality of the Park.

The EPA also acknowledges wilderness value as an important part of the Ningaloo Marine Park's appeal. This quality is held in high regard by the community.

Mauds Landing is located on the shores of Bateman Bay in the southern sector of the Ningaloo Marine Park. The area adjacent to the project site is a Recreation Zone under the Ningaloo Marine Park Management Plan. The EPA has heard differing views about the values of Bateman Bay. However, it is understood from information presented by the proponent, the public and the Department of Conservation and Land Management (DCLM) that a number of important species utilize Bateman Bay and its shores for various reasons at various time of the year.

Bateman Bay is a large semi-enclosed, relatively deep bay formed by a discontinuous barrier coral reef. The barrier reef is interrupted in the southern part of Bateman Bay by Cardabia Passage, which provides access to the open ocean adjacent to the proposal. The substratum of the lagoon in the southern part of Bateman Bay is predominantly sand colonised in patches by seagrass. Coral reefs are found north and south of Point Maud, along the barrier reefs which enclose Bateman Bay and in lagoonal areas to the north known as Stanley Pool. Significant nearshore coral communities are found nearby in Bills Bay.

The sandy beaches of Bateman Bay are used by a number of migratory birds and sea turtles. Migratory birds roost and loaf on beaches, mainly in the southern portion of the Bay. Loggerhead sea turtles use Bateman Bay as a breeding area, nesting on beaches around the Bay. Bateman Bay is an important area within the Ningaloo Marine Park for loggerhead sea turtle breeding, with nests made on beaches north of the proposal. In recent years nests have also been observed in the near vicinity of the proposal. Hawksbill sea turtles also nest in Bateman Bay. At a regional level, the most significant rookeries for loggerhead sea turtles are located on Dirk Hartog Island and the Murion Islands, north of North West Cape. Humpback whales, some with calves, have been observed in Bateman Bay during their migration. It has been speculated that these whales use Bateman Bay as a resting area. Aggregations of manta rays also occur in the vicinity of the proposal in Bateman Bay. Little is currently known about manta rays in the Bateman Bay lagoon, however a tourism industry has developed in Coral Bay which provides an opportunity for visitors to interact with manta rays.

Currently there is only one major settlement, known as Coral Bay, adjacent to the Ningaloo Marine Park. The EPA is conscious that the Coral Bay township is experiencing significant management pressure and this impacts on the close-by corals within Bills Bay, which is classified as a Sanctuary Zone within the Marine Park. Two issues are of particular and ongoing concern to the EPA. Firstly, there is a lack of appropriate wastewater treatment facilities in Coral Bay and there is evidence that current wastewater treatment practices present a risk to water quality and corals in Bills Bay. Secondly, current arrangements for boating in Coral Bay are considered inadequate.

The EPA understands that the Government has recently made commitments to address these immediate problems facing Coral Bay. The Government has proposed that it will develop an appropriate wastewater treatment system and a public boating facility for Coral Bay. The establishment of the facilities will need to be managed in such a way as to ensure that it does not trigger uncontrolled/unplanned expansion in the settlement. The DCLM and the MPRA recently released a draft Coral Bay Boating Strategy for public comment to address some immediate boating-related problems in the southern part of Coral Bay.

The EPA recognises that the CCR proposal, should it proceed, provides an opportunity to address some of these issues, especially in relation to basic utilities infrastructure and the boating activities in Bills Bay. As noted by the proponent, the proposal provides an opportunity for the Government to achieve environmental benefits for Coral Bay by connecting to the infrastructure proposed by CCMD. These benefits would only be realised if the Government makes a further decision not to proceed with the public utilities and environmental management initiatives it has proposed to address the immediate problems facing Coral Bay.

The proponent anticipates that accommodation capacity of the CCR proposal is likely to be in the order of 2000 to 2500 people per night during peak periods. By way of comparison, the EPA understands that the number of visitors staying at Rottnest Island during peak periods is approximately 3840 (including staff). The populations of nearby regional centres of Exmouth and Carnarvon on the 2001 Census Night were 4267 and 9152 people respectively, including overseas visitors.

The proposal would provide improved boat access to the outer reef because of its proximity to Cardabia Passage and increased boat numbers by including a range of boating facilities in the marina. The proposed marina includes in the order of 100 boat pens for public and commercial vessels, as well as facilities for approximately 120 trailable boats.

The proposal being assessed is the first phase (Phase 1) of what could be an expanded development in the future. The extent of any possible expansion has not been defined, but the EPA understands that it could increase the number of people by up to 50%. Any expansion of the proposal currently being assessed would require assessment by the EPA and Government approval.

The EPA is mindful that the Government has signalled its intention to seek World Heritage nomination for the Ningaloo Marine Park. Although the World Heritage values of the Ningaloo Marine Park have not yet been established, Government decisions on this proposal would need to give due regard to the protection of potential World Heritage values.

It is within the above context that the EPA has undertaken its assessment. The EPA has recognised that the proposal needs to be considered at the level of both the impacts associated with the footprint of the proposal and the potential off-site impacts on the terrestrial and marine environments. The EPA has defined the 'footprint' in this report as the constructed elements of the proposal.

Relevant environmental issues/factors

In its guidelines, the EPA identified a wide range of environmental issues/factors relevant to the proposal requiring detailed evaluation by the proponent. After reviewing the proponent's report and the public submissions received, the EPA has decided that the relevant environmental issues associated with the proposal are as follows:

(a) impacts associated with the proposal's footprint – discussion on this issue summarises the suite of biophysical and pollution impacts directly associated with constructed elements of the proposal;

(b) potential off-site marine impacts – the potential impacts of people's activities on the environmental attributes of the Ningaloo Marine Park;

(c) potential off-site terrestrial impacts - the potential impacts of people's activities on the environmental attributes of coastal areas adjacent to the proposal; and

(d) long-term management – the management arrangements proposed by the proponent and its authority to undertake on-going management of the potential environmental consequences of the proposal.

There were a number of other environmental issues which were clearly relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

Impacts associated with the proposal's footprint

The EPA considered that a number of matters relating to the biophysical and pollution impacts of the proposal's footprint required attention. The development of land at Mauds Landing would cause the loss of flora and fauna habitat and there would be potential impacts on surface water quantity and quality and visual amenity. The EPA considers that relevant environmental factors relevant to the marine elements of the proposal, such as the marina and breakwaters, include marine flora and fauna, coastal processes and marine water and sediment quality.

In terms of its size, the EPA notes that the proposal would occupy approximately 1.6 km of coastal land adjacent to the Ningaloo Marine Park, which extends for approximately 260km.

Of concern was the issue of marine water quality. The EPA is of the opinion that further work is required by the proponent to more accurately determine the area of Bateman Bay impacted by construction and early operation, and provide appropriate management to ensure that the proposal does not cause detectable changes in the environmental quality of the Mauds Sanctuary Zone in the Ningaloo Marine Park. This work would need to be complemented by a rigorous monitoring and management program to protect the values of the impacted area.

The EPA recognises that there are uncertainties about some environmental matters associated with the footprint of the proposal (eg terrestrial fauna, marine water quality). These would require further work by the proponent to resolve, and the EPA has recommended a number of conditions which would need to be satisfied. If these are implemented satisfactorily, the EPA has concluded that the issues associated with the proposal's footprint could be managed to meet the EPA's environmental objectives. The EPA also notes that the marina would need to be managed in a manner which ensures that the environmental values provide for swimming and fishing as well as the growth of corals, as proposed in the environmental review document.

The EPA is of the view that the proponent's proposed resort management structure would be critical in ensuring effective management of the proposal in the long-term. The EPA also considers that management of potential biophysical and pollution impacts associated with the footprint of the proposal cannot be considered in isolation from the additional human-use pressures and management responsibilities which the proposal is likely to introduce, and therefore has implications for the EPA's overarching advice on this proposal.

Potential off-site marine impacts

The major potential impacts, which are difficult to quantify, would be those that result from marine-based human activity and boating associated with both fishing pressure and the activities of boats in general impacting upon the marine values, including species such as whale-sharks, manta rays, dugong, turtles and humpback whales, as well as important benthic habitats such as coral reefs and seagrass meadows. The proposal, by increasing visitation in the southern portion of the Ningaloo Marine Park, will bring about additional pressures and management requirements in an area which is already under pressure.

To address the matter of off-site marine management, the proponent has committed to implement a Specific Area Marine Management Plan (SAMMP). The EPA is conscious that the proponent's authority to implement the SAMMP, once finalized, would be limited, possibly to the collection of reference information required to establish relevant values and appropriately focused management objectives, targets and strategies. While it is evident that the proponent has a contribution to make to this management, the advice of DCLM suggests that CCMD's baseline data collection and proposal for long-term environmental management are not far enough progressed at this time to establish actual management requirements. Furthermore, it is beyond the authority of CCMD to carry out the management likely to be necessary to protect the values of the Ningaloo Marine Park. This authority resides with Government and it is the EPA's view that it would not be appropriate to delegate management responsibilities and authority for this important area to the proponent.

The EPA has reservations about the proposed timeframe for implementation of off-site environmental management programs. Management of human-use pressures is clearly related to the number of people and the importance of the values which require protection. The proposed development timeframe presented in the PER suggests that, depending on visitor demand, the tourism elements of the proposal that are in addition to the components proposed as part of Stage 1 of the CCR could be constructed five years following the construction of Stage 1. In this context, CCMD propose to implement the SAMMP over a five-year period, followed by a review of performance after five years. Under this scenario, it is likely that the full implications of the proposal for off-site management would not be realised during the initial period when CCMD propose to implement the SAMMP, because the full capacity of the development for tourists and residents may not have been reached. Accordingly, if the proposal is allowed to proceed, then management and review arrangements would need to reflect key steps related to the incremental increase in human-use pressures on the environment associated with a staged development approach so that there is confidence that management can achieve appropriate long-term environmental performance targets.

The DCLM and the Department of Fisheries (Fisheries) have discussed the proposal with the EPA and it is clear that they would require a considerable level of resourcing, over and above current levels provided for the area, in order to manage the people pressures the proposal would introduce.

For example, if the proposal were to proceed, it would be essential that there be a management strategy to ensure that the recreational fishing pressure did not cause depletion of fish stocks. Fisheries has provided advice in relation to the management of recreational fishing. The EPA is mindful that additional reference information collected as part of the implementation of the SAMMP may bring about the need to consider rigorous controls on boating activities. Here again, active management of people's activities outside the proposed development area may be required and would be unlikely to be achieved without the regulatory support of Government.

The EPA commends the proponent for its initiative with respect to the preparation of the draft SAMMP. The EPA is of the view that the SAMMP is a useful first step in identifying marine management needs associated with the proposal. If the proposal is allowed to proceed, it must be recognised that the legislative responsibilities regarding a marine park, recreational fisheries and maritime management would continue to reside with Government. The implications of this are discussed under the heading of long-term management.

Potential off-site terrestrial impacts

Increasing numbers of people attracted to the coastal areas adjacent to the Ningaloo Marine Park and the complexity of land vesting and subsequent management responsibilities, have already resulted in localised detrimental impacts in the coastal zone adjacent to the Park.

The EPA is concerned about cumulative impacts associated with the use of the coast to the north of Mauds Landing, and that these impacts may well be exacerbated if the proposal were to proceed, because of the sheer effect of additional numbers of visitors and the activities undertaken. These are issues of people management, which need to be addressed, and this would require adequate resources.

For instance, loggerhead sea turtles utilise the beach area to the north of the proposed resort as part of their breeding range. It would be essential, if the proposal were to proceed, that there be a management strategy that ensured that the people pressure did not interfere with turtle nesting and hatching. The area to the west of the proposal is important as a roosting and loafing site for migratory shore birds. Here too, active management of people's activities may be required, but the actual level of management necessary can only be determined after establishment of management objectives (probably by the MPRA and DCLM) and consideration of further baseline information about the important ecological values and the likely patterns of visitor activity.

Similar to the scenario described for the management of potential off-site marine impacts, the proponent's authority beyond its proposed development area is limited.

At this time, people management along the Ningaloo coast is complicated by the various land tenures such as pastoral leases, Defence land and townsites under the management of the Shire of Carnarvon. The EPA notes that the *Carnarvon-Ningaloo Coast Regional Strategy*, currently being facilitated by the Department of Planning and Infrastructure (DPI), may assist in clarifying this matter by identifying a strip of coastal land adjacent to the Ningaloo Marine Park for the purpose of conservation and recreation.

Prompt and effective management action is required to ensure that the environmental values that attract increasing numbers of visitors to this coastal area every year are protected to provide for long-term sustainability of this valuable asset.

The proponent has not made firm commitments which it can implement effectively with respect to management of the environmental impacts of visitors along the Ningaloo Coast. However, opportunities may arise through the regional planning process currently underway which clarify management responsibilities and assignment.

Long-term Management

The EPA is of the view that the proposal is likely to be highly management-dependent, both on and off the site. In the long-term, a high level of management would be required to protect the values of the Ningaloo Marine Park as well as the adjacent coastal area from the impacts brought about by additional visitation associated with this proposal. Moreover, the long-term management of the proposal itself has environmental implications. For example, maintenance of water quality within the marina is fundamental to protecting water quality values in the adjacent waters of the Ningaloo Marine Park. So too, maintenance of beaches and foreshore area in the long-term has both social and ecological benefits.

The proponent has recognized its limited authority to manage people's activities in the Marine Park and has made a commitment to enter into a Natural Resources Management Agreement (NRMA) with DCLM and Fisheries, the purpose of which is to provide support for management commensurate with the burden the proposal creates.

The DCLM and Fisheries have discussed the proposal with the EPA and it is clear that there would need to be considerable additional resourcing and full time personnel located in the southern area of the Ningaloo Marine Park to manage the anticipated impacts of people in relation to the proposal.

The EPA notes that it is difficult to forecast the environmental management requirements imposed by the proposal because patterns of people's activities are difficult to predict, the risks of impacts have not been fully assessed at this time and management strategies have not been determined. The EPA is mindful that where there is limited reference information on the impacts of 'people pressure' on some values of the Marine Park, the environmental sustainability of the proposal is heavily dependent on monitoring and management. Therefore, it is likely that considerable Government resources would need to be made available both in the short term and in the long-term to ensure the values of the Marine Park are not impacted upon.

The extent of the resources required for sustainable management is a matter of judgement and advice from relevant Government agencies. The EPA is aware of the management arrangements for both the DCLM and Fisheries in the Shark Bay/Monkey Mia area. Moreover, dedicated management bodies/arrangements have been established to oversee and undertake environmental management in other environmentally and socially important natural areas such as Rottnest Island (Rottnest Island Authority) and the Great Barrier Reef (Great Barrier Reef Marine Park Authority). The EPA is of the view that a commitment to environmental management would be necessary for on-going protection of the environmental values and natural resources of the Coral Bay/Bateman Bay area from human-use pressures, and indeed, this would need to be extended to the proposed World Heritage Area. The financial resources would need to be for capital works as well as on-going operational expenses. These would be in addition to the current scope of agency's recurrent funding. As a result of the EPA's broad discussions with agencies, preliminary estimates suggest that recurrent costs for management as a result of the proposal are likely to be in the order of $1.1 million per annum.

The EPA does not have the capacity to undertake a detailed financial sustainability assessment of the draft NRMA, nor is it the EPA's function to do so. Nevertheless, at a broad level and considering the discussions with DCLM and Fisheries, the draft NRMA does not currently appear to provide assurance to the EPA that there would be sufficient funding and other resources available to relevant agencies to ensure that the additional human-use pressures in the area, which have the potential to translate into unacceptable impacts on the environmental values of the Ningaloo Marine Park, are adequately managed. It is also suggested that the resource management agreement should be expanded to address coastal management within a reasonable distance from the proposal and include other agencies with potential management responsibilities such as the DPI Maritime Division and the Shire of Carnarvon.

With respect to the long-term management of constructed elements within the proposed development area, CCMD has proposed that a community resort management structure be established to undertake management and maintenance of the proposal, beyond that committed to by the Shire of Carnarvon. The proponent has proposed a 'Community Association' that would be responsible for a range of management tasks and would be funded via rates, levies and fees collected after the proposal is implemented. This proposed Community Association would need to be capable of meeting environmental management obligations both at technical and financial levels in the long-term. The EPA is concerned that the current proposed Community Association would be unlikely to meet the necessary obligations in the long-term.

Notwithstanding this Community Association proposal, the EPA understands that under a proposed Land Development Agreement developed by the Department of Land Administration (DOLA), CCMD would be responsible for a lease area for a period of 50 years. The EPA understands that throughout that term, even though specific parcels of land would be excised from the lease as developed land and residential lots are sold, CCMD would remain responsible for the use and maintenance of elements of the CCR proposal, including the marina, breakwaters, revetments and boat facilities. Other areas remaining the responsibility of CCMD for the long-term include the proposed Services Area and associated public utilities infrastructure and coach terminal site, and may include other undeveloped areas, such as the foreshore and beach to high water mark.

While it may be possible for CCMD to explore with DOLA opportunities to assign management responsibilities for these elements to a third party, the EPA considers that because of the binding nature of the proposed Land Development Agreement, which provides a mechanism to ensure that the short and long-term management responsibilities of the proponent are given attention, the proposed Community Association proposal does not warrant further EPA consideration at this time.

Moreover, the EPA understands that, if CCMD formally presents a proposal to transfer management responsibilities, under the proposed Land Development Agreement, it would be necessary to demonstrate to DOLA that a new management entity is capable of meeting the environmental management responsibilities in the long-term. The EPA has recommended conditions which provide a framework for the consideration of the proponent's performance with respect to environmental management before seeking agreement to form alternative management entities in the future.

The proponent is to be commended for its undertakings to address management, but the EPA is unable to judge the adequacy of the proposed management arrangements and structures in terms of providing long-term funds. The EPA considers that, should the proposal proceed, the long-term financial and legal capacity of the proposed NRMA and the proposed Community Association to undertake management will need to be established by the Government. In assessing this capacity, the EPA recommends that the Government maintain adequate control to ensure management functions are carried out in perpetuity. In this regard, if the proposal were to proceed, the EPA would recommend that the Government ensure that there are sufficient resources for long-term management. In part, this could be done by the Minister seeking advice of the Treasurer in relation to the adequacy of CCMD's management arrangements to ensure that funds would be available and are able to be applied to appropriate areas in the long-term. The legal and technical rigour of the proponent's proposed environmental management structures and arrangements should be given further attention.

Other Advice

The EPA has provided other advice on matters relating to the management and planning of the Ningaloo Marine Park and the Coral Bay/Mauds Landing area.

The EPA has considered two alternative tourist development scenarios in the Coral Bay/Mauds Landing area – one where independent expansion of Coral Bay is facilitated through the provision of public wastewater treatment infrastructure for the settlement, and one where Coral Bay expands and diversifies concurrently with development of the CCR.

Under both scenarios there would be environmental management implications for the Government. A commitment of environmental management resources would be necessary under the first scenario regardless of whether the CCR is approved for implementation. If there is concurrent development at both Coral Bay and Mauds Landing, the potential cumulative capacity of a jointly-centred tourist node may be somewhere in the order of 5000 to 6000 people, in the long-term. The extent of the management obligations under this scenario have not been determined. However, they too are likely to be significant.

By leading to an overall increase in the tourist capacity in the southern sector of the Marine Park, both scenarios are likely to have other flow-on effects, such as condensing the planning horizon for improved regional infrastructure, including the proposed road improvements between Coral Bay and Cape Range National Park. Such proposals for infrastructure have the potential to open up less-visited coastal areas and therefore are likely to have regional-scale environmental management implications for relevant Government agencies.

Given the State, National and International importance of the Ningaloo Marine Park, whatever facilities are provided to cater for the growing population must be accompanied by a clear decision about the mechanisms by which management can be assured so as to provide the proper level of protection to the environment from the effects of people participation.

If there is to be sustainable tourism in this important and sensitive area, a clearly defined regional management framework should be established and implemented. At present there is no single Government agency/entity which has the ability to adequately control access to coastal areas along the entire Ningaloo Marine Park to enable appropriate integrated management of coastal and sea areas; rather, environmental management is sectoral with a number of agencies responsible for the protection of the natural environment. Accordingly, adequate protection of land and sea areas in the vicinity of the Ningaloo Marine Park needs to occur through carefully planned and co-coordinated integration of management arrangements. This would rely on a common and agreed set of environmental quality objectives to guide sectoral management. It is important that these objectives are considered at the earliest possible stage. In this way, decision-making would be more straightforward, environmental safeguards put in place up-front, and monitoring/management feedbacks could be linked to the agreed environmental objectives.

The EPA notes that in other areas of the State and Australia, management of areas of exceptional environmental and social value is overseen and/or undertaken by specific management entities, such as the Rottnest Island Authority and the Great Barrier Reef Marine Park Authority. Some consideration should be given to this approach to management of the Ningaloo Marine Park and adjacent coastal areas.

In this context, the EPA notes that the *Carnarvon-Ningaloo Coast Regional Strategy* currently being undertaken by DPI may, with involvement of the EPA, the MPRA and other natural resource management agencies where appropriate, provide the framework, including public participation, for the setting of the environmental objectives for this region.

The EPA has also provided advice on a number of local matters relating to both the CCR proposal and the Coral Bay townsite. Advice has been provided regarding the rationalisation of the waste management infrastructure, provision of public services, the requirements to ensure that there is adequate control over individual developments within the CCR development area and the parliamentary processes necessary should there be a need to excise a part of the Ningaloo Marine Park to construct the proposed breakwaters, if the proposal is approved.

Conclusion

The EPA has considered the proposal by Coral Coast Marina Development Pty Ltd to develop a tourist centre and residential subdivision centred around an inland marina.

The EPA notes that the Ningaloo Marine Park is an icon of State, National and International significance. Over time there is evidence of an increasing desire for people, not only from WA, but Nationally and Internationally, to visit this area and enjoy its values. One estimate is that visitation is likely to double in the next decade. Judgments need to be made as to the manner by which these people will be accommodated and facilities made available for them to enjoy the attributes of the Marine Park.

It is evident to the EPA that this proposal is likely to cause a measurable increase in people pressure, requiring a proportionate and effective management response. It has not been established that the planning framework is sufficiently advanced to quantify the management response required to ensure the protection of the Ningaloo Marine Park and adjacent coastal areas. In the absence of this framework, a consequence of appropriate management could be the imposition and enforcement of more stringent controls on the activities people currently undertake in the Ningaloo Marine Park, including fishing, boating and camping. The Government would need to consider the implications of increased management and more stringent regulation measures in the context of people's experience of the Ningaloo Marine Park, the possible movement of people pressure to other areas and its commitment to seek World Heritage nomination for the Ningaloo Marine Park.

This proposal provides one avenue to address the growth in the area. However, it is a matter of judgment by Government as to whether the proposal is sustainable, particularly from an environmental management point of view.

The EPA's overarching advice to the Minister for the Environment and Heritage is that, while the biophysical and pollution impacts associated with the proposal's footprint could be managed to meet the EPA's environmental objectives with satisfactory implementation of environmental management commitments and recommended conditions, and while the proponent has made commendable efforts to address issues of wider management, it is beyond the proponent's authority to undertake the management of people's activities outside of its development area, which is necessary to ensure that the values of the Ningaloo Marine Park and adjacent coastal areas are protected.

Accordingly, it is the EPA's recommendation that the proposal should not be approved for implementation unless Government is able to:

- identify and confirm the environmental management resources required across the natural resource management sectors to adequately protect all values of the Ningaloo Marine Park and its adjacent coastline, as well as having regard for potential World Heritage values from the impacts of additional people pressure;
- confirm that any commitments by CCMD to support environmental management are legally and financially sound in terms of their capacity to deliver the necessary environmental management in the long-term;
- make a whole-of-Government commitment to any environmental management arrangement with CCMD; and
- commit to prepare and implement an effective environmental management system, including the preparation of management plans and the provision of resources commensurate with the level of human-use pressures on the Ningaloo Marine Park, to ensure that the environmental values of the region are adequately protected in the long-term.

The thrust of the EPA's advice is fundamentally related to the challenge of sustainable use of the Ningaloo/Cape Range coastal area in the context of the Government's election commitment to seek World Heritage listing for the Ningaloo Marine Park.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the Coral Coast Resort, which includes a range of short stay tourist accommodation and a residential subdivision centred around an inland marina at Mauds Landing, north of Coral Bay.
2. That the Minister considers the report on the relevant environmental issues of:
   a) impacts associated with the footprint of the proposal;
   b) potential off-site marine impacts;
   c) potential off-site terrestrial impacts; and
   d) long-term management;

   as set out in Section 4.

3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives for factors associated with the footprint of the proposal would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 5, including the proponent's commitments.

4. That the Minister notes that the EPA has concluded that, with respect to potential water quality impacts, the proponent should undertake additional work to ensure that construction and operation of the proposal does not cause detectable changes in key indicators of ecosystem health in the Mauds Sanctuary Zone, determined by the MPRA.

5. That the Minister notes that the EPA has considered a proposal by the proponent for a draft site-specific Specific Area Marine Management Plan to manage potential off-site environmental impacts associated with the visitation to the proposed facilities in the Ningaloo Marine Park.

6. That the Minister notes that the EPA considers that while the Plan referred to in 5 above broadly covers the most relevant environmental issues, the proponent's authority to implement the Plan is limited and that the authority and responsibility for managing human-use pressures in the Ningaloo Marine Park resides with Government agencies.

7. That the Minister notes that the EPA considers there is likely to be a need to extend any site-specific management of people associated with the proposal to include land areas as well as sea areas.

8. That the Minister notes that the EPA has considered, at a broad level, a draft Natural Resources Management Agreement for the provision of support to management agencies with responsibilities in the Ningaloo Marine Park. However, the EPA considers the current draft document is unlikely to provide assistance to the Government's natural resource management agencies for environmental management commensurate with the obligations the proposal creates.

9. That the Minister notes that the EPA's overarching advice is that, while the impacts associated with the footprint of the proposal could be managed to meet the EPA's environmental objectives with satisfactory implementation of environmental management commitments and recommended conditions, and while the proponent has made commendable efforts to address issues of wider management, it is beyond the proponent's authority to undertake the management of people's activities outside of its development area, and such management is necessary to ensure that the values of the Ningaloo Marine Park and adjacent coastal areas are protected.

10. That, noting the EPA's advice in recommendation 9 above, the proposal should not be approved for implementation unless the Government is able to:
    - identify and confirm the environmental management resources required across the natural resource management sectors to adequately protect all values of the Ningaloo Marine Park and its adjacent coastline, as well as having regard for potential World Heritage values from the impacts of additional people pressure;

- confirm that any commitments by CCMD to support environmental management are legally and financially sound in terms of their capacity to deliver the necessary environmental management in the long-term;
- make a whole-of-Government commitment to any environmental management arrangement with CCMD; and
- commit to prepare and implement an effective environmental management system, including the preparation of management plans and the provision of resources commensurate with the level of human-use pressures on the Ningaloo Marine Park, to ensure that the environmental values of the region are adequately protected in the long-term.

11. That the Minister notes that the EPA has provided a set of conditions and procedures pursuant to Section 44(i)(b) of the *Environmental Protection Act 1986.*

12. That, if the proposal is approved for implementation, following consideration of recommendations set out above, the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions, pursuant to Section 44(i)(b) of the *Environmental Protection Act*, that the EPA recommends be imposed if the proposal by CCMD to develop the CCR proposal is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4. Matters addressed in conditions include the following:
    - the proponent shall fulfil the requirements in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;
    - the various management plans and programs proposed through the proponent's commitments to be made publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority; and
    - the management plans outlined in the recommended Environmental Conditions presented in Appendix 4, which include:
        1. Seagrass and Coral Management Plan
        2. Turtle Breeding Management Plan;
        3. Shoreline Stability Plan;
        4. Maintenance Dredging Management Plan;
        5. Flora Survey;
        6. Subterranean Fauna Management Plan;
        7. Marine Water Quality Study for Construction;
        8. Marine Water and Sediment Management Plan (Construction Phase);

9. Marine Water and Sediment Management Plan (Operations Phase);
10. Site Drainage and Stormwater Management Plan;
11. Decommissioning Plans;
12. Performance Review Reporting; and
13. Long-term Management Agreements.

It should be noted that regulatory mechanisms relevant to this proposal are:

- The provisions of Part V of the *Environmental Protection Act 1986*, administered by the Department of Environmental Protection. The proponent or its service provider will be required to lodge an application for a Works Approval prior to the commencement of construction of the proposed landfill facility and the wastewater treatment plant. These facilities, if approved, will be regulated by the Department of Environmental Protection under Part V of the *Environmental Protection Act*.
- The development of the proposal, if approved for implementation, would be managed though a proposed Land Development Agreement prepared under the provisions of the *Land Administration Act 1997*. The proposed Land Development Agreement will detail, among other things, the staging requirements and development milestones to be achieved by the proponent and a development bond.

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors and issues relevant to the proposal by Coral Coast Marina Development Pty Ltd (CCMD) to develop a Coral Coast Resort (CCR), which includes tourist, residential and incidental commercial facilities centred around an inland marina, at the site called Mauds Landing. In support of the tourist and residential components, the proposal includes the development of a 62 hectare (ha) site approximately two kilometres (km) east of Coral Bay for the provision of service utilities including, wastewater treatment, power, gas, landfill and miscellaneous services (eg workshops, dry and cold storage).

Mauds Landing is situated on the North-West Cape of Western Australia, between Carnarvon and Exmouth, being approximately 250 km north of Carnarvon and 150 km south of Exmouth (Figure 1).

Mauds Landing is currently vacant crown land and was gazetted as a townsite in the late 1800's. The Mauds Landing townsite covers an area of approximately 250 ha and is situated approximately 3 km north of the existing Coral Bay (Bills Bay) settlement.

The EPA assessed a previous proposal for a marina-style resort at Mauds Landing in 1995, and found the proposal to be environmentally acceptable, subject to nine recommendations and a set of recommended environmental conditions. The EPA's findings and recommendations were reported in Bulletin 796 (EPA 1995).

Appeals were received by the former Minister for the Environment against the EPA's report. Following consideration of the appeals, in May 1997 the Minister determined that the proposal assessed by the EPA should not be implemented. The Minister advised the EPA that any new proposal for Mauds Landing should be assessed with a view to reducing the scope of the development to meet achievable and definable environmental impacts, with particular emphasis on the impacts on the Ningaloo Marine Park and the water resources of the region.

In April 1999, State Cabinet invited CCMD to submit a revised proposal for a resort development at Mauds Landing and endorsed a set of guidelines for the development. The guidelines recommended that the:

- inland marina concept is preferred to an offshore marina;
- extent of tourist development proposed in Phase 1 of the project is consistent with the *Gascoyne Coast Regional Strategy*;
- golf course component should preferably be deleted from the project, or at least be relocated;

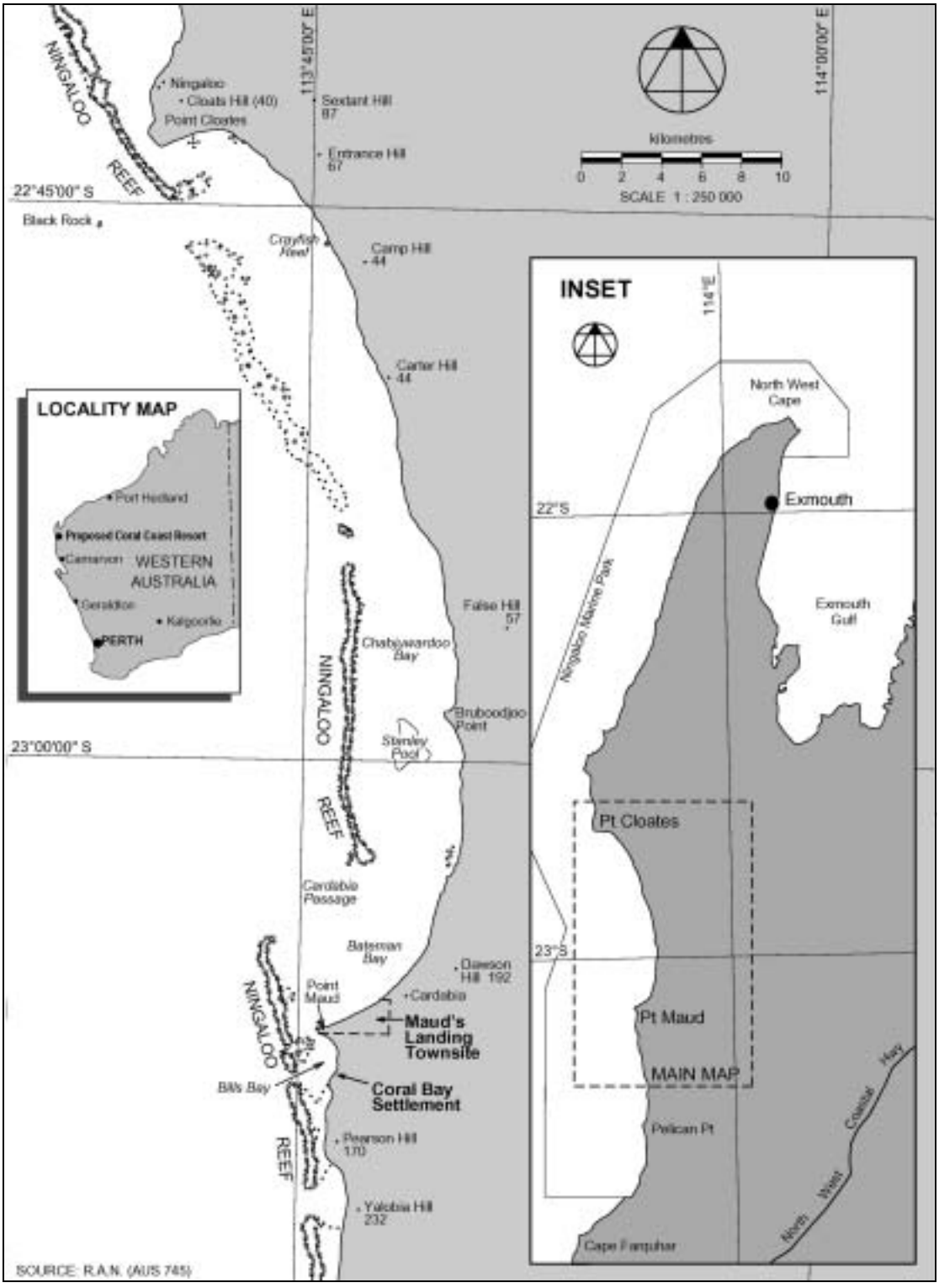

Figure 1: Location of the Coral Coast Resort (Source: Coral Coast Resort PER, ATA 2000a).

- extent of residential development associated with Phase 1 of the project should be limited to no more than 200 dwellings above that required for staff associated with the development, and the residential dwellings should be in a mixture of forms in equal proportions including apartments, strata units and single residential;
- developments in addition to the tourist and residential components (town centre and social infrastructure) to be in accord with the modified scale of development;
- development of Phase 2 of the project should be dependent on satisfactorily meeting agreed environmental and planning performance criteria established for Phase 1;
- extent of tourist development proposed in Phase 2 of the project be consistent with the *Gascoyne Coast Regional Strategy*; and
- extent of residential development in Phase 2 be limited to no more than 100 dwellings (i.e. 300 dwellings for Phases 1 and 2 combined) above that required for staff associated with the tourist development. The residential dwellings should be in a mixture of forms as per Phase 1 in equal proportions.

The CCR proposal being assessed is the first phase (Phase 1) of what could be an expanded development in the future. The extent of any possible expansion (Phase 2) has not been defined, but the EPA understands that it could increase the number of people by up to 50%. Any proposed expansion would need to be approved by Government and assessed by the EPA.

Phase 1 of the CCR proposal outlined in the guidelines above is referred to throughout this report as the CCR or CCR proposal.

The CCR proposal was referred to the EPA in May 2000 and the level of assessment was set at Public Environmental Review (PER). The CCR currently being assessed by the EPA is proposed to be developed in two or more stages, with the bulk of capital works and some tourist elements constructed in Stage 1 and other tourist elements developed in later stages as visitor demand requires.

The EPA considered that the PER should address protection of the natural assets of the Ningaloo Marine Park and its coastal zone from the impacts of the project. The EPA also considered that detailed consideration of environmental management issues, including stormwater management and marine water quality, was required.

Further details of the proposal are presented in Section 2 of this report. Section 3 outlines the context for the EPA's assessment and Section 4 discusses the environmental factors/issues relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 5. Section 6 provides Other Advice by the EPA, Section 7 presents the EPA's conclusions and Section 8, the EPA's Recommendations.

It is relevant to note that the proposal is also being assessed under the provisions of the Federal *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*)*. Under this Act, the Federal Minister for the Environment will assess the impacts of the proposal on matters of national environmental significance. Information about environmental assessments under the Federal EPBC Act can be found at http://www.ea.gov.au/.

The extent of the public submissions and the proponent's responses to them has necessitated that the responses to public submissions be provided in an electronic format. A compact disc attached to this report contains a summary of submissions and the proponent's response to submissions. It is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process and which have been taken into account by the EPA appear in the report itself.

2. The proposal

The CCR is proposed to provide a broad range of short-stay and holiday accommodation, as well as permanent residential lots. The proposal includes a 47 ha inland marina and lagoon system. There is provision in the proposal for incidental recreational, tourist and commercial facilities consistent with the anticipated needs of visitors to the location as well as a Services Area for the provision of utilities services such as wastewater treatment, landfill, gas, power and light industrial activities. The layout of the development area is shown in Figure 2.

The Mauds Landing townsite is zoned 'Resort Development' under the Shire of Carnarvon Town Planning Scheme.

The proposed development site at Mauds Landing is located adjacent to Bateman Bay, a Recreation Zone in the current Ningaloo Marine Park Management Plan (DCLM 1989). Two breakwaters which shelter an entrance channel to the marina are proposed to be constructed in Bateman Bay, within the boundary of Ningaloo Marine Park.

In addition to tourist, residential and incidental commercial facilities at the Mauds Landing site, the proposal also includes a 62 ha Services Area where it is proposed to develop infrastructure and public utilities services, including solid waste management, a power station, storage of natural gas, general stores and wastewater treatment infrastructure. The proposed Services Area is situated approximately 3 km south of Mauds Landing and 2 km inland from Coral Bay. The services area is zoned 'rural' under the Shire of Carnarvon District Planning Scheme (DPS) No.11. Amendment No.3 to that DPS provides for the provision of public utilities and light industry in the rural area, subject to Council discretion.

The CCR proposal currently being considered by the EPA consists of elements including:

- an inland marina;
- marina village (comprising a serviced resort complex, festival and convenience retail, food and beverage facilities, environment interpretive centre, including office spaces for the Department of Conservation and Land Management and the Department of Fisheries);

- tourist accommodation (including Caravan and Chalet Park, Beach 'annex' to the marina village resort providing further serviced suites, backpackers hostel, and tourist villa, townhouse and timeshare sites);
- supporting coach terminal, auto/marine servicing area, boat launching and parking facilities;
- sports and community centre;
- residential accommodation;
- staff accommodation; and
- service utilities infrastructure and Services area.

Under a proposed Land Development Agreement with the State Government, if the proposal is allowed to proceed, the proponent would develop the CCR in at least two stages as noted in Section 1 above. Table 1 sets out the proposed activities in the first stage (Stage 1) of the Phase 1 development and Table 2 sets out the activities in subsequent stages of the Phase 1 development. As set out in Section 1, this assessment does not cover a possible Phase 2 development.

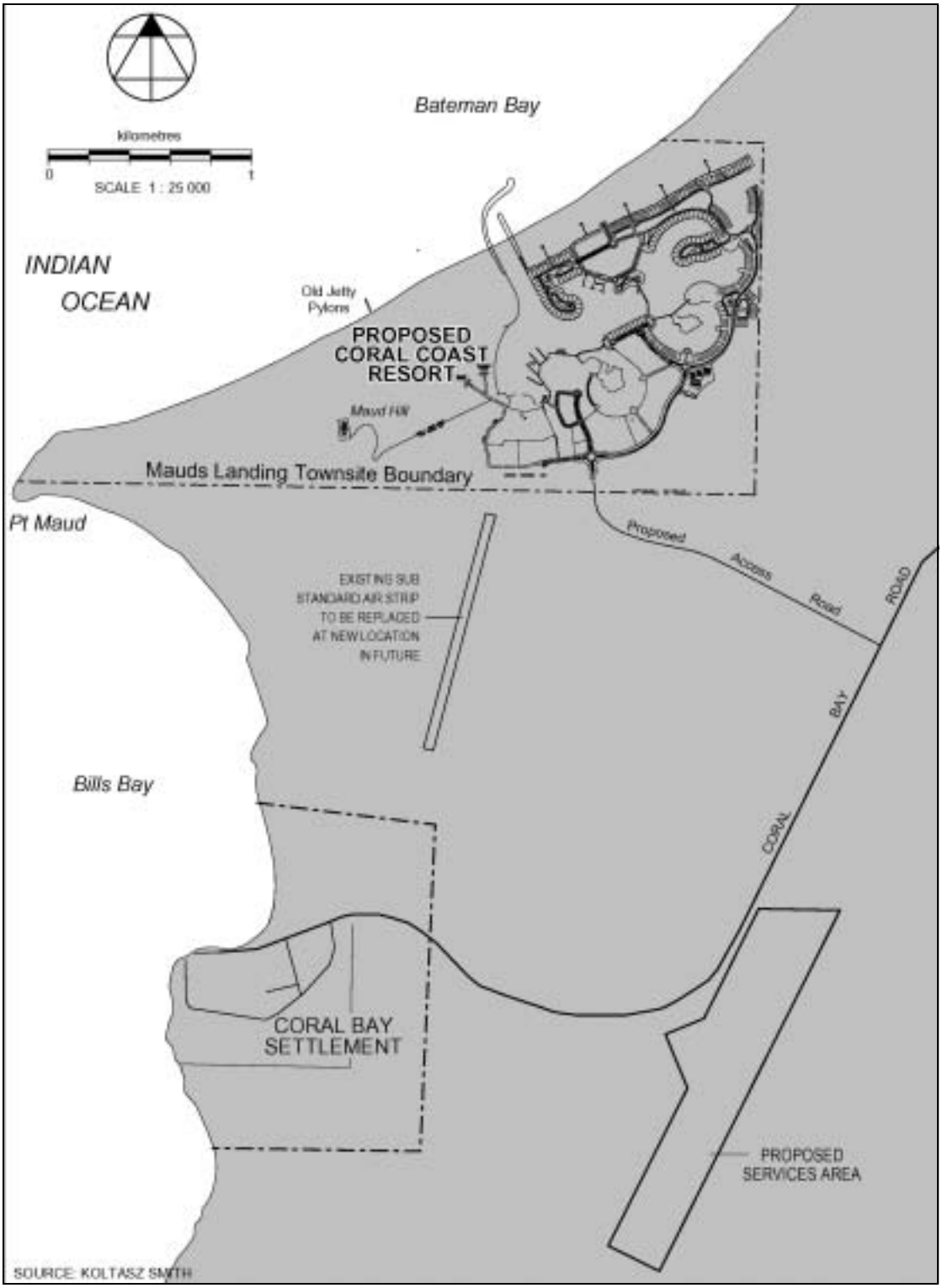

Figure 2: ***Proposed conceptual layout of the Coral Coast Resort, including location of the Services area, entry road and the existing Coral Bay settlement.***

Stage 1 involves site works and associated development works. Site works include, but are not limited to, excavation of the marina and entrance channel, site preparation and associated bulk earthworks, construction of breakwaters, road works, stormwater drainage, landscaping of public areas and development of relevant services and utilities. Associated development works include the provision of maritime facilities in the marina, landscaping and public facilities, propagation of a coral garden in the marina, construction of buildings for an Aboriginal culture centre, environmental research and visitor (interpretive) centre, administrative facilities for relevant government agencies as well as development of a caravan park, a backpacker hostel and an apartment complex comprising 60 serviced apartments and associated food and beverage facilities.

Subsequent stages of the CCR proposal being assessed include the development of elements such as tourist villas, townhouses, a further 60 resort units, timeshare and incidental tourist and commercial facilities. These elements may or may not be developed by CCMD, however, it is understood that CCMD can exercise an option to develop these tourist elements if it meets acceptable milestones for Stage 1.

A detailed description of CCR proposal, including all stages, is provided in Section 2 of the PER (ATA Environmental 2000a). Figure 3 shows the proposed Structure Plan for the CCR proposal as described in the PER. Figure 4 shows the proposed layout of the Services Area east of Coral Bay.

Since release of the PER, and on advice of the Western Australian Maritime Museum, CCMD has revised its proposal to the extent that piles from the former Mauds Landing jetty site will remain in their current location. This matter is given attention in Section 4.1.10.

In response to public submissions on the PER, the proponent has committed to the following management actions and policies, including:

- preparation and implementation of occupational health, safety and environmental management systems for the CCR that will comply with OHSAS 18001 and ISO 14001;
- to monitor and develop contingency measures, in consultation with the Department of Conservation and Land Management and the CSIRO Centre for Research on Introduced Marine Pests, for introduced marine pests as part of a Specific Area Marine Management Plan;
- to construct all bulk fuel storage tanks in accordance with Australian Standard AS1940-1993 and the requirements of the Department of Mineral and Petroleum Resources;
- prohibiting the operation of quad bikes from businesses within the CCR to protect the nearby foredunes and beaches;
- support for the recognition of the western area of Point Maud as a gazetted off road vehicle area under the *Control of Vehicles (Off-road Areas) Act 1978* to protect shore bird roosting and loafing areas;
- development and implementation of a Transport Management Plan, in consultation with Main Roads Western Australia, the Shire of Carnarvon and the

Shire of Exmouth, to put in place funding arrangements and specified procedures to manage heavy haulage transport operations during construction of the CCR;
- development and implementation a Mosquito Management Plan;
- development and implementation a Bird Management Plan to protect bird roosting areas in the vicinity of the proposed CCR;
- relocation of the current airstrip prior to completion of Stage 1 to minimise the risk to both the residents and short-stay visitors to the CCR; and
- undertaking a road safety audit and implement the findings of the road safety audit, to ensure all roads associated with the proposal are safe.

The potential impacts of the proposal initially predicted by the proponent in the PER (ATA 2000a) and their proposed management are summarised in Table 3-1 (Appendix 3 – Summary of Identification of Relevant Environmental Factors).

Table 1: Summary of key proposal characteristics of Stage 1 of the Coral Coast Resort

Element	Description
Coral Coast Resort (CCR)	The full CCR proposal as depicted in Figure 3 of the PER (ATA 2000a).
Stage 1 of the CCR proposal	Site Works and Associated Development Works (ADW) - described in a proposed Land Development Agreement developed by the Department of Land Administration for the proposal.
Breakwaters	Two (2) armoured limestone breakwaters designed to withstand Category 5 cyclones. Breakwaters extending approximately 200 metres from the shoreline with a physical extent of approximately 2.5 hectares, currently in the Ningaloo Marine Park (Recreation Zone) in Bateman Bay.
Inland marina and beaches	Approximately 50 hectares with depth ranging between 1.5 metres and 4.5 metres. 250 metre long entrance channel dredged to approximately 5 metres depth. Public swimming beaches within the marina protected by shark nets. Boating facilities including a double lane boat launching facility, service jetties and wharfs, dedicated boat fuelling and sullage pump-out facilities and a total of 100 boat pens for public and commercial use. Limestone base for the establishment of a diving/snorkelling reef. Spill response equipment including oil booms, absorbents and skimmer. Navigation aids. Boardwalks.

Preparation of the land elements of the site for development and subsequent subdivision. Note that all elements of the ultimate Phase 1 proposal may not be developed by CCMD in the long-term.	A total of approximately 86 hectares. Raised ground level to approximately 6 metres Australian Height Datum (AHD) on the ocean side of the marina and approximately 3.6 metres AHD on the landward side of the marina. Provision of Services and Utilities including: • Water supply; • Power and sewerage; • Telecommunication; • Gas supply; • Refuse disposal; and • Sewerage treatment.
Caravan and Chalet Park	Approximately 4 hectares. 100 bays with supporting camping and coach camping facilities. 20 chalets/park cabins.
Backpackers Hostel	Approximately 1 hectare. Total of 60 beds.
Permanent residential	Approximately 12.6 hectares. No more than 200 serviced freehold lots, each ranging between 420m^2 and 700m^2 in size for private sale.
Marina Village and Resort	Approximately 4 hectares. Buildings including: • Environmental research and visitor centre and contribution towards fit out; • Aboriginal heritage and cultural centre; • Administrative facilities for relevant government agencies; • 60 two bedroom strata title serviced resort apartments (First Stage); and • associated food and beverage facilities.
Access and internal arterial roads, public parking	Approximately 20.7 hectares. Road access from the existing Coral Bay road. Internal arterial roads and road reserves. Stormwater drainage. 120 boat trailer parking bays, with secure boat-parking area.
Water storage, cooling and use	Approximately 0.5 hectares. Reverse osmosis desalination plant. Water storage. Approximately 0.52 million kilolitres per annum.
Services Area	Approximately 62 hectares of rural zoned land located 1.5 km east of Coral Bay to be developed for service utilities including: • a wastewater treatment plant of 575 ML/day prescribed under Part V of the *Environmental Protection Act 1986*; • a managed landfill site prescribed under Part V of the *Environmental Protection Act 1986*; • <10 MW gas-fired power station (not prescribed under Part V); and • a light industrial area.

Emergency Services	CCMD will provide for volunteer-operated services including: • Fire and emergency services; • Nursing station and first aid; and • Sea search and rescue.
Parks, open space and northern access reserves	Public open space areas. Main entry – access road and entry statement. Road verges. Resort centre landscaping. Management controls (fencing, pathways and car park).

Table 2: Summary of key proposal characteristics of additional Stages of the Coral Coast Resort

Additional Stages of the CCR proposal	The following elements may be developed as part of the Coral Coast Resort proposal described in Section 2 of the PER (ATA 2000a). These elements may be developed by CCMD or they may be developed by third parties as demand requires.
Serviced apartments	Approximately 3.5 hectares. 130 two and three storey serviced resort apartments to form the second apartment complex.
Timeshare	Approximately 3.6 hectares. 100 timeshare units.
Tourist villas and townhouses	Approximately 6.7 hectares. A combined total of 180 resort villas and townhouses.
Staff Residential	Approximately 1.7 hectares. 40 managed freehold lots, each 420m^2 in size.
Staff – group housing	Approximately 3.8 hectares. A combined total of 130 managed villa and duplex units.
Community centre	Approximately 1.6 hectares.
Auto, marine and coach services	Approximately 0.9 hectares. Service station and auto services site.

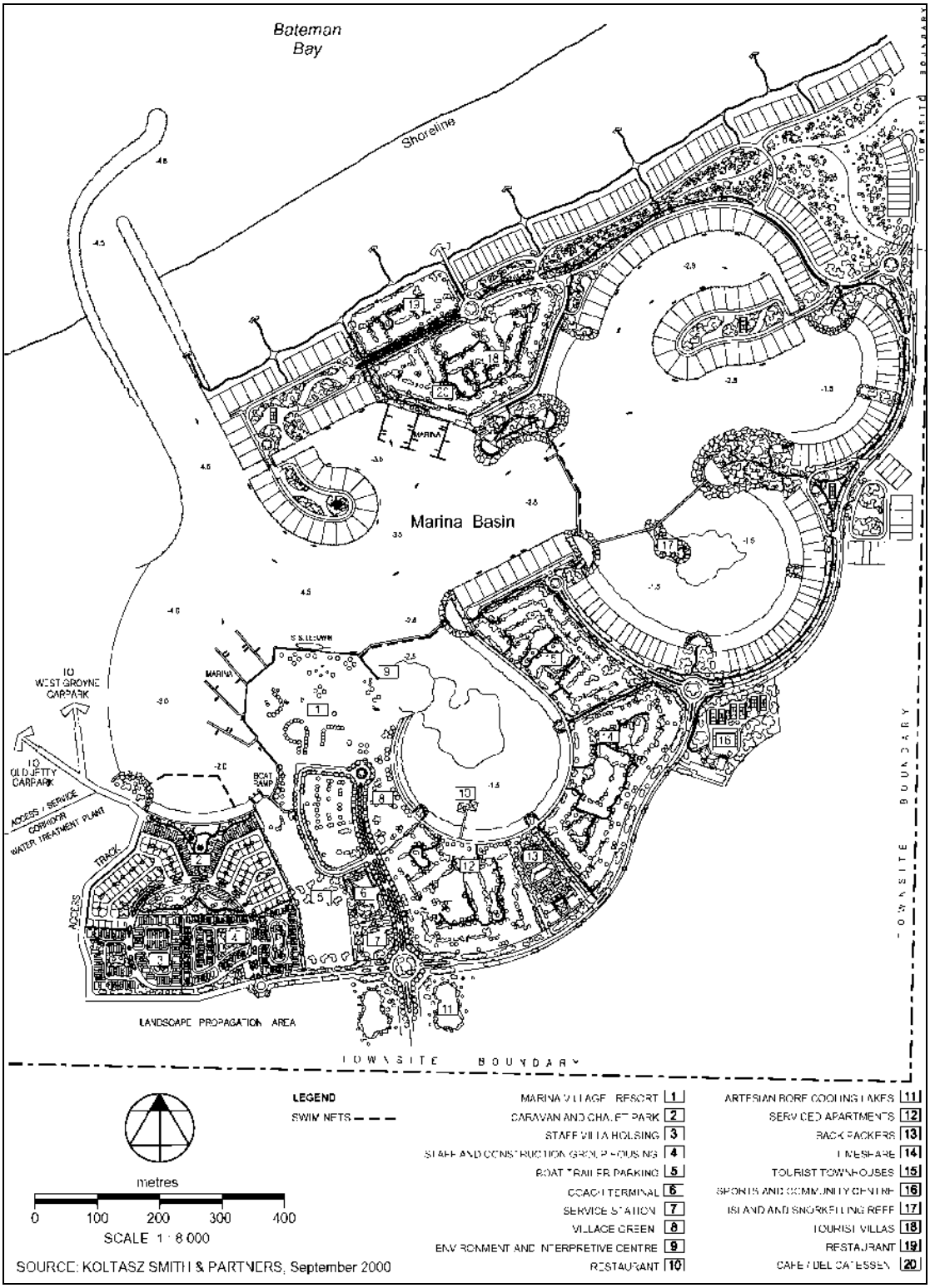

Figure 3: Proposed Structure Plan for the CCR proposal (Source ATA 2000a).

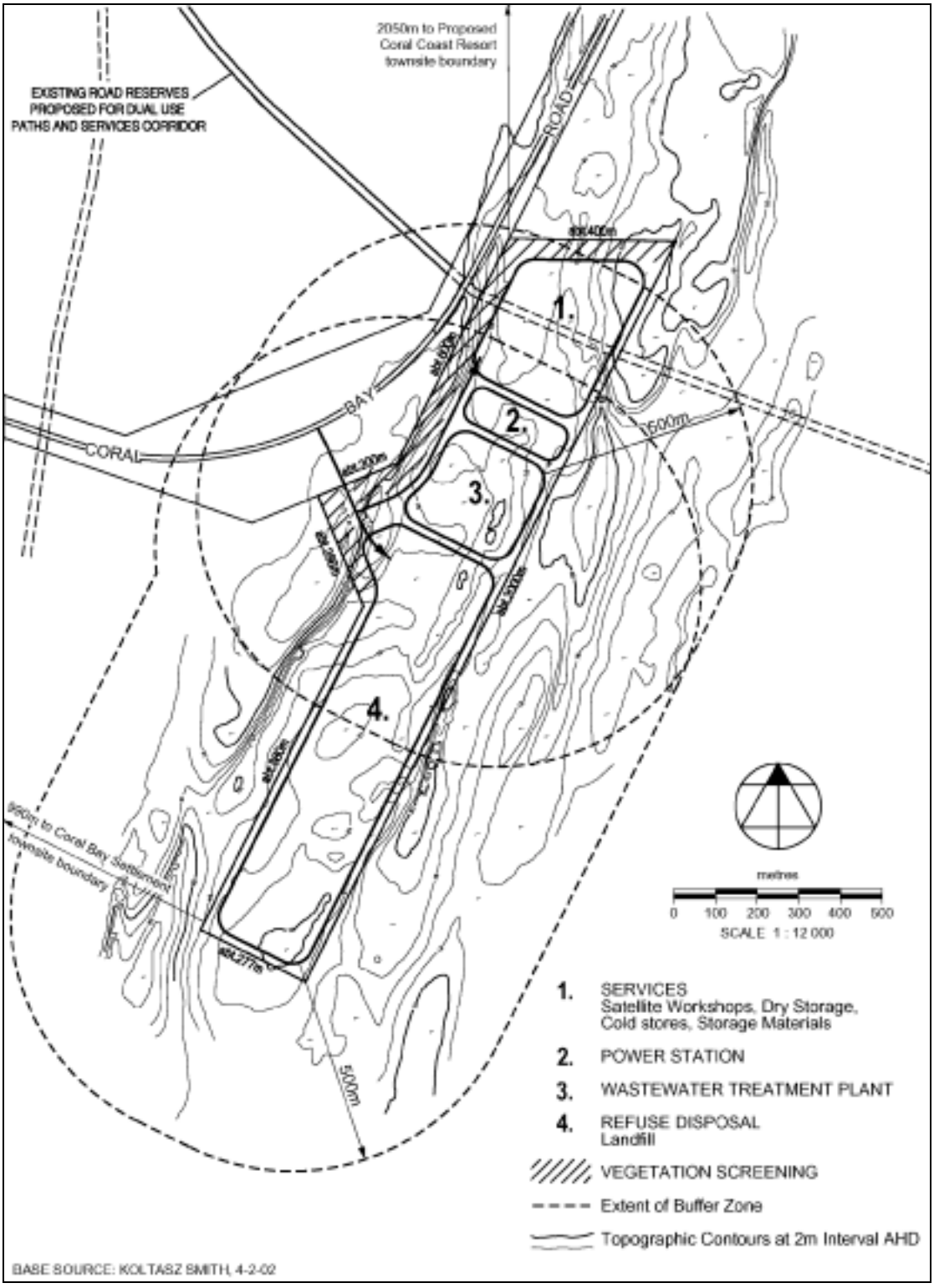

Figure 4: ***Proposed layout for the Services area associated with the CCR proposal.***

3. Context for assessment

The EPA considers that it is important to clearly articulate its interpretation of the policy framework within which it has considered this proposal. The context for the EPA's assessment is detailed below.

Strategic planning context

A number of reports have presented options and made recommendations on managing increased demand for tourist facilities along the Gascoyne coast (Parliament of WA 1995, MfP 1996, MfP 1998, EPA 1999).

Some key documents relevant to the proposal are:

- *First Report of the Legislative Council Select Committee on Cape Range National Park and the Ningaloo Marine Park* (Parliament of Western Australia, December 1995);
- *Gascoyne Coast Regional Strategy* (Ministry for Planning, Perth, WA, March 1996);
- *Exmouth – Learmonth (North West Cape) Structure Plan* (Western Australian Planning Commission, December 1998);
- *Environmental and Planning Guidelines for Tourism Development on the North West Cape* (Department of Environmental Protection and Ministry for Planning, May 1999); and
- *Position Statement No. 1 – Environmental Protection of the Cape Range Province* (Environmental Protection Authority, December 1999).

A summary of the relevant sections of these documents is presented below.

First Report of the Legislative Council Select Committee on Cape Range National Park and the Ningaloo Marine Park

In 1995, the Legislative Council Select Committee recommended that no resort development should occur within a strip of coastal land adjacent to the Ningaloo Marine Park. The Mauds Landing townsite was excluded from this recommendation.

The Select Committee also recommended that, to better manage tourist activities along the Ningaloo coast, a strip of coastal land adjacent to the Ningaloo Marine Park be excised from pastoral leases and other land tenures and be placed within the control of the Department of Conservation and Land Management (DCLM).

Gascoyne Coast Regional Strategy (GCRS)

The *Gascoyne Coast Regional Strategy* (GCRS, MfP 1996) supports the provision of tourist facilities at Mauds Landing, but suggests that residential development is best located in existing towns. It indicates that a guiding principle for development at Mauds Landing should be that the scale of any residential housing is incidental to and in keeping with tourist elements of the proposal.

The GCRS states that:
'From the State's viewpoint, the focus of freehold single residential permanent housing is best catered for in existing towns where facilities are available to support the permanent population's needs. Hence, it must be demonstrated that the nature and extent of residential development at Mauds Landing is incidental to and in keeping with the tourist component of the proposal. There may be some justification for a staged single residential component as part of latter stages, which is contingent on the provision of infrastructure and facilities being available and proven. In this regard, and as a first stage, a tourism facility with a range of quality accommodation is supported'.

The GCRS recognised that the residential component of the original Coral Coast Resort proposal was critical to the viability of the project.

The GCRS also notes that it is important that all developments along the west side of North West Cape are supported by an adequate level of management to ensure that environmental values are protected. In this regard, the possible role of the DCLM, as marine park manager, is also recognised. Requirements to manage the original CCR proposal were also recognised in the GCRS (MfP 1996).

Exmouth - Learmonth Structure Plan (the Structure Plan)

The Structure Plan Study Area did not include Mauds Landing/Coral Bay, but did recognise that generally the availability of infrastructure and the sensitivity of the environment are major limiting factors to development throughout the North West Cape area.

In the context of the Structure Plan, the west coast refers to Structure Planning Units 2 and 3. The Structure Plan states that 'It is preferred that the location of large-scale tourism development is confined to the Exmouth townsite…' for a number of reasons including the use of existing infrastructure, to consolidate the existing settlement, to maximise the use of the Exmouth Boat Harbour, to capitalise on the proximity to the Learmonth Airport and to protect the fragile environment of the west coast.

Notwithstanding this position on large-scale development in the Study Area, the Structure Plan suggested that planning for any small-scale tourism proposal should be guided by the environmental and planning guidelines prepared as part of the structure planning process.

Environmental and Planning Guidelines for Tourism Development on the North West Cape

This document was prepared by the Department of Environmental Protection (DEP) and the Ministry for Planning to complement guidance provided in the Exmouth-Learmonth Structure Plan (WAPC 1998).

The Guidelines set out principles for small/low-impact tourist development on the North West Cape from Exmouth Gulf to Coral Bay, to ensure the wilderness experience remains available and to protect the environment.

The Guidelines specifically excluded developments within the town sites of Exmouth and Coral Bay/Mauds Landing.

EPA Position Statement No.1

The EPA's Position Statement included the Mauds Landing/Coral Bay area. The EPA stated that a number of principles should be used to underpin environmental assessment and decision-making in the Cape Range Province. In regard to tourist development the EPA stated:

'From an environmental perspective, there should be no major development permitted on the west side of Cape Range. In this context, west side refers to the coastal area located in Planning Units 2 and 3 in the Exmouth-Learmonth Structure Plan North West Cape (Ministry for Planning 1998). Residential development should be confined to the existing townsite (Ministry for Planning, 1998; Select Committee, 1995; Western Australia Government 1997).

Although it may be appropriate to establish some low key, high quality ecolodge wilderness lodge/camping tourism areas on the west coast, these should be designed to meet, inter alia, the principles above, and the specific criteria (developed by the Department of Environmental Protection and the Ministry for Planning) prior to referral to the EPA'.

As noted earlier in the section regarding the *Exmouth - Learmonth Structure Plan,* the Mauds Landing townsite is not within Planning Units 2 and 3 of the Structure Plan, and thus the development proposal is not inconsistent with the EPA position in relation to the broad question of location. However, there are a number of other principles set out in the Position Statement which also need to be considered. These relate mostly to the precautionary principle, best practice and the need to ensure that there is sufficient knowledge for the EPA to be confident that implementation of a development is properly planned and managed to protect or enhance the multiple environmental values.

The EPA stated that developments must be of the highest quality 'best practice' with continuous improvement through an environmental management system. Development in the Cape Range Province must clearly demonstrate, through relevant research and knowledge, that the implementation of a properly planned and managed development will protect or enhance the multiple environmental values of the area (EPA 1999). The proponent has made commitments to undertake further environmental data collection and research should the proposal be approved. The EPA has taken this into account in this report, and the need to obtain additional data is reflected in the EPA's recommended conditions.

The Position Statement also states that the EPA would employ the precautionary principle in assessing the environmental acceptability of development proposals as a means of considering impacts on high-value elements of the environment where there is limited knowledge and certainty about potential impacts, environmental management and cumulative effects. The EPA considers that its conclusions in relation to this assessment have incorporated a precautionary approach, and this is reflected in its overarching advice to the Minister.

Recent Government processes relating to the Coral Coast Resort

In Bulletin 796 (EPA 1995), the EPA reported on a previous proposal by CCMD for a larger CCR. The EPA found the proposal to be environmentally acceptable subject to nine recommendations and a set of environmental conditions.

Appeals were received by the former Minister for the Environment against the EPA's report. In determining the appeals, the Minister found that the proposal should not be allowed to proceed.

In resolving appeals on the original CCR, the Minister determined that any future proposal for a tourist facility at Mauds Landing must be subject to consideration by an inter-agency Taskforce. In 1999, CCMD was invited to submit a revised proposal to Government for consideration by the inter-agency Taskforce. The then State Government endorsed a set of coarse-level planning and environmental guidelines against which CCMD's revised proposal was considered by the Taskforce. In April 2000, the then Government gave conditional endorsement to CCMD's proposal and considered it to be broadly consistent with the planning and environmental guidelines approved for the proposal.

The CCR proposal currently before the EPA for assessment is understood to be consistent with the decision of the State Government in April 2000.

During its assessment, the EPA has been provided with a large amount of information from a range of Government and non-Government sources expressing concern about the size and form of the current proposal.

While the EPA is conscious of concerns raised about the scale of this proposal and notes that some submissions put forward alterative development scenarios, it is the EPA's understanding that matters associated with the size and form of this proposal were considered by the Government of the day, in the context of relevant planning documents, particularly the GCRS, early in the development of CCMD's revised proposal. Accordingly, it is CCMD's understanding that its revised proposal is broadly consistent with the type of development envisaged by Government at the time.

In view of the previous consideration given by the Government to a proposal, the issue of the size and form of the CCR will not be given further specific attention in this report. However, the EPA will consider these matters indirectly in the context of the biophysical and pollution impacts associated with the footprint of the proposal and, in particular, the potential impacts and management demands associated with likely increased visitors facilities provided at the proposed CCR.

Ningaloo Marine Park and the framework for its management

As the proposal is located adjacent to and partially within the Ningaloo Marine Park, it is important that the EPA outline, at a broad level, its understanding of and views about the environmental values and management of this important area.

The Ningaloo Reef is a fringing barrier coral reef system which encloses a shallow lagoon predominantly on the west side of the North West Cape (DCLM 1989). It is the largest fringing barrier reef in Australia (EA 2002) and is unique for a number of reasons. However, of particular relevance to the CCR proposal is close proximity of the reef to the coast. Unlike the Great Barrier Reef, well developed coral reefs are easily accessible to visitors at several places along the Ningaloo Reef without the use of a boat.

A considerable portion of the Ningaloo Reef tract is reserved in the Ningaloo Marine Park, which extends for approximately 260 km from Bundegi Reef in Exmouth Gulf in the north to Amherst Point in the south (DCLM 1989). A coastal reserve, extending 40 m above high water mark between Winderabandi Point and Amherst Point, is also included in the management area for the Park. Coastal areas within the gazetted town sites of Coral Bay and Mauds Landing are excluded from the 40 m wide coastal reserve.

The Ningaloo Marine Park is reserved under both Western Australian and Federal legislation. The Ningaloo Marine Park (State Waters) was established in 1987 under Section 13 of the *Conservation and Land Management Act 1984* (*CALM Act*). The Ningaloo Marine Park (State Waters) is vested with the Marine Parks and Reserves Authority (MPRA), an independent authority established under the *CALM Act*. The management principles for the Park are outlined in the Ningaloo Marine Park Management Plan (DCLM 1989). DCLM is responsible for the day-to-day management of the State Waters of the park on behalf of the MPRA.

As noted in Section 2, the proposed development site at Mauds Landing is adjacent to a Recreation Zone in the Marine Park (DCLM 1989). The current Management Plan notes that Mauds Landing offers potential for marina developments likely to provide valuable services to Park visitors. The Plan prescribes that marina proposals could be considered in a Recreation Zone on their individual merit and that any proposal must be subject to environmental impact assessment on its own merits and meet the requirements of DCLM. The 1989 Park Management Plan is currently subject to review by the MPRA.

The Ningaloo Marine Park (Commonwealth Waters) was proclaimed in 1987 under the provisions of the *National Parks and Wildlife Conservation Act 1975*. Environment Australia is the managing authority for the Commonwealth Waters component of the Park. However, through a Memorandum of Understanding between the State and Commonwealth, DCLM and Fisheries undertake the day-to-day management of the Commonwealth Waters, including compliance and enforcement (EA 2002).

The EPA recognises that the values of the Ningaloo Marine Park are varied and reflect the broad array of ecological and social elements of the environment which require protection.

The biodiversity of the Ningaloo Marine Park is significant. The Park supports an estimated 300 species of coral, 500 fish species and 600 mollusc species (EA 2002). The Park lies on the migration path of the humpback whale (*Megaptera novaeangliae*), is home to several sea turtle species (loggerhead, green and hawksbill turtles) and dugongs (*Dugong dugong*), and regularly hosts migratory birds, some species of which are listed under international migratory bird agreements. Each March and April whale sharks (*Rhincodon typus*) are known to aggregate in waters off the Ningaloo Marine Park (Gunn *et al*. 1999). It has been suggested that these animals are attracted to the area for the coral-spawning events associated with full moons in March and April.

Several of the species above are of considerable importance in terms of the threatened status of populations across their ranges. Several marine fauna species and birds found in the Ningaloo Marine Park are listed under State, Federal and/or international legislation and agreements. For example, the loggerhead sea turtle, which has breeding sites in the Ningaloo Marine Park is listed under Schedule 1 of the W.A. *Wildlife Conservation Act 1950*, under the Federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is listed as endangered in the International Union for Nature Conservation (IUCN) *Red List of Threatened Species* (IUCN 2000). Several protected species either reside in or use the waters of Bateman Bay adjacent to the proposed CCR as transitory habitat.

It is also relevant to note that commercial ecotourism operations which are licensed by DCLM to operate in the Park from Exmouth and Coral Bay currently focus on marine wildlife, including whales, whale sharks, manta rays and turtles (DCLM 2000).

The Marine Park is also important from a biogeographical perspective. The Park, and the southern sector in particular, lies with the Western Australian Overlap Zone (DCLM 1989). In this zone, there is a transition between flora and fauna of the temperate Southern Australian Region and the tropical Indo-West Pacific. Due to its geographical location, the Ningaloo Marine Park supports species which are at the northern (in the case of temperate southern species) and southern (in the case of tropical Indo-West Pacific species) limits of their geographical ranges.

In addition to its biodiversity conservation and biogeographical values, the EPA acknowledges that recreational and wilderness values are an important part of the Marine Park's appeal to the community.

With respect to wilderness qualities, the EPA notes that while there are many remote coastal areas adjacent to the Park where wilderness qualities have not been significantly impacted, these values can and have been impacted in localised areas subject to heavy recreational use. In this context, areas in the vicinity of the proposed development site at Mauds Landing have been subject to intense human-use, including off-road vehicle access, camping, grazing and an air strip. These activities have caused some localised impacts on the terrestrial environment.

The EPA notes that the breakwaters for the CCR are proposed to be constructed within the boundary of the Ningaloo Marine Park. If the proposal brings about a requirement to amend the boundary of the Ningaloo Marine Park, the EPA understands that this could only be achieved if the Governor publishes an order in the Gazette to this effect, and the order is adopted through the Parliamentary process.

In summary, the EPA considers that the CCR proposal is broadly consistent with the provisions of the current Management Plan for the Ningaloo Marine Park, but there is a need to ensure that the significant conservation values of the area are protected in the long-term.

Current situation and initiatives

Coastal areas on the west side of the North West Cape adjacent to the Ningaloo Marine Park are currently sparsely populated. However, the EPA understands that the area is the focus of a rapidly expanding tourism industry (Parliament of WA 1995, MfP 1996).

The proposed CCR is one option to address the possible future demand for tourist facilities in the southern sector of the Ningaloo Marine Park.

The EPA is concerned that, without adequate management, a rapidly expanding tourism industry and the demands and pressures it places on the environment has the potential to result in impacts on the environmental values of the Ningaloo coast and the Cape Range region generally.

Giving appropriate attention to the issue of management during consideration of development proposals for this area will be fundamental to the protection of environmental values and the sustainability of human-use in the Region (EPA 1999).

In this context, the EPA notes the State Government's recent commitments to address long-standing environmental management issues in Coral Bay, such as wastewater treatment and boating facilities.

The EPA also understands that, as a result of community feedback on the draft Carnarvon Coastal Strategy, a new *Carnarvon-Ningaloo Coast Regional Strategy* will be developed. This *Strategy*, currently being prepared by the Department of Planning and Infrastructure (DPI), is expected to provide a framework for future planning and use of the Carnarvon-Ningaloo coast.

It is also expected that, consistent with the recommendation of the 1995 Legislative Council Select Committee Report, the *Strategy* will determine the coastal strip to be set aside as a conservation and recreation area for future generations and will recommend vesting and management options for that strip.

The EPA is also assessing the review of the Shire of Carnarvon Planning Scheme at the level of Environmental Review. The aim of this assessment is to ensure that revised planning and development within the Shire of Carnarvon is guided by appropriate principles and is undertaken in a manner which provides adequate protection to the environmental values of this important area.

Finally, the EPA understands that a proposal to seek World Heritage Nomination for the Ningaloo Marine Park has recently been considered and endorsed by the State Government. While the World Heritage values have yet to be documented, the EPA notes that the Government's commitment reflects its intent to have the unique values of the Ningaloo area formally recognised at an international level.

Submissions

The EPA received a large number of submissions from Government agencies and members of the public, including some highly respected conservation organisations such as Greenpeace, Australian Conservation Foundation, Australian Marine Conservation Society and the Conservation Council of Western Australia. Many public submissions expressed opposition to the proposal. Others expressed views in support of the proposal on the basis that it would assist in the resolution of long-standing management problems facing Coral Bay.

Key issues raised in submissions included:

- concern about large-scale private development adjacent to a key Western Australian, National and International environmental icon;
- the suitability of the type and scale of the proposal in the context of the location;
- the biophysical impacts of the proposal on the local environment;
- the pollution risks associated with the proposal, particularly the proposed public utilities (wastewater treatment, landfill);
- the risks to important marine fauna posed by additional marine-based activity associated with the proposal;
- the adequacy of the information provided by the proponent to assess impacts and establish appropriate management;
- the ability of the proponent to manage these risks;
- potential off-site coastal impacts of increased visitors numbers; and
- the appropriateness of the proposed management arrangements with Government agencies.

In view of the above, the EPA considers that, at a broad scale, the proposal needs to be reviewed in the context of the biophysical impacts of the footprint as well as the potential off-site impacts on the terrestrial and marine environments associated with increased visitor numbers in the longer term. The EPA also has given specific attention to matters associated with environmental management to ensure future tourism in the Ningaloo Marine Park and the Cape Range Province is sustainable.

The environmental issues considered to be relevant to the proposal are discussed in Section 4.

4. Relevant environmental factors/issues

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as groundwater, solid and liquid waste management, storm surge and Aboriginal heritage, are very relevant to the proposal, and the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following environmental factors/issues relevant to the proposal require detailed evaluation in this report:

(a) impacts associated with the proposal's footprint – discussion on this issue summarises the suite of biophysical and pollution impacts directly associated with constructed elements of the proposal;

(b) potential off-site marine impacts – the potential impacts of people's activities on the environmental attributes of the Ningaloo Marine Park;

(c) potential off-site terrestrial impacts - the potential impacts of people's activities on the environmental attributes of coastal areas adjacent to the proposal; and

(d) long-term management – the management arrangements proposed by the proponent and its authority to undertake on-going management of the potential environmental consequences of the proposal.

The EPA has defined 'footprint' in this report as the constructed elements of the proposal.

Details on the relevant environmental factors/issues and their assessment are contained in Sections 4.1 - 4.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The above relevant factors/issues were identified from the EPA's consideration and review of all environmental factors (preliminary factors) generated from the PER document (ATA 2000a, ATA 2000b) and the submissions received, in conjunction with the proposal characteristics.

The relationship between relevant environmental factors and key environmental issues arising from the proposal is shown in Table 3.

Table 3: The relationship between the relevant environmental factors and environmental issues arising from the proposal.

Key environmental issue	**Environmental factors relevant to the key environmental issue**
Footprint of the proposal	Marine flora, marine fauna, coastal processes, terrestrial flora, terrestrial fauna, subterranean fauna, marina water quality, marine water and sediment quantity, surface water quality (stormwater), European heritage, visual amenity and wilderness quality.
Off-site marine impacts	Marine fauna, coral reefs, marine flora.
Off-site terrestrial impacts	Terrestrial flora and fauna (including migratory species), coastal dunes.
Long-term management	Long-term management of the proposal - marina water quality, nutrient management, building/planning controls, maintenance of infrastructure; and The proponent's proposals to provide support for management of people in the Ningaloo Marine Park.

The EPA has received advice during the course of its assessment of the CCR with respect to the implications for Government, particularly agencies with statutory management responsibilities in the Ningaloo Marine Park, should this proposal be allowed to proceed. The EPA has given attention to this matter in Section 4.2 and 4.4 of this report.

4.1 Issue of footprint impacts

The following environmental factors have been identified by the EPA as relevant in the context of direct impacts of the proposal's footprint, including the proposed tourist, residential, commercial and services facilities.

- marine flora;
- marine fauna;
- coastal processes;
- terrestrial flora;
- terrestrial fauna;
- subterranean fauna;
- marine water quantity;
- marina water quality;
- surface water (stormwater management);
- European heritage; and
- visual amenity and wilderness qualities.

The impact of the proposal footprint on each of these environmental factors is discussed below.

4.1.1 Marine flora

Description

The proposal will result in the direct loss of approximately 5 ha of subtidal pavement with an overlying veneer of sand due to the development of breakwaters and a marina entrance channel. The existing pavement habitat will be converted to artificial reef habitat as a result of the placement of breakwater materials within the waters of Bateman Bay.

Information presented in the PER (ATA 2000a) indicates that intertidal and near shore limestone platforms, which are sometimes colonised by macroalgae, are not common in Bateman Bay, but are well represented in lagoons elsewhere along the Ningaloo Reef tract.

Three species of seagrass are found in the vicinity of the proposal in Bateman Bay (Section 4.2.3 of the PER).

Posidonia coreacea is a long-lived, predominantly temperate seagrass which forms discontinuous patchy meadows in moderate to high energy marine environments in Western Australia. *P. coreacea* is near the northern limit of its geographic range in Bateman Bay.

Another long-lived meadow-forming seagrass, *Amphibolis antarctica*, was found growing in patches within Bateman Bay (ATA 2000a). *A. antarctica* is found in moderate to high energy temperate coastal waters off south western Australia. This species is also at or near the recorded northern limit of its geographic range in Bateman Bay.

Halophila ovalis, is an ephemeral species which was found in low abundance during the proponent's surveys (Appendix 10 of the PER). *H. ovalis* is of particular importance in tropical systems as it is known to form a component of the diet for dugongs.

The proponent indicated in the PER that water quality within a 9 km^2 area called the Development Impact Area (DIA) would be impacted during construction and for a period of up to five years after the completion of construction. The proponent does not anticipate this will result in impacts on marine flora.

In Section 5.3.2 of the PER, CCMD suggests that potential direct impacts of the proposal on marine flora will be managed by the development of an inland marina. Indirect impacts of people's activities are proposed to be managed through management controls, monitoring and management strategies, prescribed in a Specific Area Marine Management Plan (SAMMP) to be implemented in collaboration with Government agencies. Off-site marine impacts are discussed in Section 4.3 of this report.

Submissions

Government agency submissions

DPI advised that:

- the proponent should implement the SAMMP in such a way that it will be able to mitigate the impacts of the proposed dredging on seagrasses;
- the proponent's conclusion that any loss of seagrass would not be significant, is underpinned by the assumption that seagrass is not locally significant (as food for dugong or green turtles etc); and
- the proponent should establish whether the capital dredging and any subsequent maintenance dredging could be managed to avoid serious levels of degradation to marine flora and benthic habitat.

Public submissions

Submissions focused on issues, including:

- the inadequacy of information collected by the proponent for the purposes of assessing potential impacts;
- concern about the proponent's proposal to complete habitat mapping after approval is granted;
- the impact of the proposal on seagrass and macroalgae which are known in some areas to be critical habitat for dugongs and turtles;
- the potential impacts on seagrass as a result of deterioration in water clarity due to construction activities and ongoing operation; and
- the potential impacts on seagrass from changes in the nutrient status of Bateman Bay.

Assessment

The area considered for assessment of this factor is the marine environment of Bateman Bay and the waters of the Ningaloo Marine Park.

The EPA's environmental objective for this factor is to maintain the ecological function, abundance, species diversity and geographic distribution of marine flora.

The EPA notes that surveys by the proponent suggest the footprint of the proposal is unlikely to result in the direct loss of seagrass or other significant benthic primary producer habitat.

The marina is proposed to be dry-excavated requiring dewatering, which will minimise the potential for the generation of turbidity plumes during the excavation. However, there is concern that dredging of the marina entrance and opening of the marina basin to Bateman Bay could generate turbidity plumes which, if persistent and large scale have the potential to cause indirect impacts on seagrass and corals in Bateman Bay through smothering and/or reduction of light reaching the sea floor. The protection of seagrass in Bateman Bay from these types of impacts is important in the context of the current level of information about the ecological function of seagrass as habitat for marine fauna, including juvenile fish, dugongs and sea turtles, and the geographic ranges of species found in Bateman Bay.

Turbidity of marine waters, resulting from construction and early operation phases of the proposal, has the potential to have adverse impacts on seagrasses, and other light-sensitive benthic organisms such as corals, by reducing the amount of light reaching the seafloor. Seagrasses and other benthic primary producers (marine organisms which produce biomass from sun light through photosynthesis) require adequate light for photosynthesis and survival. In this context, while the EPA notes that the proponent's advice that *H. ovalis* occurs in some turbid environments, productivity of this species is highly sensitive to light deprivation (Longstaff *et al.* 1999).

The EPA notes the proponent's high-level objectives and strategies related to seagrass and other marine flora in the draft SAMMP provided in Section 6 of the PER. However, it is the EPA's understanding that the primary purpose of the indicative SAMMP is to guide the management of impacts associated with people's activities in the Marine Park, and not to specifically address the acute and transitory impacts in the Park associated with construction and early operation of the proposal. Moreover, the EPA considers that the level at which management strategies outlined in the SAMMP are pitched, does not provide adequate assurance that potential impacts on seagrass associated with construction will be addressed.

In view of the current level of information about ecological functions of seagrass and other marine flora in Bateman Bay with respect to food sources and nursery habitat for marine fauna and fish, management of construction activities and early operation of the proposal must be of a best practice standard and must ensure that the ecological integrity/function and conservation significance of benthic primary producer species at or near the extremes of their geographical ranges in Bateman Bay (eg *P. coreacea* and *A. Antarctica*) are not compromised.

The EPA considers that a rigorous monitoring and management program needs to be in place to ensure that the health and distribution of benthic primary producers (seagrass and corals) in Bateman Bay, and possibly within the Maud Sanctuary Zone, is maintained.

Accordingly, it is recommended that an environmental condition (condition 5) be applied to this proposal, which aims to complement the indicative SAMMP as well as any other proponent commitments related to protection of the marine environment from the effects of the proposal footprint, including construction.

The recommended condition provides for a Seagrass and Coral Management Plan to be prepared and implemented by the proponent prior to the commencement of construction and be continued during operation of the proposal. The EPA considers that this Plan must address:

- collection of pre-development reference information on the distribution of seagrass species and coral reef communities;
- pre-development reference information on seagrass health and coral condition;
- establishment of the environmental values of seagrass and corals, including a study of how marine fauna utilise seagrass and corals;
- derivation of site-specific 'alert' and 'action' criteria, for the protection of seagrass and coral from the effects of the project reduced water clarity and sedimentation, which have a temporal component and, which are based on metabolic light requirements;

- a seagrass and coral monitoring program which includes procedures for monitoring light climate, seagrass and coral health and sedimentation at impact and reference sites over relevant time frames against 'alert' and 'action' criteria;
- adaptive management actions where 'alert' and 'action' may not be met;
- contingency strategies; and
- reporting procedures.

The EPA also notes that the proponent proposes to undertake further habitat mapping as part of its implementation of an indicative SAMMP. The EPA recommends that this habitat mapping work is integrated with baseline surveys of marine herbivores to gain a better understanding of the value of seagrass in Bateman Bay as habitat/food resource for important fauna such as dugong and herbivorous turtles (eg green and hawksbill turtles) which are known from the area.

The EPA notes that the proponent has made a commitment to prepare and implement a Dewatering Management Plan (commitment 30)and a Dredging Management Plan (commitment 47) as elements of a construction phase Environmental Management Program (commitment 5).

In summary, the EPA is of the opinion that provided that the proponent's commitments and recommended environmental conditions are satisfactorily implemented by the proponent it is unlikely that the EPA's objective for seagrass will be compromised. In addition, the information collected in fulfilling the conditions and commitments will assist in development of management strategies for a Specific Management Area, when finalised.

Summary

Having particular regard to the:

- localised (approximately 5 ha) direct impact of the proposal on subtidal platforms which are well represented in backreef lagoons along the Ningaloo Reef tract;
- proposal not directly impacting upon perennial seagrass meadows;
- CCMD's proposed method of construction of the marina using excavation and dewatering, which will minimise the extent of potential impacts of construction on the marine environment;
- CCMD's commitment to prepare a construction phase Environmental Management Program (commitment 5) which includes a Dewatering Management Plan and Dredge Management Plan; and
- the proponent's high-level commitments to finalise and implement strategies related to marine flora as part of the draft SAMMP (commitment 9) to the satisfaction of DCLM and the Marine Parks and Reserves Authority,

it is the EPA's opinion that the proposal is unlikely to compromise the EPA's environmental objective for this factor, provided that recommended environmental condition 5, which provides for detailed monitoring and management of benthic primary producers (seagrass and corals) in the nearby waters of the Ningaloo Marine Park, is satisfactorily implemented by the proponent.

4.1.2 Marine fauna

Description

The development of a marina-based tourist and residential proposal at Mauds Landing has the potential to impact upon marine fauna which use Bateman Bay and its coastal areas as habitat.

Section 4.2.3 of the PER (ATA 2000a) notes that loggerheads (*Caretta caretta*), hawksbill (*Eretmochelys imbricata*) and green (*Chelonia mydas*) sea turtles are common in waters adjacent to Mauds Landing. Loggerheads and green sea turtles are thought to be resident in the region, while hawksbills are regular visitors to the area (ATA 2000a).

Loggerhead and green sea turtles are listed in the IUCN Red List as endangered (IUCN 2000). Hawksbill sea turtles are listed on the IUCN Red List as critically endangered (IUCN 2000). The loggerhead sea turtle is also listed under Schedule 1 (fauna that is rare or is likely to become extinct) of the WA *Wildlife Conservation Act 1950*. All three species are listed on the threatened fauna lists under the provisions of the Federal *EPBC Act 1999*.

The PER notes that loggerhead turtles are known to nest on beaches in Bateman Bay (Section 5.3.3 of the PER). The results of a community turtle survey presented in the PER suggest that 71 turtle nests were recorded in Bateman Bay during the 1999/2000 nesting season.

Indiscriminate use of Bateman Bay beaches by four wheel drive and other off-road vehicles is considered to be current threat to sea turtle breeding. CCMD suggests that vehicle access to turtle nesting areas in Bateman Bay from the current beach access point at Mauds Landing would be interrupted by the proposal (ATA 2000a). This potentially reduces the impacts of vehicle-related disturbance to turtles from vehicles accessing the beach from Mauds Landing.

Approximately 200m of beach, which could be potential nesting habitat, will be directly impacted by the development of breakwaters and an entrance channel to the marina.

CCMD has made a commitment to prepare and implement a Turtle Management Plan (commitment 12) in consultation with DCLM and the local community (Section 5.3.3 of the PER), to address:

- public education;
- lighting management;
- maintenance of nesting habitat;
- off-road vehicle controls;
- litter; and
- management of environmental degradation.

With respect to other marine fauna, the PER notes that manta ray movements will be interrupted in the vicinity of Mauds Landing, but 'it would seem as though they are common in Bateman Bay generally and more so in areas north of Oyster Bridge' (Page 114 of the PER).

The proponent suggests that direct impacts on marine fauna as a consequence of construction of the CCR are unlikely, with the exception of benthic invertebrate fauna displaced or smothered by the breakwaters and entrance channel (Section 5.3.3, ATA 2000a).

Swimming embayments within the marina are proposed to be shark netted to provide safe swimming conditions.

Submissions

Government agency submissions

With respect to sea turtles, DCLM advised that:

- the PER document provides no assessment of the importance of this section of beach relative to the extent of the known turtle nesting area along Bateman Bay;
- within the Ningaloo Marine Park, the Bateman Bay beach is the most significant nesting area for loggerhead turtles, and the area is the southern-most nesting area in WA for hawksbill turtles; and
- there have been no targets or specific commitments set with respect to minimizing the impact of lighting from the resort development on turtle nesting areas. This needs to be addressed and there should be specific commitments to include shielding of lights and use of sodium vapour lights where these will be visible from beach areas.

The DEP raised issues regarding potential impacts on turtles as a consequence of any changes in beach conditions which may occur as a result of the proposed breakwaters.

DPI recommends that any development adjacent to turtle rookeries should be screened from the foreshore to prevent the disorientation of hatchlings.

Public submissions

Issues raised in public submissions regarding the impact of the proposal on marine fauna, included:

- the proponent will be limited in its ability to effectively manage lighting, particularly from private residences which could impact on turtle breeding;
- the potential impacts of sedimentation associated with construction and breakwaters have not been considered adequately, given that beach characteristics are known to be important factors influencing turtle breeding;
- the proposal will increase the already considerable impacts on sea turtles from feral/domestic animals;
- inadequate baseline information has been gathered by the proponent both at the local and regional levels to judge the impacts of the proposal on marine fauna species or to predict the effectiveness of proposed management strategies;
- there is uncertainty about the conservation significance of several marine species which use Bateman Bay;
- the potential consequences of the proposal for marine fauna (eg direct impacts, loss of habitat, disturbance);

- the potential impacts of the proposal on habitat (direct loss of beach), food resources (water quality impacts on algae, benthic invertebrates) and population ecology generally;
- dispersal of litter and debris from the proposal has the potential to impact on marine fauna; and
- shark nets proposed in the marina may injure or kill marine wildlife.

Assessment

The area considered for assessment of this factor is Bateman Bay and the Mauds Landing townsite.

The EPA's environmental objectives for this factor are to:

- maintain the abundance, species diversity and geographic distribution of marine fauna; and
- protect specially protected (threatened) fauna consistent with the provisions of the *Wildlife Conservation Act 1950*.

The EPA notes that sea turtle species recorded from the Bateman Bay area are recognised as species of International, Commonwealth and State conservation significance.

Artificial light generated at tourist, residential and commercial elements of the proposal has the potential to impact on sea turtle breeding. Artificial light can impact on sea turtles by causing disturbance in nesting females and affecting the sea-finding behaviour in turtle hatchlings. With the exception of one lot, Figure 3.11 of the Structure Plan shows that beach front buildings will be limited to one storey. The proponent expects that the upper storey/roofs of the proposed three storey buildings will be visible from the Marine Park.

<u>Turtles</u>

The EPA notes the concern expressed by DCLM and the public regarding the proponent's limited assessment of the importance of the impacted section of beach relative to the extent of the known turtle nesting area along Bateman Bay.

In this regard, the EPA understands that all known loggerhead sea turtle nesting in the eastern Indian Ocean occurs in Western Australia (Baldwin *et al.* in press). The greatest concentration of loggerhead turtle nesting in Western Australia occurs on the Muiron Islands, north west of North West Cape and at the northern end of Dirk Hartog Island. The review by Baldwin *et al.* (in press) suggests that from a regional perspective, current loggerhead nesting along mainland beaches in the Ningaloo Marine Park is less than at the Murion and Dirk Hartog Island locations.

Information in Baldwin *et al.* (in press) suggests that approximately 1000 loggerhead turtles nest annually at Dirk Hartog Island. The numbers of nesting loggerheads at South Murion Island and North West Cape range between 150-350 and 50-150 respectively.

On a local scale, DCLM has advised that the Bateman Bay beach is the most significant nesting area for loggerhead sea turtles within the Ningaloo Marine Park. DCLM's advice in relation to the significance of Bateman Bay for hawksbill sea turtle breeding is also noted.

Additional information provided by the proponent in its responses to public submissions suggest that 68 turtle nests were recorded on the beaches of Bateman Bay during the 2000/2001 nesting season. The PER noted that 71 nests were recorded in a similar area during the 1999/2000 season. CCMD estimates that nests represent approximately 0.5% of the total known nesting loggerhead turtles in Western Australia (ATA 2001b).

Most nesting turtles were thought to be loggerheads. The proponent also suggests that 'one or two' breeding female sea turtles on Bateman Bay beaches are hawksbills (ATA 2001a). Information and/or references to substantiate these statements were not provided by the proponent.

The potential for lighting and loss of beach associated with the proposal to impact on turtle breeding is likely to be related to the proximity of breeding sites to the proposal.

The location of sea turtle nests relative to the CCR proposal is shown in Figure 2 of the responses to submissions (ATA 2001b). This figure shows that the highest density of sea turtle nests during the 2000/01 season was recorded between 2 km and 6 km north of the proposed CCR site. The figure also shows that three nests were located in front of the development site and others were made at several locations on the beach within 1 kilometre north of the townsite boundary. The proponent suggests that nests made on the beach fronting the proposal are likely to have been made by 'one or a maximum of two nesting females'.

The removal of approximately 200 m of potential nesting habitat by constructing the breakwaters is unlikely to cause significant impacts on nesting habitat, particularly in view of the area of beach currently utilised and the area remaining. The loss of this beach also needs to be weighed up against the reduced beach access by off-road vehicles from Mauds Landing which have the potential to cause considerable disturbance to nests and hatchlings.

The EPA recognises that potential impacts of lighting from the proposal was a key issue of concern to both Government agencies and the public. Artificial lighting is known to impact sea turtle behaviour (Witherington and Martin 1996). Artificial light has been shown to reduce nesting attempts by female loggerhead and green turtles (Raymond 1984 in Witherington and Martin 1996). Sea-finding behaviour in nesting females and in hatchlings has also been shown to be adversely affected by artificial lighting (Witherington and Martin 1996).

The proponent proposes to address lighting in the Turtle Management Plan (TMP, commitment 12) by:

- developing the proposal behind dunes along the beach, which will restrict the light reaching the beaches;
- considering orientation of the buildings and windows during detailed design with the objective of minimising the number of windows facing toward the north (where the main turtle nesting activity occurs) and to shield lighting from beaches fronting the development;
- not using high intensity lighting and floodlights within the development area. Lights throughout the CCR will be directional, low intensity and mounted low on supports or buildings;
- positioning lights and access paths low with the light directed to provide sufficient illumination of the path for safety but with a limited light spillage above the vegetation and dunes;
- using lights in the green-yellow to yellow region of the spectrum (560 to 600nm) for outside lighting within the development and including lights associated with accommodation units. This range has been shown to be less attractive to loggerhead and green turtle hatchlings (Lutz 1996);
- where necessary, shielding lights within the development and accommodation units and using motion-detector lights;
- informing residents on the impacts of lights on hatchlings and nesting female turtles and encouraging the use low intensity lighting and window treatments to prevent light spill during the nesting and hatching season; and
- preparation of an environmental Code of Conduct as part of an operations phase Environmental Management System (commitment 3) that will include information for visitors to discourage the use of lighting and torches on the beaches at night during the nesting and hatching periods and providing guidelines for minimising impacts.

While the EPA considers that the measures detailed in the proponent's commitment may assist in minimising the potential impacts of artificial light on sea turtle breeding, it is essential that an appropriate mechanism be in place to ensure that the appropriate controls on lighting from buildings can be enforced across the entire development, including areas not constructed by CCMD. In this regard development on freehold residential lots adjacent to the beach are likely to be difficult to manage without enforceable building controls. This matter is given additional attention in Section 6 of this report.

With respect to concerns regarding the potential impacts on turtle nesting as a consequence of altered beach characteristics associated with the proposed breakwaters, the EPA notes that the majority of turtle nesting currently occurs between 2 and 6 km north of the proposal. Here again, the scale of potential changes in beach characteristics relative to the habitat availability is not likely to compromise the EPA's objective for this factor. Notwithstanding, the EPA considers that there is a need to monitor sea turtle nesting and ensure that coastal management practices are managed in a way which gives due regard to habitat utilisation by important fauna. For this reason, a condition (condition 7) relating to coastal management requires the proponent to consider the ecological value of beaches when developing and implementing its management program.

CCMD proposes to address concerns regarding impacts on turtles as a result of the proposal via a commitment to prepare a Turtle Management Plan (TMP) to address:

- feral animals;
- light pollution;
- beach access;
- vessel strikes - including consideration of offshoot channels near boat ramps;
- ecotourism;
- indigenous hunting;
- public education; and
- appointment of a Turtle Management Officer.

The EPA considers that satisfactory implementation of the TMP will assist in the management of potential threats to turtles in Bateman Bay. However, the current TMP has no provision for monitoring the effectiveness of the management measures proposed to be employed by CCMD.

Accordingly, and to complement the proponent's commitment to prepare and implement a TMP, and acknowledging that design modifications could be undertaken to achieve best practice, the EPA recommends that a condition (condition 6) be applied to the proposal requiring the proponent to prepare and implement a Turtle Breeding Management Plan. The Plan will address issues including the monitoring of turtle breeding parameters, on advice and with the approval of DCLM, and implementation of adaptive management if environmental performance measures are not met.

For example, modification to lighting or other management practices associated with the proposal could be made if monitoring showed that the lighting from the proposal was causing adverse impact on turtles which use Bateman Bay as habitat.

Other marine fauna issues

The information provided by the proponent about the ecology of the marine fauna which are observed in Bateman Bay is limited to observations made by tourist operators. The EPA also notes the advice of DCLM that the proponent has provided little in the way of detailed baseline data.

Consequently, the EPA is limited to making a judgement about the potential impacts of the proposal on marine fauna on the basis of risk. In view of the distribution and habitat requirements for some of the icon species (noted in the PER and in submissions) such as humpback whales, whale sharks, dugongs, dolphins and manta rays, the EPA considers that the types of impacts associated with the proposal footprint (eg deterioration in water quality, noise) and the spatial and temporal scales of these impacts are unlikely to pose significant risks to populations of these marine fauna species.

By way of example, humpback whales and whale sharks are primarily pelagic and as such are unlikely to utilise waters affected by the proposal on a regular basis. The proponent has provided advice to the effect that other marine fauna noted above are generally broadly distributed throughout the Ningaloo Marine Park in waters beyond Bateman Bay.

The acute impacts of the proposal footprint on Bateman Bay waters are likely to be primarily associated with construction and early operation phases and therefore transient in nature.

The EPA is also mindful that if the proposal is allowed to proceed, reference information would be collected on marine fauna species through the implementation of various management plans, including the SAMMP.

A considerable number of submissions raised concerns about the proposed use of shark nets in the marina. In this regard, the EPA notes that a large number of dugong deaths between 1962 and 1992 have been attributed to shark nets used in the Queensland Shark Control Program (Marsh *et al.* 2001). In order to address this matter at the proposed CCR, the proponent has committed to employ a Turtle Management Officer to monitor proposed shark nets. As a number of marine fauna species, including protected species, may enter marina waters, the EPA is of the opinion that if shark nets are to form part of the marina proposal, monitoring must be stringent and year-round to ensure that marine wildlife is not at risk from shark control devices.

With respect to the potential impacts on marine fauna from the dispersal of litter from the proposal, the EPA notes the proponent's commitments in regard to waste management. Resort waste management is proposed to include provision of adequate and strategically located waste receptacles, implementation of kerbside collection service, public waste minimisation programs, bulk waste collection and implementation of a managed fenced landfill site. The various education programs proposed by the proponent are also likely to be important elements of over-all waste management for the project. A Waste Management Plan will also form an element of the proponent's construction phase Environmental Management Program (commitment 5).

The EPA considers that, providing effective controls can be put in place to prohibit domestic animals and use of vehicles on beaches, these issues can be managed to meet the EPA's objective.

In terms of direct impacts of the proposal on sediment infauna, the EPA notes that sandy habitat is widely distributed in Bateman Bay and other lagoon areas along the Ningaloo Reef tract. It is considered likely that similar sediment infauna (fauna that live in marine sediments) inhabit other areas of Bateman Bay and Ningaloo Reef. Accordingly, the local direct loss of sandy habitat is unlikely to compromise the EPA's objectives for this factor.

In summary, EPA considers that the proposal to develop tourist and residential facilities at Mauds Landing has the potential to impact on marine turtles through light spill and loss of habitat and other fauna as a result of shark exclusion devices. However, in view of the commitments by the proponent and the recommended environmental condition 6, which provides for turtle nest monitoring and implementation of adaptive management actions, the EPA considers that it is unlikely that the proposal footprint will compromise the EPA's objectives for this factor.

Summary

Having particular regard to the:

- proponent's commitment to prepare and implement a TMP to address lighting, feral animals, beach access, appointment and role of a Turtle Management Officer and public education;
- proponent's commitment to finalise and implement a SAMMP to the requirements of DCLM and the MRPA;
- proponent's undertakings to monitor shark control devices;
- proponent's undertakings not to carry out construction activities at night; and
- proponent's commitment with regard to solid waste management during construction;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that recommended environmental condition 6, which addresses monitoring the effectiveness of measures documented in the proponent's TMP, is satisfactorily implemented by the proponent.

4.1.3 Coastal processes

Description

Two limestone breakwaters are proposed to extend approximately 200 m into the waters of Bateman Bay within the Ningaloo Marine Park. These structures have the potential to impact natural coastal processes by modifying or blocking cross-shore and long-shore sediment transport.

The effects of the proposal on coastal processes was discussed in Section 5.3.4 (ATA 2000a) and in Appendix 8 (ATA 2000b) of the PER. The PER suggests that, because prevailing swell waves approach the beach with wave crests parallel to the shore in the vicinity of the proposal, little longshore transport of sediments occurs in the southern part of Bateman Bay under natural conditions (Appendix 8 in ATA 2000b).

An examination of aerial photography by M.P. Rogers and Associates indicates that the shoreline in the vicinity of the proposal has advanced in a seaward direction by between 5 m and 65 m over the period 1948 to 1981.

The report by M.P. Rogers and Associates (Appendix 8 in ATA 2000b) also presents a summary of studies undertaken for CCMD by Port and Harbours Consultants and Steedman Science and Engineering describing the effects of Tropical Cyclone Hazel, a direct hit Category 5 storm at the proposed development location.

This storm event resulted in the transport of approximately 10,000 m^3 of sediment in the vicinity of the proposal. CCMD anticipate that a comparable storm would result in the deposition of a similar volume of sediment against the northern breakwater. It is anticipated that new beach alignments would result over a distance of approximately 300 – 500 m either side of the breakwaters (ATA 2000a). CCMD suggests that during the months and years following an extreme storm event, swell waves will rework the beach back to its pre-disturbance alignment (ATA 2000a).

In the PER, the proponent committed to the preparation and implementation of a Shoreline Movement Plan to address:

- characterisation of sediment changes;
- coastal (including sediment) accretion and erosion;
- measurement of beach profiles;
- accretion and erosion rates; and
- identification of remedial actions.

Submissions

Government agency submissions

The DPI Maritime Division advised that:

- coastal processes appeared to have been well researched and appropriately evaluated;
- the proponent's commitments were limited to 'identification of remedial actions'; and
- the proponent should commit to the implementation of appropriate remedial actions to the satisfaction of DPI Maritime Division and DCLM.

The WA Museum noted that no modelling has been undertaken of the effect of the breakwaters on longshore sand drift and suggested it would be questionable to consider there would be no impact.

The DEP noted that:

- no wave measurements were made in Bateman Bay;
- the proponent's assessment of coastal processes did not appear to address the impact of the breakwaters under ambient conditions; and
- more information was required to substantiate the proponent's assumptions that natural wave processes would realign beach profiles if impacted.

The submission by the Shire of Carnarvon focused on:

- concern that the work presented in the PER did not adequately address the issue of littoral drift; and
- concern regarding the impacts of the breakwaters under conditions other than severe cyclones as modelled by the proponent and how sediment would be redistributed and the potential impacts of recurrent storm events.

Public submissions

Submissions focused on issues including:

- limited faith in the proponent's modelling and predictions about impacts on beaches;
- concern that the construction of the marina and breakwaters are likely to have significant and unacceptable impact on coastal processes;
- concern about the impact of the proposal on coastal processes and possible downstream consequences of other important values of the Ningaloo Marine Park (eg birds and turtles);
- why any impacts on coastal processes as a result of a built structure should be acceptable in a Marine Park; and

- concern that the proposal would require maintenance dredging with resultant impacts.

Assessment

The area considered for assessment of this factor is the Mauds Landing townsite and Bateman Bay beaches.

The EPA's environmental objectives for this factor are:

- to maintain the stability of beaches and dunes and to maintain the integrity, function and environmental values of any foreshore/dune areas; and
- to ensure that the construction of the proposed marina and breakwaters do not adversely impact on important fauna habitat.

The placement of structures along a natural coast line is likely to influence the natural transport of sediments along the beach. There are no artificial structures currently in Bateman Bay that could impact the natural movement of sediments.

Studies undertaken for the PER by M.P. Rogers and Associates (Appendix 8 in ATA 2000a) suggest that the proposal is unlikely to have significant effects on natural coastal process and beaches except as a result of a significant storm event. Impacts may include accretion and erosion of sand and changes in characteristics of beaches either side of the proposed breakwaters.

With respect to issues raised in public and Government agency submissions about the adequacy of the assessment of the impacts of the breakwaters under prevailing conditions, the EPA notes that the DPI Maritime Division considers that 'Coastal processes appear to have been have been well researched and appropriately evaluated in this report'.

In its responses to submissions about the assessment of impacts on coastal processes, CCMD contends that observations of beach form (cuspate beach) and shoreline movement over time (analysis of aerial photography) support its predictions that prevailing swell waves cause little natural longshore transport of sediment in the vicinity of the proposal under natural conditions (ATA 2001a). A review of aerial photography (Appendix 8 in ATA 2000b) shows that the beach adjacent to the proposal is relatively stable with a moderate trend of accretion.

The EPA notes that while beach cusps indicate that waves generally approach parallel to the shoreline, these features are ephemeral and can change over short periods of time. Natural variation in weather and swell intensity and direction are likely to cause waves to move sediments at some times. Refraction of waves off breakwater structures such that they no longer strike parallel to the beach also has the potential to impact beaches away from the site.

The proponent has advised that the detailed design phase for the proposed breakwaters will utilise and extend the concept and preliminary engineering design work completed as part of the environmental assessment. The detailed design will include:

- updated detailed hydrographic survey of the dunes, beach and nearshore waters as well as updated shoreline movement plans to confirm the assessment of coastal processes and dynamics;
- updated numerical modelling of extreme cyclones to confirm the assessment of extreme waves and water levels for use in the detailed design of the structures and work;
- modelling of the wave penetration into the harbour entrance and optimisation of breakwater position and overlap; and
- detailed assessment of sediment dynamics using updated wave model results, optimised breakwater layout and computer models of coastal dynamics including longshore transport and storm erosion. This will include further work on the shoreline position and dynamics in response to the entrance breakwaters. The estimates of the sediment maintenance regime will be confirmed using the updated work on coastal dynamics.

With respect to the possible need to dredge the marina entrance, the EPA notes the CCMD's response to a submission stating 'from time to time there may be the need to complete some minor maintenance dredging to address sediment movement during direct hit cyclones' (Response 3.1.4.6).

In this context, the EPA notes information prepared for the DPI in relation to a previous proposal for a public boating facility at Mauds Landing (DALSE 2002) suggesting that continued shoreline accretion in the vicinity of Mauds Landing could lead to the requirement for dredging if a breakwater structure was constructed at that location.

In view of the erosion risks noted in the PER and by DPI Maritime Division and the possible need for maintenance dredging, the EPA has recommended an environmental condition relating to coastal management (condition 7). Condition 7 addresses matters associated with shoreline stability and maintenance dredging.

The EPA's advice in relation to the potential impacts of the proposal footprint on sea turtles is provided in Section 4.1.2. The EPA considers that in light of advice regarding turtle nesting and the sensitivity of coastal dunes to erosion in this area, some attention should be given to the ecological values of Bateman Bay beaches as part of coastal management associated with the proposal.

The EPA considers that the proposed breakwater structures have the potential to interrupt natural coastal processes, which may result in the accretion of sand along a breakwater, the erosion of sand from beaches and/or changed beach profiles north and south of the proposal. The EPA notes that the proponent will undertake further detailed design work to optimise the breakwater layout to address matters relevant to coastal processes. The proposal may also create the need for some maintenance dredging from time to time and the EPA has recommended a condition to address this issue in the event that dredging is necessary.

Summary

Having particular regard to the:

- advice of the DPI Maritime Division that coastal processes appeared to have been well researched and appropriately evaluated in the PER;
- proponent's advice regarding detailed design work and refinement of coastal process modelling;
- proponent's commitment to prepare and implement a Shoreline Movement Plan in consultation with DPI and DCLM; and
- results and conclusions associated with modelling undertaken for the proponent of the effects of Tropical Cyclone Hazel on the movement of sediments;

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor, provided that the proponent satisfactorily implements condition 7 which requires the preparation of a Shoreline Stability Plan (7-1) to protect the social and ecological values of nearby beaches and a Maintenance Dredging Management Plan (if required) relating to coastal management.

Due to the undeveloped nature of the Mauds Landing site and the adjacent beaches, the EPA considers that it is particularly important for the Shoreline Stability Plan (condition 7-1 and 7-2) to establish a set of rules (values and criteria) which give consideration to ecological (turtles and coastal vegetation) and social (beach access) issues relevant to Bateman Bay beaches against which to assess monitoring data.

4.1.4 Terrestrial flora

Description

The CCR proposal will result in the disturbance of approximately 114 ha of coastal land in the Mauds Landing townsite. Development of sensitive foredunes is proposed to be limited to the area required for the construction of the breakwaters and the marina entrance channel.

Approximately 62 ha of land is also proposed to be developed for services infrastructure and a light industrial area 2 km east of the Coral Bay settlement.

Potential impacts on terrestrial flora at the Mauds Landing townsite and the Services Area will arise through the clearing of vegetation and peripheral disturbance of habitat.

Flora and Vegetation at Mauds Landing

The terrestrial vegetation communities and fauna habitats in the Mauds Landing town site were discussed in Sections 4.2.1 and 5.3.6 of the PER. The results of technical work, including flora surveys of the Mauds Landing townsite, were detailed in Appendices 6 and 13 of the PER.

The proponent has undertaken two flora surveys of the proposed development site. The first was a desk-top survey supported by a brief site visit in October 1994 (Appendix 6 in ATA 2000b). The report by M. Trudgen recognised that the survey 'probably represented about 85% of the flora of the site, with those species not recorded being either present in very low numbers or being annuals not available at the time of the survey'.

The information presented in Appendix 6 of the PER indicates that there are seven vegetation communities within the Mauds Landing townsite. These are:

- foredunes;
- parabolic dunes;
- relict foredune plains;
- aeolian flats and ridges;
- saline flats;
- hypersaline pool; and
- unvegetated clay pans.

Two Priority 2 flora species form part of the vegetation at the CCR site. *Acacia ryaniana* occurs in parabolic dune communities at the western part of the site. *Eremophila glabra* spp *psammophora* is found in foredune communities directly seaward of the proposal.

To address this matter, the proponent undertook a brief survey of the site (Appendix 13, ATA 2000b) to:

- verify the location of the two Priority 2 species found within the proposal area;
- to gain an understanding of the local and regional distributions of these species;
- estimate population sizes; and
- comment on the extent of impact on populations and the implications in a regional context.

The proponent notes that the Priority 2 species were relatively common in the immediate vicinity of the proposed development and populations were well represented in the foredune system which extends to the northwest of Mauds Landing. From a regional perspective, ATA (Appendix 13 in ATA 2000b) note that *E. glabra* spp *psammophora* has been recorded during other surveys along the Ningaloo Coast. This species is also known from the conservation estate with recorded populations from Dirk Hartog Island and Dorre Island. ATA (2000b, Appendix 13) also suggest that *A. ryaniana* has been recorded from Quobba and Cape Curvier. There are no records of *A. ryaniana* within the conservation estate.

Construction of the proposed marina entrance channel will result in the loss of approximately 30 *E. glabra* spp *psammophora* plants and 70 *A. ryaniana* plants (Appendix 13 in ATA 2000b). However, in view of other records of both species along the Ningaloo Coast, the proponent concludes that these losses are unlikely to be significant in a regional context (Section 5.3.6 of the PER).

In the PER, the proponent made commitments to prepare three management plans which have relevance to the management of impacts on terrestrial flora in the Mauds Landing townsite. These are:

- a Foreshore Management Plan;
- an Environmental Management Plan; and
- a Revegetation and Landscaping Plan.

Flora and vegetation at the Services Area

The findings of a vegetation review for the proposed Services Area are presented in Appendix 14 of the PER. The review, consisting of a desk-top study and a one-day site visit (on 20 August 2000) suggests that vegetation at the proposed Services Area corresponds to Beard's (1975) 'shrub steppe on sandhills' and was in fair condition, having been heavily infested with buffel grass. Key findings of the vegetation review included:

- the variation within vegetation types from the proposed Services Area were not considered to be significant from a local perspective;
- in a regional context, the sandplain habitat is well represented (approximately 6% of the Gascoyne Region and that removal of 62 ha does not threaten representation; and
- no Threatened Flora or Priority Species were found or are likely to be found in the sandplain habitat at the proposed Services Area.

Submissions

Government agencies submissions

The DPI suggest that:

- the loss of native vegetation should be kept to the minimum;
- replanting strategies should be investigated to replace vegetation lost during the development of the site; and
- landscaping should incorporate local native species where possible.

DCLM and the DEP noted that the PER did not make an assessment of the potential impacts of stormwater runoff on terrestrial habitats, including the lake habitat.

Public submissions

Public submissions focused on:

- concern about the adequacy of the proponent's flora surveys and whether the surveys provide certainty in regard to the impacts of the proposal on native flora on the site, particularly priority species. In particular, it was considered that the proponent's surveys do not account for all species on the site nor were they likely to have accounted for seasonal variation in plant abundance and diversity. Some submitters consider this reason enough to reject the proposal;
- a preference for the saline flats to be conserved as it does not appear that the system is well represented/conserved in the Carnarvon Biogeographical Region;
- concern regarding the impact of the marina (particularly construction) on shallow groundwater and the potential for draw-down effects which may impact on vegetation; and
- concern that the proponent has not fully considered the impact of stormwater runoff on terrestrial flora.

Assessment

The area considered for assessment of this factor is the Mauds Landing townsite and the proposed Services Area.

The EPA's environmental objective for this factor is to maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities, and to protect declared rare flora and priority flora, consistent with the provisions of the *Wildlife Conservation Act 1950*.

Recommendation 9.3 of the EPA's System 9 report relates to the Ningaloo Reef Tract (EPA 1975). In the System 9 report the EPA recommends that no proposal to develop any part of the coastal areas up to 2 km inland from high water mark lying within the boundaries of Ningaloo, Cardabia and Warroora pastoral leases be approved without the concurrence of the then National Parks Board and the Director of Fisheries and Wildlife. The MPRA and DCLM have provided submissions on the proposal.

The MPRA has advised that the proposal should not proceed because it is too large, is premature in the context of the Marine Park Plan review and will create a new node of development in the Park.

DCLM advised that it would support the development of facilities at Mauds Landing providing it could be demonstrated that, among other things, there is likely to be minimal adverse effect on the environment, and that management of the natural resources in the area would be to best practice standard. DCLM considered that the PER did not provide adequate assurance that the proposal meets these objectives.

<u>Flora and Vegetation at Mauds Landing</u>

After considering information provided on flora and vegetation in the PER, the EPA is the view that the proponent has somewhat understated the results of the flora survey presented in Appendix 6 of the PER. The 1994 assessment of vegetation by M. Trudgen suggests that the condition of vegetation on the proposed development site is generally very good, with several areas tending towards excellent. Vegetation judged to be in poorer condition was generally considered to be so due to patchy weed infestation and/or the formation of tracks.

Trudgen considered the conservation significance of the proposed development site in the context of the two major vegetation associations – coastal dunes and the saline flats. With respect to coastal dunes, Trudgen appears to have considered that, due to the local and regional variation of the coastal dune vegetation and the small area of the dune system, the dunes at Mauds Landing were of moderate conservation significance. Trudgen also suggests that the importance of remaining areas would increase if the coastal system became fragmented.

The EPA notes that development of coastal foredunes is limited to the marina entrance channel and that no development is proposed on other foredunes in the Mauds Landing townsite.

Trudgen indicates that, from a regional perspective, the saline flats at Mauds Landing represented one of three such systems, located behind coastal dunes large enough to be represented on Beard's map between Carnarvon and North West Cape (Beard 1975). However, while Beard (1975) does show similar vegetation associated with Lake MacLeod and the Mauds Landing saline flats, Trudgen notes that there is not sufficient detail to assess a degree of similarity between vegetation at the two locations.

The proponent suggests that the proposal will impact 74 ha of a saline flat which occupies a total of approximately 800 ha at Mauds Landing. In Appendix 6 of the PER, Trudgen suggests that the impact of the proposal on the conservation value of the saline flat vegetation is not likely to be as great as an impact affecting the whole system. The PER refers to the landform analysis by Hesp (1986) which indicates that a number of saline flats occur along the west side of North West Cape. The proponent expects that typical saline flat vegetation could occur in these systems.

Although Trudgen suggests that the saline flats at Mauds Landing are one of a series of saline flats between Point Maud to Point Cloates, the EPA notes that he also considers that, given the relatively small proportion of the biogeographic region occupied by saline flats, the large size of the Mauds Landing example, the variability of vegetation on the flat and the good condition of it (except where affected by track formation), the area must be considered to have some conservation significance with regard to vegetation.

Trudgen also made particular reference to the vegetation of the hypersaline pool within the saline flat at Mauds Landing. Specifically, this feature was considered 'quite unusual' in that the system contained what appeared to be aquatic vegetation.

The hypersaline pool is not proposed to be directly impacted by the proposal. However, in view of issues raised regarding potential impacts of stormwater on this and the saline flat systems, the EPA has given attention to stormwater management in Section 4.1.9 of this report.

<u>Significant flora species at Mauds Landing</u>

In its assessment of the previous CCR proposal (EPA 1995), the EPA had concerns regarding the level of detail of the terrestrial flora and vegetation surveys and recommended that further work be undertaken to '…confirm whether 'Priority 2' flora species and other significant flora species identified on the site are represented in the vicinity of the proposed development site, to the satisfaction of the EPA with advice from CALM, prior to construction of the resort development commencing'.

By investigating the distribution of Priority 2 flora species (Appendix 13 in ATA 2000b), the proponent has partially addressed this recommendation.

CCMD suggests that *E. glabra* spp *psammophora* was relatively common within the Mauds Landing townsite and that several populations occurred in similar coastal vegetation north of the proposed CCR site (ecologia 1999, in Appendix 13 ATA 2000b). The EPA notes that this species has been recorded from the conservation estate.

The proponent notes that while populations of *A. ryaniana* were only recorded at two locations in the vicinity of the proposed development site, it has been historically recorded from Coral Bay, and from other locations to the south of the proposal, including Quobba and Cape Cuvier (Appendix 13 ATA 2000b). As previously mentioned there are no records of *A. ryaniana* from the conservation estate.

The proponent concluded that due to the distribution of the Priority 2 species on the site and elsewhere in the region, the losses of plants as a result of the proposal are unlikely to be significant in a regional context. While the proponent has not demonstrated that the species will be retained in viable populations locally, it has made a commitment to prepare a Vegetation Management Plan (commitment 28) to address management of Priority flora species impacted by the proposal and incorporate maintenance and protective measures.

The EPA considers that the survey presented in Appendix 13 of the PER only partially addresses the EPA's 1995 recommendation, as it did not address the distribution of another five other species noted in the original flora assessment (Appendix 6 in ATA 2000b) as having some particular significance (eg species at the ends of range, species with only limited records).

Services Area

The EPA notes that the vegetation on the proposed Services Area site corresponds to Beard's 'shrub steppe on sandhills' unit, and that this vegetation is widely represented locally and regionally. No information has been provided as to the comprehensiveness of the conservation estate with respect to the vegetation type.

Groundwater draw-down impacts as a result of marina construction.

With respect to concerns raised about the effects of groundwater draw-down on vegetation associated with de-watering the marina basin during construction, the proponent suggests that dewatering will cause a local depletion of the shallow groundwater. The proponent anticipates that the cone of depression will not extend beyond the area that has been designated in plans for construction of infrastructure, tourist facilities and residences. The EPA is not aware of any quantitative predictions made by the proponent in relation to the spatial extent of groundwater draw-down effect or the potential impacts on off-site vegetation communities.

In view of the information presented in Appendix 6 of the PER (ATA 2000b), which suggests that vegetation in the vicinity of the proposal is generally in very good to excellent condition (with the exception of localised areas where tracks have been formed), the EPA considers that it is important that groundwater draw-down as a result of construction of the marina does not cause impacts on terrestrial vegetation beyond the development footprint.

The proponent has not established the importance of shallow groundwater for vegetation in dunes and other areas in the vicinity of the proposal footprint. However, CCMD, as part of its commitment to prepare a Dewatering Management Plan (commitment 30), will monitor groundwater levels and implement contingency plans for any effects on vegetation beyond the proposal footprint.

In view of the limited information provided by the proponent to address the recommendation made in relation to flora and vegetation in Bulletin 796 (EPA 1995), the EPA recommends a condition (condition 8) relating to flora and vegetation be applied to the proposal to adequately address these matters.

With respect to issues raised about the use of native species in revegetation and landscaping of the site, CCMD advised that the investigation of opportunities for replanting vegetation destroyed during development of the site and the incorporation of local indigenous species where possible, were consistent with the EPA's objectives. The EPA expects that the proponent would adopt these principles in the preparation and implementation of the Landscaping Management Plan (commitment N4).

The EPA notes that the proponent has made a number of relevant commitments and undertakings, including:

- limiting clearing to building and waterway footprint;
- a Dewatering Management Plan (commitment 30);
- a Shallow Groundwater Monitoring Plan (commitment 40); and
- a Landscaping Management Plan (commitment N4).

Noting the information contained in the PER about limiting development to areas required for the proposal structures and the conservation value of the saline flats and the hypersaline pool and recommended condition 8, the EPA considers that the CCR proposal footprint is unlikely to compromise the EPA's objective for this factor.

Summary

Having particular regard to the:

- results of the proponent's flora and vegetation surveys and reviews;
- results of the proponent's flora survey of the Services Area which indicates that the vegetation on the site is widely represented locally and regionally in the Gascoyne;
- proponent's commitments; and
- proponent's survey of Priority 2 flora species,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that condition 8 requiring further work to establish the distribution of other species identified within the PER as being of some significance in the vicinity of the proposal and monitoring the condition of vegetation, is implemented satisfactorily by the proponent.

4.1.5 Terrestrial fauna

Description

The proponent discusses the issues associated with terrestrial fauna in Sections 4.2.2, 5.3.7 and Appendix 7 of the PER. Comments on vertebrate fauna by M.J. and A.R. Bamford are also provided as Appendix 9 of the PER.

A desktop review of vertebrate fauna and habitats was undertaken by ecologia Environmental Consultants for the proponent (Appendix 7 in ATA 2000b). The assessment of vertebrate fauna species potentially occurring in the proposed development site was based on the known preferred habitat and distribution records for all species determined from the literature reviews.

The fauna review by *ecologia* (Appendix 7 in ATA 2000b) indicates that the proposed development area within the Mauds Landing townsite contains four faunal habitat types. The habitat types and the areas to be impacted by the footprint of the proposal within the Mauds Landing townsite are:

- sparsely vegetated beachfront (4 ha removed);
- coastal scrub/heath (21 ha removed);
- samphire flats (88 ha removed); and
- salt lake (no direct loss).

Significant fauna which may be present within the project area, included:

- red tailed tropic bird (*Phaethon rubricauda*);
- grey falcon (*Falcon hypoleucos*);
- peregrine falcon (*Falcon peregrinus*); and
- loggerhead turtle (*Caretta caretta*).

Beaches to the west of the proposal are recognized as important roosting and loafing areas for migratory birds. The fauna review (Appendix 7 in ATA 2000b) suggests that 15 species of transequatorial migratory birds listed under the annex of the China and Australia Migratory Bird Agreement (CAMBA) potentially occur on the site. None of the bird species identified as potentially occurring on the site or in Table 4 taken from ATA (2001a) are listed under Schedule 3 of the *Wildlife Conservation Act 1950*.

The review by M.J. and A.R. Bamford (Appendix 9 in ATA 2000b) of the *ecologia* study recommends several additions to the list, including some significant species, and also questions the inclusion of some species. The Bamford review summarises potential impacts of the proposal as:

- mainly impacting scrub-heath habitat, while although it is likely to be more important than other nearby habitats, is a habitat that is well-represented in the region;
- attracting people to the region and potentially leading to more environmental degradation of fauna habitats;
- possibly creating a barrier to the movement of terrestrial fauna through the scrub-heath habitat, although the plans appear to provide for a vegetated buffer between the proposal and the claypans; and
- possibly creating new habitats which may benefit some species, but could also attract feral species.

The proponent made a commitment in Section 5.3.7 of the PER to undertake a fauna survey of the site.

Submissions

Government agencies submissions

The submission by DCLM focused on issues including:

- the original fauna survey undertaken by the proponent is inadequate for the purposes of drawing meaningful conclusions about the impact of the proposal on terrestrial fauna;
- limitations in the information provided on terrestrial fauna are confirmed by a review by A.R. Bamford which is included as Appendix 9 of the PER. This view was also expressed by the DPI;
- the PER did not give attention to potential impacts of the proposal on the important bird roosting area at Point Maud. DCLM suggested that for this issue to be managed, strategies and targets would need to be developed in consultation with DCLM to the satisfaction of the MPRA; and
- the PER did not make an assessment of the impact of stormwater runoff on terrestrial habitats and on the lake habitat.

The Western Australian Museum:

- noted that only vertebrate fauna have been considered in the PER;
- noted that there was no mention of molluscan fauna (terrestrial or aquatic) in the proposal area;
- suggest that in the absence of this information, it is impossible to assess the potential impact of the proposal on biodiversity in the area; and
- recommend that a fauna survey of the site should include an assessment of invertebrates so that an adequate evaluation of the site's fauna can be made.

Public submissions

Public submissions focused on:

- concern about the potential impacts of feral and/or domestic animals introduced as a result of the proposal;
- the view that the proposed landfill site and other elements of the proposal, including litter, will help to support existing populations of feral animals which will impact on native fauna;
- concern about the level of information collected by the proponent on fauna, in that its work only presents an expected list of fauna. Many submitters considered this to be inadequate and that it would be inappropriate to grant approval to the proposal before a survey was undertaken; and
- concern about the potential impact of the proposal footprint on migratory birds, particularly those listed under agreements between Australia and Japan and China.

Assessment

The area considered for assessment of this factor is the Mauds Landing townsite and the proposed Services Area.

The EPA's environmental objectives for this factor are:

- to maintain the abundance, species diversity and geographical distribution of terrestrial fauna;
- to protect Specially Protected (Threatened) Fauna consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- to avoid impacts on seabirds and their habitats, to meet the requirements of the *Wildlife Conservation Act 1950* and to adhere to national and international obligations.

The EPA considers that the development of the proposed CCR and supporting infrastructure has the potential to impact on terrestrial fauna.

Terrestrial fauna

The EPA notes that no field work was undertaken by CCMD as part of its assessment of terrestrial fauna and no consideration was given to invertebrate fauna at the proposed CCR and Services Area sites.

The EPA acknowledges the submission by DCLM which concludes that the proponent's terrestrial fauna data is inadequate to determine the extent of terrestrial fauna or to provide an assessment of the potential impacts from this development. DCLM's advice that 'it would be inappropriate to draw meaningful conclusions from this limited data' is also noted.

With respect to the proponent's commitment to undertake a fauna survey prior to the commencement of construction, the EPA is aware that DCLM has had previous correspondence with the proponent's consultant (Appendix 15 of the PER) which highlights the potential for delays if the survey reveals the presence of any Priority or Schedule-listed fauna.

In relation to concern regarding the level of information provided by the proponent on fauna, the EPA notes that the proponent has made a commitment to prepare and implement a Terrestrial Fauna Management Plan, including a fauna survey of the proposed development site prior to ground disturbing activities (commitment 20). The EPA expects that CCMD will give effect to its undertakings in the responses to public submissions and include invertebrate terrestrial fauna in the fauna survey.

Furthermore, the EPA expects that, the proponent will be guided by the principles outlined in the EPA's Position Statement No.2 *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2001).

The proponent has also advised that, should sensitive or specially protected fauna be identified in the area proposed for disturbance, it will seek advice from DCLM on appropriate population protection measures (commitment 20).

The assessment of stormwater issues is addressed in detail in Section 4.1.9 of this report.

The EPA considers that the proponent's commitments to initiate managed refuse collection, develop a managed landfill facility, implement feral animal control programs, control vehicle and pedestrian access and develop by-laws to prohibit domestic cats and dogs at the proposed facilities, if implemented satisfactorily, will also assist in protecting native fauna, if the proposal is allowed to proceed.

Shore birds

The EPA has been presented with information from Government agencies and conservation groups which suggests that Point Maud, including beaches to the west of the proposed development site, are used by birds as habitat. Data collected by DCLM suggests that, on some occasions, considerable numbers of common terns (*Sterna hirundo longipennis*) are observed near Point Maud. While not listed under Schedule 3 of the *Wildlife Conservation Act 1950*, this species is listed under the Japan Australia Migratory Bird Agreement and the CAMBA, as well as the Bonn Convention.

The EPA also notes that DCLM monitoring of the site suggests that the potential for disturbance by pedestrians, domestic animals and boats currently exists and that the proposal, by creating a barrier to the movement of vehicles to Point Maud may assist in managing off-road vehicle access. The EPA also notes that the Point Maud area was gazetted in 1992 as a No Vehicle Access, Bird Roosting Sanctuary under the *Control of Vehicles (Off-Road Areas) Act 1978*.

The key bird roosting/loafing habitat at Point Maud is approximately 1.7 km west of the proposed development site. The proponent has made a brief assessment of potential noise levels at this location (approximately 40 dB(A)) and considers that, while greater than background noise levels, the nature of construction noise will generally not exhibit tonal or impact components known to startle or disturb birds (ATA 2001). CCMD has also made commitments with regard to the management of noise and dust associated with construction.

In response to public submissions regarding shore birds, CCMD has made a commitment to develop a Bird Management Plan (commitment 18) to address:

- protection of key roosting areas;
- ongoing monitoring of bird populations;
- restrictions for vehicles entering the Maud Sanctuary Zone from the Townsite;
- education, interpretive literature and signage; and
- contingency and response measures.

In view of the habitat requirements (beaches) of roosting and loafing birds and the potential for impacts on beaches associated with the proposal, a recommended condition (condition 7) has been prepared regarding coastal management. This condition requires the proponent to recognise the ecological value of beaches in the vicinity of the proposal when deriving appropriate monitoring criteria and management responses.

Based on the limited information currently available about birds which use Point Maud as habitat, given the distance between Point Maud and the proposed CCR and provided management commitments and conditions are satisfactorily implemented by the proponent, it is the EPA's judgement that the risk of impacts on shore birds and their habitat from the footprint of the proposal is small.

With regard to the current level of information about shore birds, the proponent proposes to give further attention to this issue as it relates to the potential impacts of additional people pressure associated with the proposal through the implementation of a SAMMP. The issue of off-site terrestrial impacts is given attention in Section 4.4.

The matter of shore birds is being given detailed attention in the assessment under the *EBPC Act*.

Summary

Having particular regard to:

- CCMD's commitment to develop and implement a Terrestrial Fauna Management Plan on advice from DCLM; and
- CCMD's commitment to develop and implement a Bird Management Plan on advice from DCLM,

it is the EPA's judgement that the proposal footprint is unlikely to compromise the EPA's environmental objective for this factor.

4.1.6 Stygofauna

Description

A review of stygofauna by Dr Brenton Knott was presented in Appendix 16 of the PER (ATA 2000b).

No sampling work had been undertaken by the proponent at the time the PER was released for public comment.

The review in Appendix 16 of the PER (ATA 2000b) suggests that potential stygofauna habitat occurs in calcarenite strata below the proposed development site. The Bundera calcarenites underlie surface sediments of the coastal plains on both sites of the Cape Range peninsula. The Bundera formations of the North West Cape area are correlated with the Tamala Limestones in the south. There is a wealth of stygofauna associated with Tamala Limestone (Appendix 16 in ATA 2000b).

The depth of these formations below the site has not been determined.

Two subterranean shrimps (*Stygiocaris lancifera* and *Lasionectes exleyi*) recorded from Cape Range are listed under schedule 1 of the *Wildlife Conservation Act 1950*.

Submissions

Government agency submissions

At the time that the PER was released, the Chairman of the EPA requested that an assessment be carried out on the potential impacts of the proposal on stygofauna.

DCLM advised that the treatment of stygofauna in the PER was inadequate for the purposes of assessing the potential impacts of the proposal.

DPI suggested that insufficient detail was provided in the PER on stygofauna.

The WA Museum noted that:

- no data was provided in the PER; and
- in light of some information presented in the PER, the appropriateness of management commitments and integrity of predicted outcomes are questionable.

The Gascoyne Development Commission suggested that the proposed stygofauna monitoring should be ongoing in order to measure future impacts.

Public submissions

Public submissions raised issues including:

- concern regarding the proponent's limited assessment of impacts on stygofauna. This was considered by many submitters as generally unacceptable, particularly given the recognised importance of these fauna elsewhere on the North-West Cape;
- that it would not be appropriate to grant any approval to the proposal until it was established with reasonable certainty that stygofauna were not present at the site;
- the potential impact of stormwater runoff on stygofauna and the lack of specific conditions relating to stormwater management to protect stygofauna; and
- that any stygofauna monitoring should be ongoing.

Assessment

The area considered for assessment of this factor is the Mauds Landing townsite and the proposed Services Area.

The EPA's environmental objectives for this factor are:

- to maintain the abundance, species diversity and geographical distribution of subterranean fauna;
- to protect Specially Protected (Threatened) Fauna consistent with the provisions of the *Wildlife Conservation Act 1950*; and
- improve our understanding of subterranean fauna through appropriate research, including sampling, identification and documentation.

The Cape Range area contains a great diversity of subterranean aquatic animals (stygofauna) and elements of the stygofauna are endemic to the Cape Range peninsula (EPA 1999). The EPA (1997) noted that there is evidence to suggest that the linkage between the eastern and western coastal plains of the Cape Range peninsula is likely to be limited (EPA 1997).

Stygofauna are important because of their species richness, evolutionary history and adaptations, endemicity and the evidence they can provide for continental drift (EPA 1999). Hence they are significant in terms of Australian biodiversity.

The EPA notes that submissions on this factor reflect uncertainties due to a limited understanding of subterranean fauna in this area and generally throughout the State. The EPA has previously commented on the lack of baseline information on the distribution of stygofauna and the almost complete lack of monitoring data on the response of subterranean ecosystems to changes brought about by development proposals (EPA 2001). Until this situation changes, the EPA must adopt a risk-based approach that considers information presented at project level and predicted impacts based on reasonable assumptions about how subterranean ecosystems function.

The proposal could impact on stygofauna by impacting water quality and hydrology of the shallow unconfined aquifer below the site.

In response to concerns expressed regarding the adequacy of information provided on subterranean fauna in the PER, the proponent undertook a survey of subterranean fauna at the proposed development sites (i.e. CCR site and Services Area). The assessment undertaken by the proponent is presented in full as Appendix 1 of Volume II of the proponent's responses to public submissions (Appendix 1 in ATA 2001b).

The proponent's survey found that no stygofauna species were present in samples collected from bores drilled at the proposed Services Area and CCR site. Due to concerns about the shallow depth of bores drilled by CCMD, the EPA sought the advice of Dr W. Humphreys of the WA Museum, as to the adequacy of CCMD's assessment.

In general, Dr Humphreys considered that the proponent's document provided an inadequate risk assessment and contained only limited sampling. Dr Humphreys also noted that two species (*Lasionectes exleyi* and *Milyeringa veritas*) listed under the *EPBC Act*, are known from the Cape Range peninsula but this was not mentioned in the survey document.

The EPA notes that limestone strata immediately below the site have the potential to support stygofauna (Appendix 16 in ATA 2000b). The EPA considers that the proponent's sampling bores are unlikely to have been deep enough to account for potential stygofauna habitat in Bundera calcarenites and Tulki limestones which underlie surface sediments on the coastal plain on both sides of Cape Range.

While habitat suitable for stygofauna is likely to exist below the site, the EPA notes that geological strata below the site are in hydraulic continuity (Appendix 16 in ATA 2000b) and therefore there is no evidence for local barriers likely to restrict the distribution of stygofauna to this area.

The potential threats to stygofauna from this proposal are considered to be primarily related to changes in water quality in the shallow unconfined aquifer, and possibly dewatering during excavation of the marina basin. Impacts on groundwater quality could potentially occur as a result of the marina (which will be hydraulically connected to the aquifer), stormwater runoff, leaching of contaminants from the

wastewater treatment plant and landfill facility or as a result of spills during construction and operational phases. The proponent proposes to monitor groundwater quality as part of a commitment to prepare and implement a Shallow Groundwater Management Plan (commitment 40).

Based on the information currently available on the likely habitats and potential impacts on these habitats, the EPA considers that the risk of stygofauna species extinction as a result of the proposal is small. The risk of impacts on stygofauna is small primarily because:

- the proposal is unlikely to result in a persistent depletion of supply of shallow groundwater as the shallow aquifer is hydraulically connected to the sea;
- the excavation of the marina to a maximum of –5mAHD is unlikely to impact on large areas of Bundera calcarenites; and
- the proponent proposes to monitor the quality of groundwater in the vicinity of the proposal as part of a Shallow Groundwater Management Plan (commitment 40).

Notwithstanding, due to limited previous studies on stygofauna in the area and the possible presence of stygofauna habitat below the site (Appendix 16 in ATA 2000b), the EPA considers that the proponent should produce a Subterranean Fauna Management Plan (condition 9) for the project area to collect additional information that will add to the basic knowledge of stygofauna in this area in limestone strata immediately below surface sediments at the site.

Summary

Having particular regard to:

- results of work to date;
- limited predicted impacts of the proposal footprint on stygofauna habitats; and
- the proponent's commitment to prepare and implement a Shallow Groundwater Management Plan (commitments 40 and 41),

while additional information is necessary to address information deficiencies regarding stygofauna in the area (condition 9), it is the EPA's judgement that stygofauna is unlikely to be a major issue.

4.1.7 Marina water and sediment quality

Description

The proposal envisages an inland marina with a surface area of approximately 47 ha and with depths ranging between approximately 1.5 m and 5 m. The marina is proposed to be connected to Bateman Bay via a 5 m deep entrance channel which will dissect foredunes and beach adjacent to the site. In a southern embayment of the marina, CCMD proposes an artificial reef, upon which corals will be propagated.

The proponent's assessment of water quality within the marina is presented in Section 5.3.12 of the PER (ATA 2000a). The hydrodynamic modelling and water quality predictions by M.P. Rogers and Associates is presented in full in Appendix 8 (ATA 2000b).

The hydrodynamic modelling (Appendix 8 in ATA 2000b) suggests that water flushing times in the marina vary considerably, with the flushing characteristics improving closer to the marina entrance channel. The proposed marina has a water flushing time of approximately 17 days at the northern end, 14 days at the centre of the main canal and less than two days near the entrance channel. Worst case flushing of the northern lagoon of the marina was predicted to take up to 19 days. The proponent suggests in the PER that tides and wind-driven currents are the key vectors which will force the flushing of marina water.

The source waters for the marina from Bateman Bay are clear and near pristine in terms of nutrients and other contaminants. Some nutrient and contaminant influx from developed land area may enter the marina during and following extreme rain events (eg tropical cyclones).

The proponent has made a number of assumptions about factors which could influence the quality of water entering the marina from the built environment, including application rates of nutrients, the behaviour of nutrients in soils at the site (eg leaching rates), volumes of run-off generated by an extreme rainfall event (eg a tropical cyclone) and the fate of nutrients in excess run-off, to calculate 'worst case' nutrient inputs to the marina. This work is presented in full in Appendix B, Appendix 8 of the PER.

The proponent has calculated that approximately 60 kg of dissolved inorganic nitrogen and 7 kg of phosphorus could enter the marina as a result of extreme (140 mm over 1 day for summer and over 3 days for winter cases respectively) rainfall events.

The proponent predicted that maximum dissolved inorganic nitrogen and phosphorus concentrations in the marina would be in the order of 25 µg/L and 7µg/L respectively.

As part of the marina, substrata will be provided for artificial snorkelling and diving reefs. It is proposed that corals and other biota associated with reefs will become established on the substratum provided. The success of this element of the proposal will be closely linked with maintenance of water quality.

The proponent has made a number of other commitments broadly related to the management of marina water quality, including:

- prepare and implement an environmental management system for the Coral Coast Resort that will comply with ISO 14001;
- design stormwater management systems, to the satisfaction of Department of Environmental Protection on advice from Department of Planning and Infrastructure and the Shire of Carnarvon to, as far as practicable, direct stormwater inland away from both the Coral Coast Resort and marina;.
- develop and implement an Emergency Response Plan to address matters including, but not limited to cyclone and flood warning and response, fuel spillage, fire and explosions, collision between vessels, sewage and chemical spills, failure of containment at the WWTP and loss of containment at bulk hydrocarbon storage facilities (including boat bunkering);
- develop and implement a Nutrient and Irrigation Management Plan;
- provide a boat sewage pump-out facility;

- prior to the placement of breakwater materials the proponent will develop and implement a Marina Water Quality and Sediment Management Plan that will include, but not be limited to, procedures for a Water Quality and Sediment Monitoring Program to allow comparison between the results from within the marina and those predicted in the nutrient modelling, appropriate adjustments to be made on an annual basis, and identification of specified procedures to be put in place to control, identify and manage marina water quality and sediment impacts;
- develop and implement a Marine Pests Management Plan; and
- exclude vessels with tributyltin treated hulls from mooring within the marina.

M.P Rogers and Associates (Appendix 8 of the PER) made reference to the design and management of the marina to meet the following recreation and aesthetic objectives:

- direct contact recreation (eg swimming);
- boating;
- adjacent residential development; and
- passive recreation (eg enjoying the scenery).

In summary, the proponent proposes that marina waterway water quality management strategies will be linked to:

- the control of construction impacts (eg. de-watering, dredge management);
- the provision of services at an inland location (WWTP and landfill);
- the management of nutrient inputs to private gardens and public open spaces; and
- the direction of potentially contaminated stormwater inland and away from the marina/ocean.

Submissions

Government agency submissions

Concern was expressed by a variety of Government agencies on this issue. DCLM, DEP, DPI, the WA Museum and the Shire of Carnarvon raised issues in regard to the proponent's assessment of water quality in the marina.

Government agency submissions focused on:

- concern about the worst case flushing time of 17 to 19 days in the upper reaches of the marina and contingencies for managing algal blooms;
- further consideration should be given to the influence of density gradients on marina flushing;
- the effects of differential heating and vertical temperature structure on marina flushing;
- the ecological consequences of limited flushing of the marina (eg potential for algal blooms, deoxygenation of the water column and potential release of nutrients from sediments);
- the effect of marina water on the Ningaloo Marine Park and the definition of acceptable zones of influence;
- the influence of marina water temperature on the ability to grow and sustain corals within the marina; and
- the proponent's ability to manage nutrient inflow to the marina which will be fundamental to maintaining water quality generally.

The DEP advised that the management of the marina should be consistent with the National Water Quality Management Strategy (ANZECC and ARMCANZ 2000) and the EPA's position on marine water quality management (EPA 2000). The DEP considered that the marine waters in the marina be managed to achieve no less than a moderate level of ecosystem protection (i.e. small – moderate changes in ecosystem processes, biodiversity, abundance and biomass of marine life and levels of contaminants in water and sediment beyond limits of natural variation may occur but not exceed agreed criteria).

Public submissions

Public submissions raised issues in several key areas relating to water quality, including:

- the scope of the proponent's assessment of water quality within the proposed marina (consideration of temperature, biogeochemical cycling, sediment colour, and ecological processes including phytoplankton blooms);
- limited confidence in the proponent's predicted nutrient inputs;
- concern about pollution related to boating (sewerage/nutrients, spills and engine exhaust);
- concern about contamination of the marina with material transported via stormwater (fertilisers/nutrients, hydrocarbons and metals);
- concern that irrigation with nitrogen-rich Birdrong groundwater may impact on water quality;
- concern about the flushing characteristics of marina design and the effects on water quality;
- concern that water quality could not be maintained at a level which would support the growth of corals as proposed;
- the ability of the proponent to manage the marina to ensure that the ecological and social values of water quality are protected both within the proposed marina and within the adjacent waters of the Ningaloo Marine Park, particularly considering the proposed uses of the marina and the long residency times;
- monitoring and management of marine pest incursions; and
- the ability of the proponent to implement the undertaking made in the PER to prohibit vessels from the marina which utilise tributyltin antifouling paints.

Assessment

The area considered for assessment of this factor is the proposed inland marina and the waters of Bateman Bay, within the Ningaloo Marine Park.

The EPA's environmental objective for this factor is to maintain or improve marine water quality to protect environmental values, in accordance with Environmental Quality Objectives (EQO's) defined in the EPA document *Perth's Coastal Waters: Environmental Values and Objectives* (EPA 2000) and water quality guidelines provided in the *Australian and New Zealand Water Quality Guidelines* (ANZECC 2000).

Since the release of the PER, in order to address issues raised regarding the risks of impacts associated with marine pests, CCMD has made a commitment to develop and implement a program for the monitoring for and management of introduced marine pests with CSIRO Centre for Research into Marine Pests as part of the proposed

SAMMP (commitment 9). The EPA is of the view that this program should include rigorous baseline and ongoing surveys for marine pest species in the proposed marina and the adjacent waters of the Ningaloo Marine Park.

The EPA notes concerns raised regarding management of boating activities within the marina. The pollution to waterways and the State's navigable waters from boats is regulated through the *Environmental Protection Act* and the *Navigable Waters Regulations*. The EPA notes that DPI Maritime Division suggests that it would be unlikely to delegate the *Navigable Waters Regulations* to the marina manager as suggested by CCMD. Accordingly, there may be a requirement for some DPI presence to assist in the management of the marina in the long-term. This matter is given further attention in Section 4.5.

In response to public submissions regarding the assessment of water quality in the marina, the proponent generally considered that its assessment was adequate to ensure that its objectives for the marina are met. The EPA notes CCMD's undertakings in the PER to protect the social values associated with water quality in the marina.

In terms of marina water quality, social values and some level of ecosystem function are protected in other marinas and waterways which are heavily utilized by boats and have potential for inputs of nutrients from the built environment (eg Hillarys Marina and Exmouth Boat Harbour). The predicted 'worst case' nutrient concentrations in the marina are within the range of ambient nutrient concentrations measured in marine waters of Warnbro Sound and Comet Bay, south of Perth (DEP 1996b).

While these facilities are likely to have better flushing characteristics than the proposed CCR marina, the EPA is of the view that given the near-pristine quality of source waters for the marina (primarily Bateman Bay waters), the eventual quality of marina water will be strongly influenced by the amount of nutrients and other potential contaminants entering the system from the built environment and the superficial aquifer. The EPA recognises that the marina, like most similar water bodies, will be a sink for fine organic sediment, which can accumulate elevated concentrations of contaminants and nutrients.

Given that the proposed wastewater treatment plant will be lined and situated several kilometres from the coast, the greatest potential threats to water quality in the marina are posed by nutrients from landscaped areas, contaminants and pathogens from roads/other paved areas, sewage discharge from boats and inappropriate fuelling practices.

To address these matters, the EPA notes that the proponent made commitments in the PER and responses to submissions to manage nutrients on landscaped areas, boat fuelling, sullage discharge and stormwater as part of the project design and during operation of the proposed CCR. The various education programs proposed, including a proposed Environmental Code of Conduct, prepared as elements of the respective Environmental Management Systems for construction and operations (commitments 1 and 3), if implemented adequately, will also assist in minimising threats to water quality from these vectors.

With particular regard to concerns about nutrient management, work undertaken by the W.A. Chemistry Centre as part of the original CCR assessment (Jeffery 1994) suggests that where suitable grasses were irrigated with Birdrong groundwater in Coral Bay, no additional nutrient application is required for growth. This work also showed that most nitrogen is assimilated by grasses in Coral Bay, with little nitrogen leaching into underlying soils. On the advice of the Water and Rivers Commission (WRC), in its responses to submissions, CCMD made a commitment to manage grassed areas in accord with the WRC document *Environmental Guidelines for the Establishment and Maintenance of Turf and Grassed Areas* (WRC 2001). The EPA expects that the proponent's commitment to prepare and implement a Nutrient and Irrigation Management Plan (commitment 38) will incorporate the principles contained in WRC (2001) and will consider the factors noted above.

In response to advice provided on the EPA's position on water quality management, in addition to protecting social values associated with marina water quality, CCMD made a commitment to manage the marina to achieve an 'E3' or moderate level of ecosystem protection. This level of protection to ecosystem integrity allows for moderate changes from natural variation in key elements of ecosystem integrity including, ecosystem processes, biodiversity, abundance and biomass of marine life and the quality of water, biota and sediments (EPA 2000).

It is the EPA's preference that marina water quality is managed within the context of an integrated framework which incorporates the management of both marina and adjacent marine waters. Accordingly, it is proposed that the proponent prepare and implement a detailed Water and Sediment Quality Management Plan for operations (condition 10-5) prior to the commencement of construction of the marina. In the context of the marina, this program will require that the water and sediment quality achieves the following Environmental Quality Objectives as defined in the EPA document Perth's Coastal Waters: Environmental Values and Objectives (EPA 2000):

- Maintenance of ecosystem integrity such that a 'moderate level' (E3) of protection is met within the marina (maintenance of the structure and function of marine ecosystems – an ecological value);
- Maintenance of aquatic life for human consumption (seafood safe to eat – a social value);
- Maintenance of primary contact recreation values (water safe for swimming – a social value);
- Maintenance of secondary contact recreation values (water safe for boating – a social value); and
- Maintenance of aesthetic values (water pleasant to be near or look at – a social value).

In addition, the EPA recommends that the proponent meet an objective to maintain ecosystem integrity such that corals and other benthic organisms are able to become established and survive on the constructed reef systems proposed within the marina.

In meeting these objectives, it will be necessary for the proponent to:

- identify ecosystem health and social value indicators based on the threats to environmental quality within the marina and cause-effect pathways;

- establish site-specific 'guideline' and 'standard' water and sediment quality criteria for the indicators based on pre-development water and sediment quality data collected from reference sites;
- develop and implement a monitoring program for the marina to determine whether criteria are being met; and
- develop and implement adaptive management strategies to ensure that the Environmental Quality Objectives are achieved and maintained in the event that agreed guidelines and standards are not met.

Should monitoring of marina/marine water and sediment quality indicate that contaminants from the proposal cause environmental quality standard criteria for marina and/or marine to be exceeded, the proponent will need to implement a management response which could include measures such as nutrient stripping for water used for irrigation and/or refinements to stormwater management systems.

The long-term management of the marina is discussed in Section 4.5 of this report.

Summary

Having particular regard to:

- the assessment of marina water quality made in Appendix 8 of the PER;
- CCMD's identification of social EQO's and agreement on a moderate level of protection in the marina;
- CCMD's commitment to develop and implement an Emergency Response Plan (commitment N1);
- CCMD's commitment to develop and implement a Nutrient and Irrigation Management Plan (commitment 38);
- CCMD's commitment to develop and implement a Marine Pests Management Plan in consultation with CSIRO (an element of commitment 9);
- to the provision of a sewage pump-out facility connected to an appropriate lined, inland wastewater treatment plant;
- CCMD's commitment to employ a Waterways Manager to manage activities outside the scope of the *Navigable Waters Regulations* within its area of management; and
- proposed stormwater management to direct water away from the marina,

it is the EPA's opinion that the proposal could be managed to meet the EPA's environmental objective for this factor provided that recommended condition 10 is implemented and there is satisfactory management of nutrient flux to the marina from the landscaped and built environments via the Nutrient and Irrigation Management Plan (commitment 38) and Site Drainage and Stormwater Management Plan (condition 11) during operations.

4.1.8 Marine water and sediment quality

Description

Potential impacts of the proposal on marine water quality are discussed in Section 5.3.11 of the PER (ATA 2000a). Appendix 10 (in ATA 2000b) provides the results of a water and sediment quality survey of waters within the Ningaloo Marine Park in the vicinity of the proposal. With the exception of localised areas near Coral Bay (DEP 1995), marine waters and sediments in the vicinity of the proposal are near-pristine, with very low levels of nutrients, metals and other contaminants such as hydrocarbons.

Construction and operation phases of the proposal have the potential to impact on water and sediment quality in the Marine Park.

The proponent proposes to excavate a marina basin using 'dry' techniques. This will require dewatering of the basin during construction. No direct discharge of recovered groundwater to the marine environment is proposed to occur. Dredging will be required to develop the marina entrance. A suction cutter dredge will be used to excavate the channel to 5 m below AHD, with dredged material being deposited on the development area. Construction of the breakwaters is proposed to occur over approximately 8 months with silt screens and bunds used to reduce suspended sediments in return waters from dredging and dewatering activities.

The proponent expects that during the period of Stage 1 construction (approximately two years) and for a period of up to five years following the completion of the marina water body, revetments and breakwaters, the proposal will cause a deterioration of water quality (primarily turbidity) over an area of approximately 9 km^2 in the Ningaloo Marine Park. Potential impacts on water quality are primarily anticipated to be associated with dredging the marina entrance channel and opening the marina basin to Bateman Bay. An indicative 9 km^2 Development Impact Area (DIA) has been proposed in the proponent's draft SAMMP and covers waters in Bateman Bay, including a portion of the Mauds Sanctuary Zone.

After the initial phase of operations when water quality impacts are expected (up to 5 years), CCMD suggests that Maintenance of Biodiversity and Maintenance of Ecosystem Integrity (Class 1 – Conservation Zone) (DEP 1996) would be achieved for the waters of Bateman Bay beyond a proposed mixing zone at the entrance of the marina channel. The nutrient modelling undertaken for the proponent by M.P. Rogers and Associates indicates that under 'worst case' conditions, water quality in Bateman Bay waters adjacent to the marina entrance may be influenced by water flushed from the marina (eg Figure 5.6, Appendix 10 of the PER). The proponent predicts that the initial mixing zone, where elevated nutrient levels would be attenuated, would be in the order of 50 m to 70 m from the marina entrance.

CCMD propose to monitor water and sediment within the DIA as an element of the draft SAMMP.

In addition to water and sediment monitoring in the DIA, the proponent proposes that, as part of the SAMMP, it will develop and implement a marine water and sediment quality monitoring component for an indicative 111 km^2 area it has named the Mauds

Specific Management Area (MSMA). The PER suggests that the monitoring component of the SAMMP is proposed to focus on nutrient, metals, microbial contamination and tributyltin in seawater.

In the PER (Section 5.3.11 in ATA 2000a) CCMD suggested that water quality monitoring programs will be undertaken for a period of at least five years following completion of Stage 1, followed by a review.

In summary, the proponent proposes that nearshore water and sediment quality management strategies will be linked to the:

- control of construction impacts (eg. de-watering, dredge management);
- provision of services at an inland location (WWTP and landfill);
- management of nutrient inputs to private gardens and public open spaces; and
- direction of potentially contaminated stormwater inland and away from the marina/ocean.

Submissions

Government agency submissions

DCLM advised that:

- the management of nutrient loads is critical to maintaining the quality of water in the marina and in the Ningaloo Marine Park; and
- acceptable zones of influence and water quality parameters for marina flushing within the Ningaloo Marine Park will need to be negotiated with the Marine Parks and Reserves Authority.

The DEP advised the proponent that its proposed management should be consistent with the *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000) and the EPA's position regarding the management of marine water quality (EPA 2000). The DEP considers that the marine waters in the Ningaloo Marine Park should be managed to achieve a total level of ecosystem protection (i.e. there are not detectable changes in ecosystem processes, biodiversity, abundance and biomass of marine life and levels of contaminants in water and sediment). In order to meet this objective, a total level of ecosystem protection should be met at the boundary of any impacted area within the Marine Park.

Public submissions

Public submission raised issues including:

- it is considered unacceptable that construction of the proposal will result in water quality impacts over a 9 km^2 area for a period of up to five years;
- concern that water quality impacts during construction, particularly those caused by turbidity plumes, are likely to impact on corals, seagrasses and other marine wildlife;
- concerns that the proposal will result in an increased flux of nutrients and contaminants into the Marine Park. The potential impacts of this on water quality in the Marine Park are considered unacceptable.
- concerns that the provision of improved boating facilities in the Marine Park may encourage more international vessels, particularly cruising yachts, to visit the Ningaloo Marine Park which pose risks to the Marine Park in terms of marine pest incursions; and

- concern about the limited consideration given to the potential for acid sulphate soils to be exposed as a result of construction, particularly given that the proposal is located on a Holocene mangrove system.

Assessment

The area considered for assessment of this factor is Bateman Bay and nearby waters, within the Ningaloo Marine Park.

The EPA's environmental objective for this factor is to maintain or improve marine water quality to protect environmental values, in accordance with Environmental Quality Objectives (EQO's) defined in the EPA document *Perth's Coastal Waters: Environmental Values and Objectives* (EPA 2000) and water quality guidelines provided in the *Australian and New Zealand Water Quality Guidelines* (ANZECC 2000).

The EPA has considered the factor of marine water and sediment quality in the context of construction and early operation, and on-going operation of the proposal.

Construction and early stages of operation

The EPA is concerned about the anticipated scale and the potential persistence of water quality impacts associated with construction of the marina entrance channel and breakwaters, and the flooding of the marina basin. Depending on the degree to which the proposal causes changes in the level of suspended material in the water column, a deterioration in water clarity over an area of approximately 9 km^2 (DIA) for up to five years after the completion of the Stage 1 CCR proposal has the potential to impact on important ecological and social values of Bateman Bay. Of particular concern, is that the proponent's indicative DIA extends to areas of the Mauds Sanctuary Zone (MSZ), which should be afforded the highest level of protection from the effects of the proposal.

The EPA notes CCMD's operational objective, as set out in its responses to submissions, to be:

'Within the five years following the structural completion of the Coral Coast Marina Development, the marine flora and fauna, their support habitats and water quality within the Development Impact Area and MSMA adjacent to the development will be in the same or better condition than in the year of initial implementation' (ATA 2001a).

The 'dry' excavation method is likely to minimise the potential water quality and subsequent habitat impacts. The proponent has advised that dewatering waters will be discharged to stilling basins constructed in the area of the entrance channel and quality of return waters will be managed using silt screens.

'Wet' dredging is proposed to be limited to construction of the marina entrance channel and will be undertaken using a suction cutter dredge with dredged material being deposited on the CCR site to be used as fill (Appendix S in ATA 2001b).

In its responses to submissions, the proponent suggested that it did not consider areas of seagrass and macroaglae in the northern section of the proposed DIA to be regionally or locally significant.

With respect to concern about water quality impacts on significant habitats in the MSZ section of the DIA, the proponent suggests that, because the longshore drift is northward, 'Bills Bay will not be impacted by water quality change' (Response to 3.2.2.26 in ATA 2001a). CCMD suggests that Bills Bay is included in the DIA to provide a regional measure of environmental quality.

Notwithstanding CCMD's operational objectives, proposed construction methods and the CCMD's views on the significance of habitats, the proponent has provided little in the way of substantiated information on likely type and intensity of water quality impacts associated with construction and early operation and importantly, whether the potential deterioration in water quality may impact on key structural habitats in the proposed DIA. Persistent turbidity plumes have the potential to significantly impact ecological function of marine habitats, particularly by reducing light reaching the sea floor. The EPA notes that drilling on the CCR site undertaken as part of the stygofauna assessment indicates that the surface soil layers in some areas of the site consist of silty sands with fine to very fine grain size. This will have implications for the management of return waters to ensure that dispersion of fines is minimised.

Also, it is noted that the indicative DIA does not appear to have been delineated on the basis of quantitative assessments of likely spatial scale of water quality impacts.

The EPA does not consider that the proponent has clearly demonstrated that the construction and early operation of the proposal will not cause impacts that compromise the EPA's objective for water quality. The EPA considers that a key objective of the proposal must be that it causes no detectable changes in the ecosystem health of the MSZ.

If the proposal is allowed to proceed, the EPA considers that it is appropriate for the proponent to undertake modelling of potential turbidity and other water quality impacts associated with construction, prior to the commencement of any ground disturbing activities. The objective of this work will be to more clearly delineate the area required to attenuate water quality changes associated with construction and early operation of the proposal, and, in particular, to demonstrate that management can be implemented to ensure that there will be no detectable change in the ecosystem health (particularly the function and processes associated with structural habitats) of the MSZ. The EPA expects that the proponent should have management responsibility within the DIA in relation to matters associated with the proposal footprint. This does not imply control of the area nor its removal from the Park. Therefore the DIA should be as small as possible and be determined by the modelling required by condition 10-1 in liaison with DCLM and the MPRA.

The EPA considers that water quality impacts associated with construction activities (particularly dewatering, dredging and breakwater construction) will require rigorous monitoring and management to protect the values of marine waters in Bateman Bay, particularly benthic biota such as seagrass, corals and other marine fauna such as manta rays, which aggregate adjacent to the proposed site and which may be sensitive to deteriorations in marine water quality.

Accordingly, and to address the special monitoring and management requirements associated with construction of the proposal, the EPA recommends that the proponent implement a Marine Water and Sediment Quality Management Plan for the construction phase consistent with condition 10-2.

The EPA considers that the objective for the construction and early operation period must be that water quality outside an agreed DIA is managed consistent with its position on water quality management as articulated in *Perth's Coastal Water's Environmental Values and Objectives* (EPA 2000). In that document, the EPA states that the objective for ecosystem integrity in a marine reserve is to achieve a total (E1) level of protection where there is no detectable change from natural variation in key elements of ecosystem health including:

- types and rates of ecosystem processes;
- biodiversity;
- abundance and biomass of marine life; and
- levels of contaminants in biota, water and sediments.

With respect to the potential for the construction activities to expose acid sulphate soils, the proponent has advised that investigations on the site, while not specifically directed at assessing the acid-sulphate potential, have indicated that the potential for acid-producing soils at the development site is low because:

- drilling at the marina site did not intersect any organic rich muds;
- the marina area is underlain mostly by fine to medium grained carbonate sand and overlain by minor amounts of lacustrine sediments; and
- testing of the sands up to 2m depth by Jeffrey (1994) in the marina area revealed that the sand is between approximately 69% and 86% calcium carbonate.

In view of the above, it is the EPA's judgement that the risk of problems developing with acid sulphate soils at the marina site is small.

Ongoing operations

The EPA notes that the proponent has advised that it will manage its proposal such that marine waters of Bateman Bay achieve a total (E1) level of protection within five years of the completion of the construction period, with the exception of a zone of influence where the effect of the marina will be attenuated. As noted above, the narrative of 'E1' level of protection is to achieve no detectable change from natural variation in key elements of ecosystem integrity.

The EPA also notes that the proponent will need to seek the concurrence of the MPRA with respect to a zone of influence in the Marine Park. The proponent suggests that this area is likely to be in the order of 50 to 70 m, however, the concurrence of the MPRA has not been sought at this time. It is the EPA's view that the effect of the marina should be attenuated within any lease or similar provided in the Marine Park for the development of the breakwaters. In this way, the demarcation of prime management responsibilities can be made clear.

On the basis of modelling undertaken by the proponent and experience with Hillarys Boat Harbour, which is located adjacent to the Marmion Marine Park, it is the EPA's judgement that, following the initial period of operation when the marina basin settles, the proposal is unlikely to compromise the EPA's objective for water quality in the Marine Park.

In addition to requirements relating to the marina water and sediment quality, condition 10 also will require CCMD, after the initial construction and settling period, to monitor and confirm the adequacy of waters in the MSMA for the designated environmental Quality Objectives (EQO). The EQOs that are considered relevant to Bateman Bay and the MSMA generally include:

- Maintenance of ecosystem health – E1 – 'total' level of protection;
- Maintenance of aquatic life for human consumption;
- Maintenance of primary contact recreation values;
- Maintenance of secondary contact recreation values; and
- Maintenance of aesthetic values.

The EPA considers that the Water and Sediment Quality Management Plan for operations required in condition 10-5, which addresses protection of the ecological and social values associated with marine waters, should aim to integrate marina and marine water quality management.

Through the development of the Water and Sediment Quality Management Plan for operations required in condition 10-5, the proponent will need to identify the site-specific ecological values which require protection. This must be undertaken in consultation with DCLM and the MPRA, and with the agreement of the EPA.

After the relevant environmental values, requiring protection from the water quality impacts associated with the proposal, have been agreed and set, it will be necessary for the proponent to:

- identify ecosystem health and social value indicators based on the threats to environmental quality within the marina and cause-effect pathways;
- establish, using baseline water data, site-specific 'guideline' and 'standard' water and sediment quality criteria for the indicators which have spatial and persistence elements;
- develop and implement a monitoring program for the marine waters of the DIA to determine whether criteria are being met; and
- develop and implement adaptive management strategies to ensure that the EQOs are achieved and maintained in the event that agreed guideline and standards are not met.

Summary

Having particular regard to:

- CCMD's commitment to prepare and implement a Construction Environmental Management program to address matters including Dredging, Dewatering and Breakwater Construction;
- CCMD's commitment to construct the marina primarily using 'dry' (excavation) construction methods, stilling basins and silt curtains;

- the limited requirement for dredging during construction;
- CCMD's commitment to develop and implement an Emergency Response Plan;
- CCMD's commitment to develop and implement a Nutrient and Irrigation Management Plan;
- CCMD's commitment to develop and implement a monitoring and response program for marine pests in consultation with CSIRO;
- CCMD's agreement on an E1 level of protection for Bateman Bay waters following construction and on-going operation of the marina;
- CCMD's commitment to provide a sewage pump out facility connected to an appropriate lined, inland wastewater treatment plant; and
- the direction of potentially contaminated stormwater inland and away from the marina,

it is the EPA's opinion that the proposal could be managed to meet the EPA's environmental objective for this factor, provided that recommended condition 10 is implemented and there is satisfactory management of nutrient flux to the marine environment via the Nutrient and Irrigation Management Plan (commitment 38) and the Site Drainage and Stormwater Management Plan (condition 11) during construction and operation of the CCR.

4.1.9 Surface water - stormwater management

Description

Development of a built environment at the Mauds Landing townsite has the potential to change the natural drainage of stormwater runoff at the site. Currently, stormwater is either infiltrated immediately or is transported by overland flow to low lying areas where it evaporates.

Mauds Landing townsite

Urban stormwater is proposed to be directed away from the marina waterbody, except during extreme storm events (tropical cyclones) when run-off may enter the marina. It is proposed that stormwater run-off be directed to saline flats west of the proposal where it will be allowed to evaporate.

The Mauds Landing site is susceptible to tropical cyclones that can deposit significant rainfall on the area during the summer months.

CCMD propose that silt and gross pollutant traps will be installed on all discharge points and basins.

Services Area

All uncontaminated stormwater from the proposed services area is proposed to be discharged to infiltration basins. All drainage from servicing areas that may be contaminated (workshops, WWTP, etc) is proposed to be directed to appropriate grease and oil traps (if necessary) and then either to an appropriate treatment system or lined evaporation basins.

Submissions

Government agency submissions

Key issues raised by DPI and DCLM included:

- that the PER did not adequately address the issue of stormwater management, particularly discharge of potentially contaminated stormwater to low lying areas inland of the proposal; and
- that there has not been an assessment of the potential impacts of additional stormwater runoff on terrestrial habitats as a result of run-off from the built environment.

DCLM noted that the proponent should investigate opportunities for stormwater reuse.

DPI suggested that:

- the stormwater catchments should be defined and modelled;
- overflow into the marine environment should be of a known quality; and
- it is preferable that water sensitive urban design principles are used to ensure that gross pollutants are not introduced into any overflows to the marine environment.

The DEP requested that the proponent provide additional information on stormwater quality and management.

Public submissions

Public submissions suggested that the proponent should investigate and assess the viability of stormwater treatment prior to its discharge to the environment.

Assessment

The area considered for assessment of this factor is the Mauds Landing townsite and adjacent saline flats ecosystem and the proposed Services Area.

The EPA's environmental objective for this factor is to maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance, are protected, consistent with the National Water Quality Management Strategy (ANZECC/ARMCANZ 2000).

The EPA notes that land uses associated with the proposal (eg roads, parking areas, gardens and landscaped areas, light industrial facilities and service utilities) have the potential to contaminate stormwater. Inappropriate management of stormwater would have implications for water quality in the marina and the nearshore environment as well as on the saline flat environment adjacent to the proposal. Erosion of sensitive areas is also possible.

In terms of the issues raised regarding the modelling of stormwater catchments and stormwater quality, the EPA notes that the proponent has advised that the various catchments for stormwater have been defined and appropriate stormwater discharges have been calculated using different runoff characteristics for the different types of catchment. The proponent's assessment of water quality also took into account the quality of stormwater which may enter the marine environment during extreme storm events.

The EPA notes the proponent's commitments to stormwater design principles, which include areas to remove gross pollutants prior to overflowing into the waterways.

With regard to issues raised about the discharge of stormwater to the saline flats, the proponent considers that deleterious impacts on the saline flat flora and fauna will not occur as stormwater volumes will not increase as a result of the proposal and pollution control measures will be instigated for the life of the project.

The EPA notes the information provided by the proponent which indicates that in the natural state, during and after periods of heavy rain, little direct infiltration to dune soils occurs. Under these circumstances, infiltration may not account for total rainfall, with excess run-off being directed to low areas of the saline flat and hypersaline pool.

The EPA notes that CCMD's consideration of stormwater has focused on significant storm events such as tropical cyclones. However, few details have been provided as to how stormwater from more typical rainfall events with more frequent return periods will be managed.

It is the EPA's experience that urban stormwater is an issue that can be managed using best management practices and the principals of water-sensitive urban design.

Accordingly, and in light of the environment at the site, issues raised in submissions and the limited detail provided regarding stormwater management, the EPA recommends that a best practice Site Drainage and Stormwater Management Plan (condition 11) be prepared, on advice from the WRC, the DPI and DCLM to guide consistent management of stormwater across the entire proposal. This requirement complements the proponent's commitments made in the PER and responses to submissions in relation to stormwater treatment at the proposed CCR (silt and gross pollutant traps) and Services Area sites (oil and grease traps/separators), a Shallow Groundwater Management Plan (commitment 40) and Nutrient and Irrigation Management Plan (commitment 38) as well as management of marine water quality.

In summary, the objectives of the Plan are to:

- protect the pre-development quality of the water resource in the unconfined aquifer beneath the site, consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000);
- maintain the pre-development water balance in the unconfined aquifer beneath the site;
- have regard for the findings of the results of the proponent's terrestrial fauna survey as well as the flora survey required in condition 8, to protect terrestrial habitats beyond the direct footprint of the proposal;
- adopt the principles of water-sensitive urban design consistent with the most recent revision of the WRC document *A Manual for Managing Urban Stormwater Quality in Western Australia*.

Summary

Having particular regard to the:

- design features to direct stormwater away from the marine environment under all but extreme rainfall events; and
- CCMD's commitments,

it is the EPA's opinion that the proposal could be managed to meet the EPA's environmental objective for this factor provided that the recommended condition 11 is implemented satisfactorily by the proponent during detailed design and implementation of the proposal.

4.1.10 European heritage

Description

The proposal described in the PER included the relocation of piles from the former Mauds Landing Jetty site to the CCR marina, with interpretive materials provided at the marina site.

The piles were proposed to be relocated for navigation reasons.

Submissions

Public submissions

Public submissions raised concern that the proposed treatment of the remains of the Mauds Landing Jetty would be inappropriate and contrary to best heritage conservation practice. It was also considered that the Mauds Landing Jetty, in its present location, represents a valuable heritage resource.

Assessment

The area considered for the assessment of this factor is the site of the former Mauds Landing jetty.

The EPA's objective for this factor is to ensure that the development complies with the statutory requirements in relation to areas of cultural or historic significance.

After the close of the public submission period, the Western Australian Maritime Museum (WAMM) advised that it strongly opposed the relocation of the Mauds Landing Jetty remnants, on the basis that the seabed around and under the jetty is a significant maritime archaeological site under the terms of the *Maritime Archaeological Act 1973*.

The WAMM considers that the issue of navigation safety could be addressed using approved navigation aids to the satisfaction of the DPI, without removing the remaining jetty structures.

The WAMM suggest a preferred course of action would be:

- to retain the submerged jetty structure;
- to mark the jetty area using navigation aids to the satisfaction of the Department of Planning and Infrastructure to advise mariners of foul ground;
- for the proponent to consider funding a test excavation around the jetty (on the condition that some materials raised are made available for the proposed interpretative centre);
- for the Museum (subject to adequate funding) to assist in the provision of research and interpretative materials, and expertise and equipment. It may also remain a party to the ongoing maintenance of the facility.

The proponent has made a commitment to protect the Mauds Landing Jetty site and to retain and mark the remnants of the former Mauds Landing Jetty (commitment 46). A further commitment has been made to prepare a Site Heritage Management Plan to protect sites of European and Indigenous heritage significance (commitment 44).

Summary

Having particular regard to the:

- advice of WAMM regarding the historical significance of the Mauds Landing Jetty site; and
- the proponent's commitment to amend its original proposal to protect the remains of the former Mauds Landing Jetty,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

4.1.11 Visual amenity and wilderness qualities

Description

At full development the proposal envisages a broad range of tourist and residential accommodation associated with an inland marina adjacent to the Ningaloo Marine Park.

The guidelines endorsed by the Government for the CCR proposal were provided by the proponent as Appendix 1 of the PER.

The proposal is described in detail in Section 2.5 of the PER and in the draft Structure Plan (Koltasz Smith 2000).

The proponent anticipates that, at 80% occupancy, the proposal will accommodate 2025 people, including visitors, residents and staff.

Submissions

Government agency submissions

The MPRA suggests that the proposal will increase people pressure locally and regionally, likely to exceed carrying capacity, and have a significant impact on the Park both north and south. A result of the proposal will be the loss of wilderness values along the entire coast of the Park.

The DPI suggests that:

- the overall objective should be to ensure that the development offers minimal intrusion into the existing coastal landscape;
- the impacts of the development on viewsheds from the Marine Park and foreshore areas should be assessed; and
- a well screened, low level development should be the general guiding principle, with materials that are sympathetic to local landforms, rock type and vegetation. This principle should be considered to be as important as the inherent aesthetics of the development itself.

DCLM suggest that there is an excellent opportunity for the proponents to be creative in blending the resort into the land and seascape to maintain the visual amenity of the coastline. Visitors to the Ningaloo Reef currently experience a sense of remoteness and 'outback' when looking back to the coast. Imposing an urban design onto this coastal strip is likely to detract from the current visitor experience. Consideration should be given towards a more 'eco-friendly' design and layout.

Public submissions

Submissions considered that the proposal would impact on the intrinsic wilderness values of the Ningaloo Marine Park. Wilderness value is held in high regard in public submissions. Many public submissions consider this value is one of the key reasons for visiting the area. Public submissions reflected the view that the proposal was not in keeping with the landscape, and considered that potential impacts on visual amenity would not be acceptable.

Assessment

The area considered for assessment of this factor is the Mauds Landing townsite and the proposed Services Area.

The EPA's environmental objectives for this factor are:

- to ensure that the visual amenity of the area adjacent to the proposal is not unduly affected;
- to protect the conservation, education and recreational values of the Ningaloo Marine Park.

The proposal will create a major tourism and residential node adjacent to the Ningaloo Marine Park and adjacent to the existing tourist node at Coral Bay. In effect, the proposal is a small town.

The EPA acknowledges that the issue of large-scale development along the Ningaloo coast is a sensitive issue in the community. The community has expressed strong concerns that tourist development at the proposed development site will impact on current visual amenity and wilderness values.

When compared with other areas along the Ningaloo coast, the EPA considers that the proposal is located in an area where aesthetic and wilderness values have been historically impacted by recreation activities, primarily undertaken by visitors to Coral Bay, but also other informal camping and coastal access along Bateman Bay beaches as well as an informal airstrip.

Although the proposal will alter the landscape and aesthetics of the site, the EPA is of the view that the aesthetic impacts of the footprint will primarily be localised. Moreover, the EPA considers that because of the historic high level recreational use of Mauds Landing, the proposed site is not considered to support equivalent wilderness qualities as do more remote areas of the Ningaloo coast.

The EPA considers that, should the proposal be allowed to proceed, all practical opportunities offered by the planning process should be taken to achieve a desired 'sense of place' relevant to the landscape at Mauds Landing. Manipulating the aesthetics of the proposal through the planning process will assist in managing the visual impacts of the proposal, if it is allowed to proceed.

The EPA notes that the proponent has indicated its intent to prepare Building and Landscaping Guidelines for the proposed development area to address aesthetics of buildings within the project area. The Western Australian Planning Commission and Shire of Carnarvon, in consultation with the proponent should ensure that a satisfactory mechanism is in place to enforce a set of agreed Building and Landscaping Guidelines in order to achieve the desired aesthetic and 'sense of place'.

The EPA also considers that it is important that issues associated with the potential impacts of a large-scale nodal tourist development on visual amenity and wilderness qualities are weighed up against the potential benefits for environmental management of providing for a focus of visitor activities.

It is the EPA's judgment that, from an environmental management perspective, provided adequate resources are available, human-use pressures are likely to be more easily managed through a nodal development than a string of developments spread along the coast.

In view of the community's strong opinions regarding the potential impacts of the proposal on aesthetic and wilderness qualities, the EPA considers that, in making a decision on the proposal, the Minister for the Environment and Heritage should determine whether the aesthetic impacts of the proposal are acceptable to the Government and the community when balanced against the provision of additional tourist facilities in the southern section of the Ningaloo Marine Park.

Summary

Having particular regard to the:

- former Government's considerations in relation to tourist development at Mauds Landing and to this proposal in particular; and
- opportunities via the planning process to refine the aesthetics of the proposal to achieve a desired sense of place; and
- EPA's judgment that visitors at a nodal tourist development are likely to be more easily managed than similar numbers of people at a string of small developments,

it is the EPA's opinion that the footprint of the proposal is unlikely to compromise the EPA's environmental objective for this factor, provided that adequate resources for off-site management of people are available to protect the ecological and social values of the broader Cape Range Province.

4.2 Context for the consideration of off-site impacts

A proposal of this type and scale raises an important suite of environmental issues apart from those directly associated with the proposal footprint. These issues are primarily related to the peripheral effects of visitation on both the marine and terrestrial environments beyond the proposed development site. The EPA is strongly of the view that the activities of visitors in this environmentally important region of the State require management to ensure that inherent values of the Ningaloo Marine Park as well as its abutting coastline and hinterlands are protected.

Until recently, there has been only limited presence of regulatory agencies in Coral Bay. DCLM now have a permanent ranger based in Coral Bay. Management in this area by other Government agencies such as Fisheries and DPI, as well as the Shire of Carnarvon, relies on short visits by officers based in Exmouth and Carnarvon.

As noted elsewhere in this report, the proposed CCR is effectively a small town, which the proponent anticipates will be occupied by up to 2500 people at capacity. The EPA considers that additional people associated with the CCR will impose additional pressures on the environment both locally and in the Gascoyne region generally.

The EPA notes that the current level of visitation at Coral Bay is causing localised impacts on the environment. The Marine Parks and Reserves Authority (2001) suggests that environmental and social values in a localised area (1-2 ha) of the Maud Sanctuary Zone adjacent to the Coral Bay settlement have been impacted by inappropriate recreational and commercial activities associated with visitation to Coral Bay.

Similarly, the EPA is aware that localised degradation of coastal areas, particularly areas outside the direct control of DCLM, is occurring along the Ningaloo coast as a result of unmanaged access to sensitive coastal areas.

These human-induced impacts in the Maud Sanctuary Zone and at other areas along the Ningaloo coast clearly demonstrate the risks posed to the environment by the current level of recreational activity, particularly where limited resources are available to manage the pressures of visitation.

Growing tourism and provision of significant facilities, such as the CCR for overnight visitors adjacent to the Ningaloo Marine Park, have the potential to place significant additional pressures on the intrinsic values of the Marine Park and adjacent coast areas.

Accordingly, and in view of the considerable and credible submissions raising concerns about the off-site impacts of people, the EPA considers that potential off-site impacts of visitors to the CCR on the marine and terrestrial environments warrant detailed attention in this report.

4.3 Potential for off-site marine impacts

Description

The CCR proposal includes a broad range of tourist accommodation, residential lots and staff accommodation. Once complete, the CCR envisages 710 tourist accommodation units, 200 free-hold residential lots and 170 lots and units for staff.

The CCR proposal is focused around a 47 ha inland waterway, which itself is proposed to include a range of facilities to support marine-based tourism and private boats, including:

- a sealed 2-lane boat launching ramp with a 120-bay car/trailer parking area;
- 100 marina boat pens;
- jetties;
- a service jetty with fuelling facilities; and
- a sullage pump out facility.

The proponent considers that its proposal provides an opportunity to address issues of public safety and localised impacts on corals in southern Bills Bay, which have been linked to boat use in the area.

The proponent also anticipates that provision of formal boating facilities in a sheltered marina is likely to encourage greater boat use in the area.

In the PER, the proponent considers that, as a consequence of additional visitors and boating associated with the proposal, there may be increased pressures imposed on attributes of the marine environment, including wildlife, benthic habitats and water quality.

The PER presents information which suggests that significant marine fauna, including humpback whales, dugongs, green turtles, bottlenose and Indo-Pacific humpback dolphins and whale sharks, are observed in Bateman Bay from time to time.

The PER also indicates that other significant marine species such as loggerhead and hawksbill sea turtles use areas of Bateman Bay as habitat.

The PER notes that several of these species are important from a conservation perspective and are included on various State, Federal and International threatened fauna lists.

For other species, such as manta rays and a variety of fish species, which the PER notes occur in Bateman Bay, the significance of the area has not been established.

Figure 7 of the PER (ATA 2000a) shows the marine habitats of Bateman Bay and Bills Bay to the south. Benthic communities, including corals, seagrass meadows and reefs colonised by macroalgae, occur in Bateman Bay.

Throughout the PER, the proponent has alluded to some specific activities which it considers may increase the risk of impacts on values of the Park, including:

- recreational and commercial boating;
- recreational fishing;
- snorkelling and SCUBA diving; and
- interactions with marine wildlife.

The impacts identified as being associated with these activities include pollution of marine waters, boat strikes on marine wildlife, depletion of fish stocks, physical damage to benthic communities (eg corals, seagrass) and disturbance of wildlife.

Recognising that the above activities require a level of management, CCMD have prepared a draft Specific Area Marine Management Plan (SAMMP), proposed to be included as an appendix of the Ningaloo Marine Park Management Plan and implemented in consultation with DCLM and Fisheries.

The draft SAMMP is proposed as a vehicle for the establishment of values, objectives and management strategies for an area of the Marine Park likely to be subject to increased people pressure as a result of the proposal. The proponent identified a 111 km^2 area it called the Maud Specific Management Area (MSMA) as being indicative of an area likely to be subject to increased human-use pressure during operation of the proposal. The proponent has also advised that the SAMMP, when agreed, is intended to guide the gathering of reference information by the proponent to address current gaps in knowledge about the area relevant to management.

The SAMMP is proposed to be implemented during construction (i.e. prior to the placement of breakwater materials) and for a period of at least five years following structural completion of the project. At this time there will be a further review of objectives, needs and funding for the SAMMP, and an assessment as to what further actions need be taken.

The proponent proposes to implement the majority of works relating to the operation of the SAMMP during the period to practical completion of the CCR. Prior to year 7, the proponent proposes that a workshop/symposium be held to review the SAMMP, identify the ongoing management needs and to explore funding opportunities.

Within the indicative MSMA, the proponent also identified a 'Development Impact Area' (DIA), within which it anticipates there will be impacts directly associated with the effects of construction and operation of the CCR. The draft DIA covers an area of approximately 9 km^2 and includes a portion of the Maud Sanctuary Zone.

Submissions

Government agency submissions

Fisheries advised that the major impacts on fish stocks in the area of the proposed development will occur through:

- increased visitor numbers, and presence of larger numbers of people over longer periods of time; and
- improved boat launching and mooring facilities which will allow larger and better equipped boats to operate over longer periods of time, with the capability of extending the zone of high exploitation further offshore (likely to extend in a 20 km radius around the proposed launching and mooring facilities).

DCLM considers that education of visitors and residents is critical to minimise the impact of the development and the increased pressures on the environment. It is not expected that the proposed Interpretive Centre alone would be adequate to meet all of the public education commitments implied in the document. Other strategies should be documented in an Environmental Education Plan.

DCLM note that the SAMMP will need to be finalised to the satisfaction of DCLM and the MPRA.

Public submissions

Common issues raised in public submissions regarding the impact of the proposal on marine fauna included:

- the adequacy of baseline information provided for both local and regional levels to adequately judge the off-site impacts of the proposal;
- no risk assessment against which to establish appropriate management strategies;
- baseline information is inadequate to pre-determine the effectiveness of management strategies;
- there is uncertainty about the conservation significance of several marine species which use Bateman Bay and the potential consequences of any impacts;
- shifting the focus of boating activity from Coral Bay, while addressing issues of damage to corals and risks to swimmers, may shift the risk of off-site impacts to other environmental attributes such as marine fauna;
- the potential impacts on seagrass from increased visitation (eg anchor damage);
- the proponent's commitments in relation to the management of potential impacts on marine fauna from people in boats are inadequate;
- it would be difficult for the proponent to control off-site human activities;
- the potential impacts of the proposal on habitat (direct loss of beach), food resources (water quality impacts on algae, seagrass and benthic invertebrates) and population ecology generally of marine fauna are unacceptable, particularly in light of significant threats to migratory species in other parts of their distribution;
- that the proposal could impact on several marine fauna, including listed species is unacceptable; and

- dispersal of litter and debris from the proposal has the potential to impact on marine fauna.

Fundamental to the issue of off-site marine impacts were concerns about the impacts of increased 'people pressure' on icon marine species. Particular concern was raised in relation to impacts of boating activities on;

- sea turtles – leatherback turtles, hawksbill turtles, green turtles, flatback turtles;
- whale sharks;
- dugongs;
- whales and dolphins;
- manta rays;
- fish stocks; and
- coral reefs.

Assessment

The area considered for assessment of this factor is the off-shore areas of Bateman Bay and the Ningaloo Marine Park generally.

The EPA's objectives with respect to this issue are to:

- maintain the Ningaloo Marine Park environmental values, ensuring that management is consistent with the Ningaloo Marine Park Management Plan, and to protect the conservation, education and recreational values, biodiversity and ecosystem functions of the Ningaloo Marine Park;
- maintain the abundance, species diversity and geographic distribution of marine fauna and to protect Specially Protected (Threatened) fauna and their habitats, consistent with the provisions of the *Wildlife Conservation Act 1950*;
- protect endangered species consistent with the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*;
- maintain the abundance, species diversity and geographic distribution of the marine life of coral reefs;
- maintain ecological function, abundance, species diversity and geographic distribution of marine flora; and
- maintain or improve the quality of marine water consistent with the National Water Quality Management Strategy (ANZECC and ARMCANZ 2000).

While CCMD's proposition that the proposal provides an opportunity to address current boating-related problems at Coral Bay has some merit, the EPA considers that the CCR proposal raises a suite of off-site marine-based environmental issues relevant to the Mauds Landing site which require attention in their own right.

Being a marina-based development adjacent to one of the State's environmentally and socially important marine areas, the EPA considers that the proposal is likely to attract additional people who want to experience the natural values of the Ningaloo Marine Park.

A consequence of this is that there is likely to be increased local demand for commercial marine-based recreation and tourist activities. There is also likely be an increase in the number of people who undertake marine-based activities privately.

The provision of improved boat launching facilities at the CCR is likely to remove current limitations on the size and number of boats used in the southern sector of the Ningaloo Marine Park. The EPA notes the advice of Fisheries in this regard.

During the course of the assessment, CCMD approached the EPA with a proposal to remove public boating launching facilities from the proposal as a means of addressing issues raised in public submissions regarding the potential boat-related impacts on values of the Ningaloo Marine Park. CCMD did not propose to remove 100 public/commercial boat pens from the proposal.

The EPA recognises the intent of the proponent's proposal to reduce potential impacts on elements of the marine environment, but the EPA is of the opinion that the proponent's proposal to remove some boating facilities does not acknowledge the responsibility to cater for the boating public who choose to stay at facilities provided in the CCR proposal.

Moreover, the EPA is of the view that CCMD's proposal to remove public boating facilities from its proposal does not address the need to consider and manage the potential impacts of increased offshore activities, which will be associated with the proposal regardless of where boats are launched/retrieved.

The EPA has considered the information provided by the proponent and in submissions and considers that, at a broad level, the matters which have the potential to pose risks to the EPA's objectives from this proposal, include:

- fishing pressure;
- boat strike on significant marine fauna;
- disturbance of marine fauna;
- physical degradation of habitat; and
- pollution.

The EPA notes that the proponent, in its responses to submissions, has provided some information on the expected demand for commercial tourist activities in the Marine Park. The EPA has considered this information along with additional advice provided by DCLM and Fisheries to form its conclusion regarding off-site marine impacts.

The EPA's consideration of relevant threats to the environmental values of the Marine Park is presented below.

Fishing pressure

The potential impact of coastal development without adequate provision for management has been illustrated in recent years by the identified collapse of two discrete populations of pink snapper confined to the western and eastern inner gulfs of Shark Bay. This impact was associated with intensive recreational fishing on major spawning aggregations over three to four years between 1991 and 1995.

A creel survey conducted by Fisheries in the Gascoyne Region between April 1998 and March 1999 estimated the annual recreational fishing effort in Ningaloo Marine Park at 85,000 fisher days. Of the total fishing effort, Fisheries estimated that approximately 40,000 fisher days were associated with boats launched from ramps within the Marine Park, and 26,000 associated with beach-launched craft. This represented 40 per cent of the boat-based fishing activity in the entire Gascoyne region over the survey period. Fisheries also estimated that 20% of trailered boat activity was concentrated in the Coral Bay area.

It is of concern to the EPA that, assuming 37 per cent participation in recreational fishing at the proposal, and a peak season fishing window of 5 months from April to September, Fisheries predict that the potential additional fishing pressure as a result of the CCR proposal is in the order of 200,000 fisher days per year. If this fishing effort is realised as a consequence of the proposal, it represents more than double the fishing effort for the entire Ningaloo Marine Park during the 1998/99 survey period.

The EPA also notes the advice of Fisheries which estimates that the likely boating effort would exceed 24,000 fisher days, and may run as high as an additional 60,000 fisher days. This level of fishing activity is within the range of fishing pressures in the Shark Bay area (Nanga, Denham and Monkey Mia) during 1998/99 (49,800 fisher days).

Noting the advice of Fisheries, the EPA is of the opinion that the proposal raises real and possibly significant assessment and management issues in relation to sustainable recreational fishing.

To properly monitor the impacts of the CCR and provide resources for on-going management of fishing activity, Fisheries have advised that the following is required:

- an ongoing recreational fishery monitoring program to collect catch, effort, catch composition and length-frequency data. This should be conducted to establish baseline information prior to the development and at annual intervals for a period of at least 5 years to allow analysis of trends against a background of other environmental variables. After this time it may be possible to decrease the frequency of survey to every two or three years;
- biological and movement studies on the key exploited species;
- mortality studies on key species using the assistance of volunteers in tagging and catch and release;
- development of predictive indices of recruitment for key exploited species in the area;
- a compliance and education program capable of delivering at least a 10 per cent intercept rate against recreational fishing effort; and
- a community education program which should include the assistance of the local business community, volunteers and local charter operators.

With respect to the role of the proposed SAMMP in collecting the necessary information, CCMD may be able to carry out aspects of the work required (eg data collection and some aspects of community education). However, the EPA notes that Fisheries have had no specific discussions with CCMD on how this arrangement might operate at a practical level. Due to the highly specialised nature of fisheries science, it is anticipated that Fisheries scientists would design surveys and analyse the data in consultation with CCMD.

Therefore, there would be an ongoing requirement for Fisheries to resource the research program, interpret monitoring results and enforce compliance with fishing regulations.

Boat strike on significant marine fauna

The EPA is mindful that there is limited information from the Ningaloo Marine Park, the Gascoyne region or other areas of WA with which to make comparative judgements about risks of boat strikes on marine fauna.

Notwithstanding, the species most at risk from boat strikes are most likely to be those that spend a considerable proportion of time at the sea surface (either to feed or breathe), are relatively small (therefore difficult to see), are slow moving (have limited capacity to avoid fast-moving boats), or are thought to have limited capacity to detect approaching boats.

Other factors likely to affect the possibility of boat strike, include abundance/density of animals, water depth, the proximity of heavily utilised boat passages to important habitat, numbers of boats and boat speed (Preen 2000). A report by Preen (2000) for the Great Barrier Reef Marine Park Authority notes that small to large planing power boats are the type of vessel most likely to strike dugongs and turtles.

There is documented evidence of boat strikes causing mortality in dugongs in other areas of Australia where there is a considerable level of boating activity in the vicinity of dugong habitat (Preen 2000). The EPA notes that there is conflicting evidence from the *Gascoyne Fisheries Environmental Management Review* (Fisheries 2000) and *Dugong Status Report and Action Plans of Countries and Territories* (Marsh *et al.* 2001) about boat strikes on dugongs in the Gascoyne. Even if boat strikes do not occur, dugongs are sensitive to boat movements.

Sea turtles are also susceptible to boat strike due to their habit of swimming or basking at/near the water surface. The EPA notes that a number of leatherback turtles observed in Perth's coastal waters (Fremantle, Cockburn Sound, Floreat and Rottnest Island) have displayed evidence of boat strike (Prince unpublished data). There is also evidence from the Moreton Bay Marine Park in Queensland that 22% of loggerhead turtles had propeller cuts and fractures from boat strikes.

No information is available on the incidence of boat strike on manta rays, whale sharks, humpback whales and dolphins in the Ningaloo Marine Park. The EPA considers that cetacean populations are unlikely to be highly vulnerable to impacts from small boat strikes because they generally occupy broad ranges, commonly use pelagic or open water habitats which are often inaccessible to small recreational craft due to rough sea conditions, are unlikely to be solely dependent on ecological

resources in the specific area adjacent to the proposal where boat traffic will increase, and, in the case of common and bottlenose dolphins, they are known to approach boats and 'bow ride'. Notwithstanding these factors, *The Action Plan for Australian Cetaceans* notes that while shipping strikes (from both large ships and small recreational vessels) on Australian cetaceans are not well documented, they are not rare (Bannister *et al*. 1996) and can cause immediate mortality or injury (Wells and Scott 1997) which may increase an individual animal's vulnerability to environmental stresses and predators.

Accordingly, it is possible that active management may be required to minimise the impacts of boat strikes on these fauna, particularly as the number of humpback whales wintering in Australian waters increases as populations recover.

At present there is little known about manta rays in Bateman Bay, the population in the Ningaloo area generally, or its vulnerability to boat strikes. If, as suggested in submissions, some manta rays aggregate in Bateman Bay to breed, there may need to be some active management of boating activity to minimise the risks associated with fast-moving recreational vessels. The EPA understands that manta rays are regularly encountered in fore reef slope and back reef habitats along the Ningaloo Reef tract, including remote areas unlikely to be accessed by the majority of boats from the CCR.

In view of this, the EPA is mindful that additional boating activity associated with the proposal has the potential to pose risks to individual marine fauna, particularly dugongs and sea turtles, in the vicinity of the proposal.

The EPA recognises that data on the marine fauna of Bateman Bay is not adequate at this time to forecast the management strategies necessary, if the proposal were to be approved for implementation. The EPA notes that pre-development reference data could be collected as part of the proponent's SAMMP. Appropriately focused, this information could assist in developing management strategies.

The EPA considers that protecting marine fauna from boat strikes is primarily a matter of people management. The advice of DCLM in its submission is that additional information is required to undertake the necessary risk assessment, develop strategies within the various management plans and determine the extra management resources required. Provided the extra information and resources are at hand, the EPA considers that risks could be minimised with appropriate management. This is likely to only be possible with the regulatory authorities available to DCLM, Fisheries and possibly DPI (Maritime Division) via relevant legislation.

Disturbance of marine fauna

The EPA notes that disturbance from inappropriate interactions between tourists and certain large marine fauna may cause stress and behavioural modification in animals (Environment Australia 2000). Disturbance of marine mammals (particularly short term effects) from private boating and commercial operations has been well documented (Corkeron 1995, Bannister *et al.* 1996, McCauley *et al.* 1996, Nowacek and Wells 2001, Van Parijs and Corkeron 2001). However, little is known about the ecological effects of causing annoyance or stress to marine mammals.

Documented impacts of boating-related disturbance in marine mammals include, avoidance (diving, swimming away), changes in communications among individuals (McCauley *et al.* 1996, Van Parijs and Corkeron 2001), feeding disruption, impacts on group cohesion (including mother-calf pairs, Van Parijs and Corkeron 2001) and displacement/alienation of animals from important habitat (Preen 2000).

The EPA notes that the ecological impacts of disturbance on populations of marine fauna are difficult to evaluate.

Marine fauna which are currently the subject of off-shore tourist activities (eg viewing and interaction) in the southern sector of the Ningaloo Marine Park include whales, whale sharks, manta rays, dugongs and turtles (DCLM 2000).

In the Ningaloo Marine Park, potential impacts on marine species from commercial tourism operations are managed by DCLM through licensing arrangements and industry-specific Codes of Conduct. Visitors can interact with marine fauna privately, and these private interactions are generally unregulated.

There is currently no evidence to suggest that the current level of commercial and private interactions with marine wildlife is having demonstrable adverse impacts on populations in the Ningaloo Marine Park.

Nevertheless, it is possible that additional commercial and private boat traffic, as well as an increase in the number of visitor interactions involving marine wildlife associated with this proposal, may increase risks of disturbance-related impacts on some marine fauna.

Here too, the EPA is of the view that risks to populations of marine fauna are small. However appropriately focused baseline data gathering, monitoring and management will need to be in place to ensure risks are minimised as far as practical.

Physical degradation of habitat

The EPA considers that the key habitats within the area relevant to the assessment of this issue include:

- coral reefs;
- limestone reefs;
- seagrass beds; and
- coastal waters.

These habitats may be important for a number of reasons, including:

- primary production;
- supporting biodiversity;
- food resources for marine species; and
- resting and migration.

The EPA considers that the types of activities relevant to this proposal, which may place pressure on these habitats, include:

- boating (anchor and boat damage to coral and seagrass, litter); and
- tourist activities - diving/snorkelling (physical modification/damage, litter);

The EPA notes that direct damage to benthic habitats (seagrass, corals) as a result of boating is generally not thought to be significant in the Gascoyne region, with the exception of some local impacts near popular boat launching facilities (Fisheries 2000). There is clear evidence that localised degradation of benthic communities does occur where boat use is concentrated in areas which support sensitive benthic communities (MPRA 2001). The EPA notes the current initiative by DCLM and the MRPA to address this matter in Coral Bay via the draft Coral Bay Boating Strategy.

With respect to the potential impacts on benthic habitats as a result of other tourist activities, the EPA considers that physical damage from in-water activities such as snorkelling and SCUBA diving are relevant. The EPA notes the results of research undertaken for DCLM which show that approximately three quarters of visitors to Exmouth (73%) engaged in snorkelling from the shore during their visit.

While there is little known about the impacts of current SCUBA diving/snorkelling activities on marine habitats in the Ningaloo Marine Park, research on the impacts of qualified divers on the Great Barrier Reef suggests that the majority of divers (85%) did not cause impacts on corals (Rouphael and Inglis 1995). The proponent also cited other research in its responses to public submissions which drew similar conclusions. Where divers do cause structural damage to corals, the impacts are generally localised.

The EPA understands that divers in sensitive environments can be managed to minimise impacts. For example, work on the Great Barrier Reef suggests that increasing diver skill levels, appropriate site selection, managing the numbers of dives at individual locations and providing for greater diver education/training can assist in managing potential impacts (Rouphael and Inglis 1995).

Pollution

From information provided by the proponent and submitters, the EPA considers that inappropriate disposal of litter and fishing gear and fuel spills are the most likely sources of pollution from people engaged in off-site marine-based activities.

The EPA considers that the likelihood of boats associated with the proposal contributing to tributyltin (TBT) contamination is very low because the application of TBT on boats less than 25 m in length is prohibited by law in WA.

Indiscriminate disposal of litter and fishing gear poses risks to marine fauna and their habitats (Environment Australia 1998, MPRA 2001), as well as the aesthetic quality of underwater landscapes (MPRA 2001). By way of example, litter such as plastic bags are a known threat to marine turtles which feed on jelly fish (Environment Australia 1998).

With respect to litter, the EPA notes that the proposal will include litter collection facilities strategically located around the marina, with all litter collected at these points disposed at a managed landfill site.

Spills of hydrocarbons (eg fuels, oil) from boats also present risks to marine fauna and habitats. An increase in the number and size of boats associated with the proposal may increase these risks in the Marine Park. Spills generally occur as a result of inappropriate fuelling practices and accidents involving one or more boats where fuel/oil tanks are ruptured.

In response to concerns about marine pollution, CCMD has advised that the proposal will include a service jetty and managed fuelling facility designed to meet relevant Australian Standards. CCMD will also provide spill response equipment. In addition, CCMD has committed to prepare and implement an Environmental Management Plan and an Emergency Response Plan to address, among other things, spill response and boat collisions respectively.

In relation to pollution of off-shore areas from sewage, the proponent has included a sullage pump out facility in its proposal as a means of minimising impacts of the disposal of sewage from boats. While the EPA considers that this is a commendable undertaking, the use of a sullage pump out facility will be limited to vessels which have on board sewage holding tanks. A considerable proportion of vessels will be small and unlikely to have onboard holding tanks or toilets.

Public education and adequate regulatory agency presence will be important in managing these matters.

Proposed management of risks

After considering information from other areas of the State and elsewhere in Australia, it is apparent to the EPA that some off-site marine-based activities do pose real risks to marine fauna, marine habitats and fish stocks.

Although the EPA recognises that there is currently limited scientific information about some ecological attributes of the Ningaloo Marine Park, the EPA considers that, provided there is adequately resourced and appropriately focused management in place for the life of the project, the off-shore activities of additional people are unlikely to result in the rapid and uncontrolled decline of populations of marine species or the widespread degradation of structural habitats.

The EPA recognises that CCMD has proposed to address site-specific information deficiencies and the development of management objectives and strategies for a specific management area by finalizing and implementing a Specific Area Marine Management Plan (SAMMP). Other commitments including a Turtle Management Plan (commitment 12), a Marine Mammal Management Plan (commitment 14), a Whale Shark Management Plan (commitment 16), a Waste Management Plan for construction (commitment 53) and a Fuel and Chemical Spill Management Plan (commitment 57) will assist in the management of off-site marine issues outlined above.

CCMD propose to implement the SAMMP for a period of five years following the completion of Stage 1 of the CCR, followed by a review of performance at year years. In view of the proposed development timeline presented in the PER, the EPA considers it unlikely that the full implications of the proposal for off-site management would be realised within the 5-year timeframe because development of the ultimate CCR would have only just been completed.

The EPA is aware that if the SAMMP were to be incorporated as an appendix of the Ningaloo Marine Park Management Plan, it would need to be finalised following a period of public consultation and to the requirements of the MPRA. Reviews would be undertaken by DCLM and the MPRA as part of its routine audits of management plans. If the proposal is allowed to proceed, the period between audit will need to be determined by the MPRA, having regard for CCMD's proposed development timeline and the expected growth of the population at the CCR. DCLM and the MPRA would need to have a common and clear understanding of the various responsibilities for meeting agreed performance targets which will need to be established prior to the implementation of the SAMMP.

The EPA notes that, while the SAMMP is a positive initiative, submissions by DCLM and Fisheries suggest that the SAMMP is still in early stages of development. In view of this advice, the EPA considers that, in its current form, the SAMMP is unlikely to prescribe the management in adequate detail required to minimise the risk of impacts in a specific management area which will be the focus of intensified people pressure if the proposal proceeds.

The EPA has not made any judgement about the appropriateness of the indicative Maud Specific Management Area (MSMA) proposed by CCMD in the PER. A decision on the final extent of a MSMA will need to be made on advice of DCLM and Fisheries to the satisfaction of the MPRA, if the proposal is allowed to be implemented.

The EPA concurs with submitter's concern about the ability of the proponent to manage potential impacts of people within the Marine Park.

The EPA considers that education of visitors will be a very important management tool available to the proponent to increase awareness of potential off-site impacts and identify ways to minimise potential impacts. The proponent has made commitments to develop and implement a number of strategies associated with education and marine nature-based tourism in the draft SAMMP. The proposed Environmental Code of Conduct is considered to be a helpful initiative. The EPA recommends that, if the proposal is approved from implementation, the proponent should consolidate all of its commitments into an Environmental Education Plan which will from a part of the SAMMP. The Environmental Education Plan will prescribe all the education initiatives considered necessary to minimise the risks of impacts from people associated with the proposal.

The EPA notes that the proponent could collect some of the reference information necessary to develop site-specific management strategies/policies for the management of people's activities in the specific management area on advice of DCLM, MPRA and Fisheries.

The way in which information gathering should be coordinated between the proponent and natural resource management agencies has not been established at this time. The EPA considers that a whole-of-Government approach is needed to establish how various Government agencies and the proponent would work together to gather pre-impact reference information.

With respect to implementation of management strategies detailed in a SAMMP, the proponent has little authority to implement and particularly to regulate the activities of visitors to the proposal, which have the potential to threaten environmental values of the Ningaloo Marine Park. Government natural resource management agencies (DCLM and Fisheries) and maritime managers (DPI Maritime Division) have the statutory powers to implement and enforce management strategies in the Ningaloo Marine Park. The EPA considers that it would not be appropriate to delegate responsibility or authority for management to the proponent or any other non-Government entity.

In order to address this matter, CCMD, to its credit, has proposed a draft agency-specific arrangement to provide assistance to DCLM and Fisheries by way of a Natural Resource Management Agreement (NRMA). The NRMA is given attention in Section 4.5 of this report.

Summary

Having particular regard to the proponent's limited authority to manage visitors in locations outside of the proposed development area, it is the view of the EPA that the proposal is unlikely to be managed to meet the EPA's objective unless:

- the Government is satisfied that any arrangement with CCMD to contribute to long-term management is commensurate with the burdens imposed on agencies as a consequence of the proposal; or
- the Government can commit to provide all necessary resources to relevant agencies such that the risks to the values of the Ningaloo Marine Park posed by additional visitors associated with the proposal are minimised as far as practical.

The matter of long-term management and implications for Government is given detailed attention in Section 4.5 of this report.

4.4 Off-site terrestrial impacts

Description

The CCR proposal includes a broad range of tourist accommodation, residential lots and staff accommodation. Once complete, the CCR envisages 710 tourist accommodation units, 200 free-hold residential lots and 170 lots and units for staff.

CCMD expect that improved facilities at the CCR will encourage visitors to stay in the Gascoyne region for up to one week. CCMD estimates that the typical length of stay at the CCR will be in the order of three to four days, with the balance of the time spent elsewhere in the region.

In the PER, CCMD suggest that additional visitors to the CCR proposal would pose potential threats at a local level to:

- migratory birds which use Point Maud as a roosting and loafing area;
- sea turtles which use Bateman Bay beaches for nesting; and
- coastal dune systems.

The proponent proposes to address potential terrestrial impacts associated with additional people through a variety of management plans.

CCMD proposes to develop and implement a Turtle Management Plan in consultation with DCLM and the MPRA to manage the impacts of its proposal on nesting sea turtles in Bateman Bay. Reference to turtles is also made in Section 6.8.10 of the draft SAMMP.

A Foreshore Management Plan and a Revegetation and Landscaping Plan proposed for the townsite area underpins CCMD's proposed management of impacts on local coastal dunes. In the PER, the proponent indicated that it would liaise with the owners of Cardabia Station with respect to coastal access beyond the development site.

An Environmental Management Plan is also proposed to address on-site issues, including flora and fauna management, fire control, emergency spill response, control of access to sensitive vegetated areas, beaches and lagoons and exclusion of cats and dogs at the Coral Coast Resort in line with normal National Park regulations.

Submissions

Government agency submissions

The DCLM advised that:

- Bateman Bay beach is a very important nesting area for turtles. Within the Ningaloo Marine Park, the Bateman Bay beach is the most significant nesting area for loggerhead turtles and for hawksbill turtles, the southern-most nesting area in WA;
- effective off-road vehicle control and hardened beach access have the potential to reduce the current impacts on these nesting sites. It is acknowledged that construction of the breakwater will provide a barrier to access from the south along the beach, but other measures will be required to ensure the impacts from the increased numbers of people are minimized;
- the PER did not acknowledge that Point Maud was an important bird roosting area, nor did it consider the potential impacts of the proposal on the area both during construction and operation. DCLM suggested strategies and targets would need to be developed in consultation with DCLM and to the satisfaction of the MPRA if this issue was to be managed;
- the proposed Development Impact Area should be expanded to include terrestrial areas which may be subject of pressure due to additional land-based visitor activity; and
- the proposal is highly management dependent. DCLM note that the proponent has not attempted to predict activity patterns for visitors and residents of the resort. Therefore, it is difficult to determine the extent and focus of the main pressures on the environment.

Main Roads WA (MRWA) notes that visitors to the proposal are likely to travel along the coast in the region, giving rise to potential impacts of unmanaged access along the coast. MRWA also notes that the PER is limited with respect to management of off-site visitor impacts identified as being likely if the proposal proceeds. It suggested commitments for consideration by the proponent.

The MPRA noted that the PER contained little in the way of information about the likely impacts of the proposal away from the proposed development site. The MPRA also suggests the proposal would increase people pressure locally and regionally to a level likely to be in excess of carrying capacity, having a significant impact on the Park both north and south, and leading to the loss of wilderness values along the entire coast adjacent to the Park.

Public submissions

Public submissions focused on:

- the impact of quad-bike hire operations and privately owned off-road vehicles on coastal dune systems;
- the potential for visitors to the proposal to disturb nesting sea turtles and shore birds, particularly those listed under agreements between Australia and Japan and China;
- the increase in pressure on dune areas both locally and regionally as a result of increased visitor activities;
- the proponent's limited ability to manage coastal impacts from increased visitation in areas outside of the townsite to the north and south of the proposal; and
- the impact of the proposal on public access to beaches.

Assessment

The area considered relevant to this factor is the Cape Range Province as shown in the EPA's Position Statement No.1.

The EPA's objectives for this issue are to:

- maintain the Ningaloo Marine Park environmental values and ensure that management is consistent with the Ningaloo Marine Park Management Plan and to protect the conservation, education and recreational values, biodiversity and ecosystem functions of the Ningaloo Marine Park;
- maintain the abundance, species diversity and geographic distribution of marine fauna and to protect Specially Protected (Threatened) fauna and their habitats consistent with the provisions of the *Wildlife Conservation Act 1950*;
- protect endangered species, consistent with the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*; and
- maintain the integrity, function and environmental values of coastal and foreshore areas.

The EPA notes the *Gascoyne Tourism Research Review* produced by the Western Australian Tourism Commission (WATC 2000) which suggests that 82% of the 150,000 domestic visitors who visited the Gascoyne Region in 2000 travelled in their own/private car.

The results of research undertaken for DCLM (Wood and Hopkins unpublished data) in Exmouth suggest that, while the Ningaloo Marine Park is the major attraction for visitors to Exmouth, access to the coast, the natural environment, the Cape Range National Park, peace and quiet and access to activities are also important reasons to visit the area. Wood and Hopkins also suggest that visitors to Exmouth participate in an average of five different activities during their stay.

From this information, as well as the proponent's expectation that visitors will only spend a portion of their stay in the region of the proposed CCR, the EPA considers that it would be reasonable to assume that a considerable proportion of domestic visitors to the Gascoyne can travel independently within the Region and are likely to travel to a number of attractions during their stay in the region.

Furthermore, the EPA is also conscious that the CCR proposal is also likely to bring forward expectations for improved infrastructure such as a upgrades to the coastal track linking Coral Bay with Yardie Creek in the Cape Range National Park.

Coastal areas along the Ningaloo Reef tract are fragile, provide habitat for important fauna and are susceptible to erosion if not adequately managed. The EPA understands that the current level of visitation is having localised impacts both in the vicinity of Coral Bay and at other locations along the Ningaloo Coast.

With respect to issues raised about potential impacts of people's activities on nesting turtles outside of the proposal area, the EPA notes that the proposal will provide a barrier to vehicle access from Mauds Landing to important nesting areas in Bateman Bay. Notwithstanding, the EPA considers that, without adequate management of the coast and other sensitive terrestrial areas by the relevant entities, at both local and regional levels, there is a risk that additional visitors and residents will cause impacts on important environmental values such as sea turtles. Control of vehicle access to important turtle nesting beaches in the vicinity of the proposal is of particular concern. The EPA considers it is important that adequate management be in place to ensure that people in vehicles, walkers those wishing to view nesting turtles from the CCR proposal do not impact on nesting and hatching sea turtles. While sea turtle-based tourism can assist in conservation, negative impacts on sea turtle breeding sites can occur as a result of increased numbers of tourists wanting to watch nesting turtles (Limpus 1994, in Wilson and Tisdell 2001). If the proposal is to proceed, strategies will need to be developed by DCLM, the Shire of Carnarvon and CCMD. The EPA notes CCMD's commitment to employ a Turtle Management Officer (commitment 12).

In a similar way, with further evaluation of risks, it is important that appropriate education, and possibly active management is in place to address potential impacts of people's activities on roosting shore birds near Point Maud.

Similar to the issue of off-site marine impacts (discussed in Section 4.3), the EPA notes that the proponent's authority to manage people associated with its proposal in areas beyond its lease area is limited. The EPA considers that CCMD's commitment to various eduction initiatives, if implemented satisfactorily, may assist in managing threats posed by people associated with the CCR to terrestrial environments in the vicinity of the proposal.

The EPA is conscious that responsibility for implementation of coastal management along the Ningaloo coast falls to a number of Government and non-government entities, including DCLM, the Shire of Carnarvon and pastoral lessees.

The EPA recognises that the current level of visitation is having localised impacts on the coastal environment in the Region (MfP 1996) and that because of various land vesting, management responsibilities are complex.

In this regard, the EPA is aware that the new *Carnarvon-Ningaloo Coast Regional Strategy* is expected to determine the coastal strip needed as a conservation and recreation precinct. The Strategy is also expected to recommend vesting and management options for the coastal strip.

The EPA considers that, while this initiative may have the effect of simplifying management roles along the Ningaloo coast, in the mean time, a practical and equitable mechanism for the protection of the coastal environment and its ecological attributes from the cumulative impacts of additional visitation associated with this proposal must be established.

If this proposal is to proceed, there will be a need for additional management which is adequately funded, and has appropriate expertise and authority to protect coastal values in the region.

The EPA also notes that DCLM acknowledged this issue in its submission, suggesting that the proponent expand the indicative area covered in the draft SAMMP to address management of peripheral terrestrial impacts. The proponent, in its responses to submissions considers that, as a management tool, the extension of the DIA to include land surrounding the CCR has some merit. However, CCMD notes that extension of the SAMMP to include terrestrial area beyond the boundary of the Marine Park would be complicated if the SAMMP is to be included as an annex of the Marine Park Management Plan. The proponent also acknowledged its limited authority in relation to off-site terrestrial management.

The EPA considers that potential cumulative impacts on coastal areas are of sufficient importance, particularly in light of the fact that the proponent has little control over off-site management, that the proposal should not be allowed to proceed unless there can be a commitment by the Government, in consultation with CCMD, to address the management of people.

The EPA considers that a framework similar to that proposed by the proponent for the management of off-site marine-based activities, which includes all relevant entities, should be considered. The EPA notes that the degree to which visitors to the CCR may contribute to additional burdens on relevant entities to provide management is yet to be determined, but some additional impositions on Government natural resource managers are likely.

The EPA also considers that at a minimum, management of off-site terrestrial impacts in the vicinity of the proposal must address:

- improved control of access by vehicles and pedestrians to beaches used by sea turtles for breeding;
- improved control of access by vehicles and pedestrians to roosting and loafing areas used by migratory birds listed under international agreements;
- litter at popular coastal access points; and
- rationalisation of existing indiscriminate tracks and camping in sensitive dune areas.

Summary

Having particular regard to the:

- advice of DCLM that the management of terrestrial based activities outside of the townsite boundary were not specifically addressed in the PER;
- information in WATC Tourism Review documents and research undertaken for DCLM which suggests that many visitors to the area travel independently and undertake a range of activities;
- limited information available regarding likely visitor use patterns in the area associated with the proposal;
- likelihood that additional visitation associated with the proposal is likely to act in a cumulative way to cause incremental impacts on coastal areas along the coast unless adequate management is in place;
- proponent's limited capacity and authority to enforce any management in off-site land areas as a consequence of the proposal; and
- need to give special attention to the likely cumulative impacts on coastal areas, including associated habitats and species, which are likely to be brought about by the proposal;

it is the EPA's opinion that the proposal is unlikely to be managed to meet the EPA's objective unless:

- the Government is satisfied that any arrangement with CCMD to contribute to long-term management is commensurate with the burdens imposed as a consequence of the proposal on various entities that have management responsibilities for coastal areas in the Region; or
- the Government can make a commitment to provide the necessary resources to ensure that the risks to the values of the Ningaloo Marine Park and adjacent coastal areas posed by additional visitors associated with the proposal are minimised as far as practical.

The matter of long-term management and implications for Government is discussed in detail in Section 4.5 of this report.

4.5 Long-term management

Description

The proponent has proposed separate mechanisms to provide for the long-term management of infrastructure associated with the proposal and the potential impacts of visitors on the values of the Ningaloo Marine Park.

Management of the proposal

The proponent proposes to develop Stage 1 (marina, site and associated development works, caravan park, backpacker hostel, 60 serviced resort apartments and service infrastructure) of the CCR proposal and to be directly responsible for its management and maintenance for a minimum period of 5 years after completion of construction. Under this scenario, and if construction of Stage 1 is undertaken over approximately 2 years, CCMD would be directly responsible for a minimum of seven years.

In the PER, CCMD also committed to develop and implement a Resort Management Agreement with the Shire of Carnarvon to address matters including:

- the use of differential and specified area rating to ensure adequate funding exists to maintain infrastructure important for safeguarding the environment in the vicinity of the Coral Coast Resort;
- long and short term management of the public infrastructure in the resort and marina;
- environmental management commitments and coastal and waterways management; and
- the formation and resourcing of a management committee to oversee the management of the Coral Coast Resort.

Management of the Marine Park

The proponent has proposed a draft Natural Resource Management Agreement (NRMA) intended as an agency-specific framework for cooperative implementation of the SAMMP by DCLM, Fisheries and CCMD.

The draft NRMA presented in Appendix 12 of the PER (ATA 2000b) outlines the respective interests and commitments of CCMD and DCLM and Fisheries for the ongoing protection of the environment and fish stocks at Mauds Landing and in adjacent waters of the Ningaloo Marine Park.

Submissions

Government agency and statutory authority submissions

Concerns have been expressed by the MPRA, relevant Government agencies and the public that the proposal would lead to increased management burdens to protect the values of the marine park.

DCLM's submission focused on:

- the need for a contribution from the proponent to offset the increased management costs associated with the development and increased visitation and

for the commitment to be expressed in terms of a guarantee to meet the costs required to achieve specific and agreed outcomes;

- the view that there should not be an extra financial burden placed on DCLM and other agencies as a result of increasing pressures in the area;
- the NRMA is an appropriate initiative to detail financial and management arrangements, however, it should be noted that the draft included with the PER is a working document and is far from being finalized;
- the inclusion of the Shire of Carnarvon in the natural resource management agreement;
- the need to finalise the SAMMP to the satisfaction of DCLM and the MPRA;
- given that the proposed development is highly management dependant and the PER is not clear on the cost and who will have the responsibilities for long-term management, and the need for support or commitment from the relevant agencies to accept the increased management obligations;
- the importance of educating visitors and residents in minimizing the impact of the development and the increased pressures on the environment;
- the need for the proponent to ensure and promote free entry to the public to a section of the Interpretive Centre for it to function in an educational capacity. It is not expected that the facility alone would be adequate to meet all of the public education commitments implied in the document. Other strategies should be documented in an Environmental Education Plan;
- if the Interpretive Centre is part of the environmental offsets for the development (through improved public education), this should be an ongoing responsibility for the proponent as part of the conditions of approval;
- an option to manage the Interpretive Centre, but exercising the option would be based on a business planning decision. Whilst the Centre is highly desirable, it must be recognized that, under the current proposal, there would be additional long-term costs to DCLM for management. Management arrangements for the Centre could be incorporated into the draft NRMA; and
- the ability to influence the behaviour of residents in the long-term remains a concern with this development. Appropriate mechanisms and conditions would need to be put in place at the outset to ensure that commitments that relate to residents behaviour can be met. These include the keeping of pets, nutrient input to gardens and low water use gardens; and
- the management strategies which implicate other agencies include:

  (a) control of off-road vehicles in the area (Shire of Carnarvon);

  (b) connection of Coral Bay to the constructed waste water treatment plant (Shire of Carnarvon, Water Corporation);

  (c) use of the managed landfill site for the Coral Bay townsite (Shire of Carnarvon);

  (d) Specific Area Rates to contribute to environmental management (Shire of Carnarvon); and

  (e) reduction of boating-related impacts (Department of Transport).

The DPI:

- supports the principle of providing an agreement such as the draft NRMA, but advocates the provision of a holding bond to be secured from CCMD so that in the event of the company selling the site or falling into receivership, their obligations can still be met;
- advises that the responsibility for management of the waterway is unclear. The Shire of Carnarvon is a small local authority without either the resources or expertise in waterways management. No details are provided of how this shortfall could be overcome. A Deed of Agreement to outline management arrangements for waterways and other areas including foreshores should be developed in conjunction with all relevant agencies; and
- advised that it may authorise some of the Authorities operating in the area to administer the Navigable Waters Regulations, but is unlikely to give that authority to the Marina Manager as suggested in the PER.

The DEP raised:

- issues regarding the proposed responsibilities for long-term environmental management of the site and resort facilities;
- concern about the authority and ability of the proponent to manage some aspects of the proposal, particularly matters considered to be best addressed through planning mechanisms or local Government by-laws.

Public submissions

Public submissions focused on:

- the proponent's proposal to be responsible for management for a short period (approximately 5 years after the completion of construction of Stage 1);
- support for a contribution by the proponent for management in Ningaloo Marine Park;
- concern about the financial responsibilities for environmental management;
- if the Shire of Carnarvon is to be responsible for managing the environmental matters at the proposed CCR, the Shire should also be required to have an Environmental Management Plan in place for their area of responsibility before being allowed to take control of such an important and environmentally sensitive area as Mauds Landing;
- budgets must be allocated to achieve the standards committed to by the proponents;
- questions about the capacity/authority of the proponent to implement measures which would effectively manage the potential impacts of visitors; and
- the proponent's capacity and authority to implement management of issues including nutrient application, the keeping of domestic animals, lighting controls and control of vessels treated with TBT.

Assessment

The area considered for assessment of long-term management arrangements is the proposed development site and the area of the Ningaloo Marine Park encompassed in the indicative Mauds Specific Management Area (MSMA) shown in the PER.

The EPA's objective for this issue requires the management of the proposal to be transparent, accountable and creditable, and responsibility for ensuring compliance with environmental conditions and commitments to be clear.

The EPA considers that the delivery of effective and appropriately focused management over the life of this project would be essential to ensure that both the marine and terrestrial environments are protected. In view of the scale and location of this proposal, failure to provide an adequate level of management can be expected to lead to unacceptable environmental impacts.

Long-term management of the proposal

The CCR proposal, essentially being a small tourist town, would require a high degree of management involving a number of entities for the life of the project.

In cases where waterway-based proposals have been developed elsewhere in the State (eg Mandurah), it is common for the local Government authority to accept responsibility for the project as the developer's interest diminishes as lots are sold.

However, during the assessment, the EPA has become aware that the Shire of Carnarvon has serious concerns about CCMD's original framework for long-term management of the proposal, which had the Shire being responsible for the management of the CCR, including the marina and related coastal structures and systems.

The EPA understands that CCMD was invited to revise the proposed long-term management framework to address the Shire's concerns. CCMD now proposes that, as its role as developer diminishes (as land ownership is passed onto others either as packages for further development or sale to private landowners), management responsibility would be passed on to a proposed incorporated Coral Coast Resort Community Association to be formed under the *Associations Incorporation Act 1987*.

The Carnarvon Council has given preliminary consideration to this alternate framework. While indicating that the proposed Community Association may address some concerns with the original long-term management framework, issues such as the levels of service required by the Shire and the framework for the implementation of respective responsibilities for management have not been resolved. The EPA understands that the Shire's in-principal support of the Structure Plan was conditional on servicing and management arrangements between the Shire and CCMD being resolved prior to the commencement of construction.

The EPA supports this position.

The proposed responsibilities of the proposed Community Association are noted. Some of these responsibilities may require special technical and financial abilities to implement and may have significant environmental implications if not managed adequately. The proponent has indicated that the proposed Community Association may take on direct or indirect (through funding) responsibility for management, including:

- waterways;
- breakwaters and revetments;
- foreshore;
- coastal areas/coastal processes;
- maintenance of stormwater systems;

- some aspects of waste management;
- groundwater monitoring; and
- implementing relevant local by-laws where they are created for the purpose of management.

While the EPA notes CCMD's proposed Community Association for long-term management, it has not given detailed attention to this framework for reasons discussed below.

Firstly, the EPA is aware that the Department of Land Administration (DOLA) has prepared a proposed Land Development Agreement (LDA) for the proposal, which should the proposal be allowed to proceed, would bind CCMD to the management of key elements of the proposal for the period of the lease. The LDA is proposed to have a term of 50 years.

DOLA has advised that, under the proposed LDA, CCMD have an obligation for the management and maintenance of a number of elements of the proposal which will remain in the lease for the term of the proposed LDA.

In summary, even if all packages of land available for development in the proposed LDA development lease area are on-sold by CCMD, it would maintain direct responsibility for the management of areas including the marina, breakwaters and revetments, some roads and open-space/reserves, including the foreshore and beach to high water mark. The EPA understands that other areas remaining in the lease for the long-term include a service station site, coach terminal site, and the Services Area including the power supply, water supply and wastewater treatment works.

Secondly, responsibility for the implementation of environmental management commitments and conditions related to the proposal under the *Environmental Protection Act* rests with CCMD for the life of the project, unless it approaches the EPA with a proposal to change proponentship.

Although the EPA understands that the proposed LDA currently does not give specific attention to future desires by CCMD to transfer long-term environmental management obligations, DOLA has indicated that it would consider alternative arrangements, of which the Community Association proposal may be one, if formally approached by the proponent.

If CCMD formally expresses a desire to transfer its environmental management obligations in the future, the EPA considers that any proposed management entity and arrangements must be legally sound, have adequate experience, knowledge, authority and the statutory obligations to meet the environmental management requirements detailed in any Statement issued for this proposal by the Minister for the Environment and Heritage, if the proposal is allowed to be implemented.

The EPA notes issues raised about the CCMD's financial capacity to implement management of the proposal for the long-term. While it is beyond the ambit of the EPA to assess this issue, the EPA understands that the proposed LDA provides for DOLA to make an assessment of CCMD's or any proposed alternative management entity's economic capacity to fulfil its environmental management obligations for the term of the proposed LDA.

With respect to issues raised about the proponent's ability/authority to implement management of issues including nutrient application, the keeping of domestic animals, lighting controls, control of the types of businesses in the lease area, the EPA notes that CCMD have made commitments to:

- develop and implement development approval guidelines for the CCR;
- develop and implement a Landscaping Management Plan;
- develop and implement a Nutrient and Irrigation Management Plan; and
- provide facilities in the Services Area to manage domestic animals/pets.

Satisfactory implementation, particularly of lighting controls and nutrient application as discussed above, are likely to be important from an environmental protection perspective.

While the EPA concurs with the proponent that by-laws and local planning policies linked to the Shire's Planning Scheme could address these matters in the Mauds Landing town site, development and implementation of such controls would need to be made with the concurrence of the Shire of Carnarvon. The EPA notes that implementation and monitoring compliance with various management strategies at the CCR may have implications for Shire resources.

After considering the advice of DOLA regarding the proposed LDA, the EPA has reservations regarding the proponent's suggestion to use covenants or conditions on titles as a means of ensuring implementation of issues which are essentially planning matters. DOLA has advised that the only means of enforcement of restrictive covenants on titles would be by forfeiture of the title. This is likely to be costly to administer for minor matters. The EPA considers that these matters should be given attention as necessary by the Western Australian Planning Commission as part of its assessment of CCMD's Structure Plan.

The respective roles of the Shire and CCMD in regard to the implementation and policing of these controls has not been finalized. The EPA notes that clarification of this matter was a condition of the Shire's support of the Draft Structure Plan, currently being considered by the Western Australian Planning Commission. The EPA considers that this matter can be adequately addressed via the development arrangements between the Shire and CCMD which should, consistent with the Shire of Carnarvon's conditional support of the Structure Plan, be finalised prior to development commencing.

Notwithstanding CCMD's commitments and the Shire of Carnarvon's desire to seek formal agreement on respective management responsibilities, in order to assist the Government in considering any proposal by CCMD to transfer environmental management responsibilities and to provide some certainty that environmental objectives are being and can continue to be achieved, the EPA recommends that a

condition be imposed on the proponent to enter into a legal agreement with the Shire of Carnarvon, on advice of the Minister for Local Government for long-term management (condition 15) which aims to ensure that management is effective at the time that any responsibilities are transferred and demonstrates that management is sustainable in the future. Environmental milestones/performance objectives and procedures to demonstrate that these are being met should be considered before further consideration of a proposal to transfer management responsibilities. To this end, the EPA has recommended a Performance Review condition (condition 14).

In view of the EPA's advice on environmental factors associated with the proposal footprint, the management necessary to achieve environmental objectives could be onerous for the proponent and may have implications for the Local Government in the long-term.

Long-term management of off-site impacts

The EPA has considered this matter in the context of its advice in Sections 4.3 and 4.4 of this report, which reflects the view that no decision should be made to allow the proposal to be implemented unless there is a clearly defined and appropriately scoped mechanism to provide additional management presence in the area, commensurate with the burden the proposal creates.

The EPA concurs with the view that, if the proposal proceeds, the proponent should fund the additional environmental management costs associated with the proposal.

While the EPA commends the proponent on its commitment to formalise the draft NRMA with DCLM and Fisheries (commitment 59), it is of some concern to the EPA that broad discussions with DCLM and Fisheries indicate that the likely costs for management exceed those committed to by CCMD in the draft NRMA. Moreover, some of management likely to be required to ensure the values of the Ningaloo Marine Park are protected is likely to fall beyond the ambits of these agencies.

The extent of the resources required for sustainable management is a matter of judgement and advice from relevant Government agencies. The EPA is aware of the management arrangements for both the DCLM and Fisheries in the Shark Bay/Monkey Mia area. Moreover, dedicated management bodies/arrangements have been established to oversee and undertake environmental management in other environmentally and socially important natural areas such as Rottnest Island (Rottnest Island Authority) and the Great Barrier Reef (Great Barrier Reef Marine Park Authority). The EPA is of the view that a commitment to environmental management would be necessary for on-going protection of the environmental values and natural resources of the Coral Bay/Bateman Bay area from human-use pressures, and indeed, this would need to be extended to the proposed World Heritage Area. The financial resources would need to be for capital works as well as on-going operational expenses. Theses would be in addition to the current scope of agency's recurrent funding. As a result of the EPA's broad discussion with agencies, preliminary estimates suggest that recurrent costs for management as a result of the proposal are likely to be in the order of $1.1 million per annum.

The EPA notes that CCMD has suggested that it will investigate other mechanisms to provide support for environmental management. Proposals include provision of funds through special area rating, fees for boat launching and use of the marina, and collection of entry fees for the proposed Environmental and Interpretive Centre. The capacity of these proposals to generate adequate support for management agencies is as yet unquantified.

While there is merit in CCMD's proposals to generate income for off-site environmental management, there may be legal and financial implications for third parties including the Shire of Carnarvon and possibly government agencies which would need to be resolved to ensure that any income-generating proposals for environmental management are sustainable and funds appropriately allocated in the long-term.

For example, the EPA notes that, when considering CCMD's draft Structure Plan, the Shire of Carnarvon considered that it was of concern and inappropriate to levy a Special Area Rate to cover the costs of off-site environmental management which would be tendered to DCLM and Fisheries. The EPA has not been provided with information to suggest that this matter has been resolved.

Moreover, the current agency-specific draft NRMA does not address the likely need for the involvement of other entities, such as the DPI, Maritime Division and the local Shire, if the proposal proceeds. Nor does the draft NRMA address the likely requirement to provide some level of support for the management of potential off-site terrestrial impacts associated with additional people attracted to the CCR.

Further to this, while considering the draft management arrangements proposed by the proponent as well as advice provided to the EPA by relevant Government agencies, it has become apparent to the EPA that the extent (spatially, temporally and financially) to which it may be reasonable to expect the proponent to contribute to the management of natural resources of the Ningaloo Marine Park and the adjacent coast must be more clearly established.

The EPA is particularly mindful that a relevant, reasonable, specific management area, for which the proponent must contribute to management costs, needs to be defined and the management requirements evaluated by Government agencies in consultation with the proponent, before the proposal could proceed. Given the EPA's consideration under Section 4.3. and Section 4.4 of this report, this area should include both land and sea areas.

The EPA notes that, while at this time there may be considerable challenges in determining an appropriate specific management area and long-term management framework(s) for both land and sea, the EPA considers that the *Carnarvon-Ningaloo Coast Regional Strategy*, by defining a coastal strip and providing options for its management, may assist in simplifying this issue.

In view of the information currently before the EPA at this time, it is considered that CCMD has not demonstrated that adequate long-term support for environmental management will be generated by the current proposal, nor has it clarified the issues raised regarding responsibilities for environmental management in the long-term.

Given the likely need to broaden the scope of the draft NRMA to incorporate arrangements for the management of both land and sea areas and therefore possibly include other Government agencies, the EPA recommends that any arrangements for the long-term off-site management of people associated with the proposal should be made between CCMD and the State of Western Australia, rather than with individual Government agencies. With such an arrangement, the EPA also considers that there would need to be a concomitant commitment by Government to ensure that assistance provided by any management arrangements with the proponent directly, and/or via other funding mechanisms, is appropriately directed from gross Government revenue to environmental management associated with the Ningaloo Marine Park, and particularly the specific management areas.

In view of the high environmental, conservation and social values of the Ningaloo Marine Park, the EPA considers that unless there is up-front resolution of environmental management arrangements necessary to protect these values, the proposal should not proceed at this time.

Summary

The EPA's recommendations are two-fold and examine the long-term management for the footprint of the proposal and the off-site management of people's activities in the Ningaloo Marine Park and its abutting coastline.

Long-term management of the proposal's footprint

With particular respect to the arrangements for the long-term management of the proposal, having particular regard to:

- the binding nature of the proposed Land Development Agreement prepared by DOLA for the CCR proposal, which can provide for the capacity and authority of any entity/proposal by CCMD to transfer it obligations conveyed in the proposed LDA;
- CCMD's legal responsibility under the *Environmental Protection Act* to fulfil any environmental management commitments and conditions for the life of the project; and
- the proponent's commitments to seek agreements with the Shire of Carnarvon in relation to respective management responsibilities;

it is the EPA's view that the proposal could be managed to meet the EPA's objective, provided that the proponent implements conditions 14 and 15 prior to proposing any formal transfer of responsibilities for long-term management of the proposal. The responsibility for management of the proposal's footprint can not be considered in isolation from the management requirements associated with the people the proposal will attract.

Long-term off-site management of people

With respect to the arrangements for long-term management of off-site issues, having particular regard to the commendable efforts by the proponent to address issues of wider management, it is beyond the proponent's authority to undertake the management of people's activities outside of the development area, which is

necessary to ensure that the values of the Ningaloo Marine Park and adjacent coastal areas are protected.

Accordingly, it is the EPA's advice that the proposal should not proceed unless Government is able to:

- identify and confirm the environmental management resources required across the natural resource management sectors to adequately protect all values of the Ningaloo Marine Park and its adjacent coastline, as well as having regard for potential World Heritage values from the impacts of additional people pressure;
- confirm that any commitments by CCMD to support environmental management are legally and financially sound in terms of their capacity to deliver the necessary environmental management in the long-term;
- make a whole-of-Government commitment to any environmental management arrangement with CCMD; and
- commit to prepare and implement an effective environmental management system, including the preparation of management plans and the provision of resources commensurate with the level of human-use pressures on the Ningaloo Marine Park, to ensure that the environmental values of the region are adequately protected in the long-term.

Given the possible financial implications for the State, the EPA suggests that, if the proposal is approved for implementation, any management arrangement between CCMD and the State for long-term environmental management should be developed on advice from the Treasurer, to evaluate the sustainability of resourcing.

5. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

A number of the proponent's commitments are superseded by recommended conditions.

5.1 Proponent's commitments

The proponent's commitments as set out in the PER and subsequently modified, as shown in Appendix 4, should be made enforceable.

5.2 Recommended conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by CCMD to develop the CCR proposal is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- that the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4. Matters addressed in conditions include the following:
    - the proponent shall fulfil the requirements in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;
    - the various management plans and programs proposed through the proponents commitments to be made publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority; and
    - the management plans outlined in the recommended environmental conditions presented in Appendix 4, which include:
        1. Seagrass and Coral Management Plan
        2. Turtle Breeding Management Plan;
        3. Shoreline Stability Plan;
        4. Maintenance Dredging Management Plan;
        5. Flora Survey;
        6. Subterranean Fauna Management Plan;
        7. Marine water Quality Study for construction;
        8. Marine Water and Sediment Management Plan (Construction Phase);
        9. Marine Water and Sediment Management Plan (Operations Phase);
        10. Site Drainage and Stormwater Management Plan;
        11. Decommissioning Plans;
        12. Performance Review Reporting; and
        13. Long-term Management Agreements.

It should be noted that a regulatory mechanism relevant to this proposal is:

- The provisions of Part V of the *Environmental Protection Act 1986*, administered by the Department of Environmental Protection. The proponent or its service provider will be required to lodge an application for a Works Approval prior to the commencement of construction of the proposed landfill facility and the wastewater treatment plant. These facilities, if approved, will be regulated by the Department of Environmental Protection by a licence issued under Part V of the EP Act.
- The development of the proposal, if allowed to proceed, would be managed though a proposed Land Development Agreement prepared by the Department of Land Administration. The proposed Land Development Agreement will detail, among other things, the staging requirements and development milestones to be achieved by the proponent.

6. Other Advice

Sustainable environmental management of the Ningaloo coast

Through this assessment, it has become evident that a tourist and residential facility of the scale proposed at Mauds Landing will ultimately attract additional people to the southern sector of the Ningaloo Marine Park and these people are likely to have regional-scale implications for environmental management.

Growth will occur in this region regardless of this proposal, although this growth is currently limited by infrastructure provision. Accordingly, it is necessary that planning for the future of this area gives consideration to developments of the scale proposed here but also acknowledges the potential for significant expansion of existing tourist facilities/nodes in the region. The planning should consider potential cumulative environmental impacts of these tourist facilities, and particularly the impacts associated with human-use pressures, in the context of baseline knowledge of environmental values, agreed environmental objectives and the resources required to achieve these objectives.

With respect to existing tourist facilities/nodes, expansion and diversification of Coral Bay could occur under the current Shire of Carnarvon planning scheme if public drinking water and wastewater treatment infrastructure are provided. It must be borne in mind that along with a public water supply, the Government's commitment to provide wastewater treatment infrastructure to Coral Bay would allow for this expansion to occur. One estimate is that the formal tourist capacity of Coral Bay could increase to approximately 3000 over-night visitors. This number of visitors will clearly place increasing pressure on the environmental values of the Mauds Sanctuary Zone and the Ningaloo Reef.

The Government's commitment to provide wastewater infrastructure may ultimately provide one option to address one aspect of current peak season overcrowding in Coral Bay. However, in accord with the EPA's advice on the CCR proposal, additional human-use pressures arising from any independent expansion of Coral Bay is also likely to require a commitment of Government management resources to ensure the on-going sustainability of the Ningaloo Marine Park and its adjacent coastal area in relation to people's activities.

The possible implications of an alternative scenario where the CCR proceeds and there is concurrent expansion of Coral Bay should also be considered. If the CCR proposal is allowed to be implemented, the services infrastructure provided as part of that proposal could be proportionally upgraded by the Government, similarly allowing Coral Bay to expand.

Under this scenario, a significant tourist node, jointly-centred at Coral Bay and Mauds Landing, could be created in the southern sector of the Ningaloo Marine Park. The EPA concurs with the proponent in that some people who currently stay in Coral Bay will 'over-flow' to facilities at the CCR proposal. However, the proportion of visitors to the CCR proposal which account for 'over-flow' is debatable and one estimate is that the ultimate Coral Bay/Mauds Landing node could have a total capacity somewhere in the order of 5000 to 6000 people. By way of comparison, the EPA understands that the number of visitors staying at Rottnest Island during peak periods is approximately 3840 and the population of Exmouth was approximately 4267 on census night in 2001. The extent of the management obligations under this scenario have not been determined. However, they are likely to be significant.

In view of the possibility that Coral Bay could expand regardless of whether the CCR proceeds, in its assessment of the Shire of Carnarvon Town Planning Scheme, the EPA is likely to provide strategic environmental advice on matters relating to the future planning and management of the Coral Bay townsite.

By leading to an overall increase in the tourist capacity in the southern sector of the Marine Park, the CCR proposal and/or growth of the Coral Bay townsite is likely to have other corresponding flow-on effects, such as condensing the planning horizon for improved regional infrastructure, including the proposed road improvements between Coral Bay and Cape Range National Park. Such proposals for infrastructure, have the potential to open up less-visited coastal areas and therefore are likely to have regional-scale environmental management implications for relevant Government agencies.

If there is to be truly sustainable tourism in this important and sensitive area, a clearly defined regional management framework should be established and implemented. At present there is no single Government agency/entity which has the ability to adequately control access to coastal areas along the entire Ningaloo Marine Park to enable appropriate integrated management of coastal and sea areas. Rather, environmental management is sectoral with a number of agencies responsible for the protection of the natural environment. Accordingly, adequate protection of land and sea areas in the vicinity of the Ningaloo Marine Park needs to occur through carefully planned and co-coordinated integration of management arrangements. This will rely on a common and agreed set of environmental quality objectives to guide sectorial management. It is important that these objectives are considered at the earliest possible stage. Coordinated management is needed to ensure that decision-making is more straightforward, environmental safeguards are put in place up-front, and monitoring/management feedbacks are linked to the agreed environmental objectives.

The EPA notes that the *Carnarvon-Ningaloo Coast Regional Strategy* currently being undertaken by DPI may, with involvement of the EPA, the MPRA and other natural resource management agencies where appropriate, provides the framework, including the public participation, for the setting of the environmental objectives for this region.

The EPA notes that in other areas of the State and Australia, management of areas of exceptional environmental and social value is overseen and/or undertaken by specific management entities. Examples include the Rottnest Island Authority and the Great Barrier Reef Marine Park Authority. The EPA is of the opinion that some consideration should be given to this approach to management of the Ningaloo Marine Park and adjacent coastal areas.

The EPA is mindful that a possible outcome of the CCR proposal and/or other planning processes in the southern sector of the Ningaloo Marine Park is that it may be necessary to place more stringent controls on peoples' activities in order to protect important environmental values. In this regard, the EPA notes the advice of the MPRA which suggests that the imposition of such rigorous management regimes could have impacts on people's expectations and experiences of the Marine Park.

Other matters

At a more local level, if the CCR proposal is allowed to proceed, a number of matters should be addressed by parties other than the proponent.

Firstly, the EPA has raised the matter of placing binding planning controls on structures built within the CCR lease area to minimise the risk of light-related impacts on turtles which use Bateman Bay as a nesting area and to manage the aesthetics of the proposal. Planning controls are also likely to be necessary to reduce the area of land on freehold lots which require irrigation and/or nutrient applications.

The proponent has suggested that to ensure that a high standard of development is maintained throughout the CCR, development controls will be imposed and ultimately reflected in Council's Town Planning Scheme Policies to ensure development is consistent with the unique values of the location and a high standard of visual amenity. The EPA has not received advice to suggest that a mechanism to address planning controls has been finalised.

The EPA is of the view that, if the proposal is to proceed, the WAPC should give attention to and provide appropriate guidance on this matter to the Minister for Planning and Infrastructure. Resourcing for the Shire to administer any planning controls may also require attention.

The EPA is aware that the Government has made commitments to address the immediate boating management issues affecting Coral Bay. The DPI is currently seeking approvals for a small boat facility and DCLM is undertaking public consultation on a draft Coral Bay Boating Strategy. Coral Bay is a Sanctuary Zone within the Management Plan of the Ningaloo Marine Park and the values are impacted upon to a significant degree. If the CCR proposal were to proceed, the opportunity should be taken at an early date to ensure that activities which have the potential to threaten the values and purpose of the Mauds Sanctuary Zone could be relocated to a Mauds Landing facility.

The EPA also considers that it would not be desirable for there to be two landfill facilities in close proximity to Coral Bay. As the CCR proposal includes a managed landfill facility it is the EPA's view that arrangements should be made between the DEP, the Shire of Carnarvon and CCMD to ensure that waste management is appropriately rationalised. If the decision is made to allow a landfill facility to be developed as part of the CCR proposal, the existing landfill should be decommissioned and rehabilitated to an appropriate level. The responsibility for the existing landfill facility at Coral Bay currently rests with the Shire of Carnarvon.

The EPA considers that, if the proposal proceeds, opportunities should be taken by responsible entities to formalize the movement of vehicles to and from Mauds Landing to halt current disturbance of the saline flat area caused by indiscriminate vehicle access. The EPA also notes that the proponent also proposes to relocate the existing Coral Bay airstrip, which currently operates from the saline flat area.

As well as provision of resources for natural resource management agencies at the CCR, the EPA considers that it will be important for the Government to provide an appropriate level of resourcing to support other services to enforce measures to protect the environment. By way of example, the provision of appropriate public services, including law enforcement, would assist the community proceeding to a greater form of self-regulation.

Finally, the breakwaters for the CCR are proposed to be constructed within the boundary of the Ningaloo Marine Park. If the proposal brings about a requirement to amend the boundary of the Ningaloo Marine Park, the EPA understands that this could only be achieved if the Governor publishes an order in the Gazette to this effect, and the order is adopted through the Parliamentary process.

7. Conclusions

The EPA has considered the proposal by Coral Coast Marina Development Pty Ltd to develop a tourist centre and residential subdivision centred around an inland marina.

The EPA notes that the Ningaloo Marine Park is an icon of State, National and International significance. Over time there is evidence of an increasing desire for people, not only from WA, but Nationally and Internationally, to visit this area and enjoy its values. One estimate is that visitation is likely to double in the next decade. Judgments need to be made as to the manner by which these people will be accommodated and facilities made available for them to enjoy the attributes of the Marine Park.

It is evident to the EPA that this proposal is likely to cause a measurable increase in people pressure, requiring a proportionate and effective management response. It has not been established that the planning framework is sufficiently advanced to quantify the management response required to ensure the protection of the Ningaloo Marine Park and adjacent coastal areas. In the absence of this framework, a consequence of appropriate management could be the imposition and enforcement of more stringent controls on the activities people currently undertake in the Ningaloo Marine Park,

including fishing, boating and camping. The Government would need to consider the implications of increased management and more stringent regulation measures in the context of people's experience of the Ningaloo Marine Park, the possible movement of people pressure to other areas and its commitment to seek World Heritage nomination for the Ningaloo Marine Park.

This proposal provides one avenue to address the growth in the area. However, it is a matter of judgment by Government as to whether the proposal is sustainable, particularly from an environmental management point of view.

The EPA's overarching advice to the Minister for the Environment and Heritage is that, while the biophysical and pollution impacts associated with the proposal's footprint could be managed to meet the EPA's environmental objectives with satisfactory implementation of environmental management commitments and recommended conditions, and while the proponent has made commendable efforts to address issues of wider management, it is beyond the proponent's authority to undertake the management of people's activities outside of its development area, which is necessary to ensure that the values of the Ningaloo Marine Park and adjacent coastal areas are protected.

Accordingly, it is the EPA's recommendation that the proposal should not be approved for implementation unless Government is able to:

- identify and confirm the environmental management resources required across the natural resource management sectors to adequately protect all values of the Ningaloo Marine Park and its adjacent coastline, as well as having regard for potential World Heritage values from the impacts of additional people pressure;
- confirm that any commitments by CCMD to support environmental management are legally and financially sound in terms of their capacity to deliver the necessary environmental management in the long-term;
- make a whole-of-Government commitment to any environmental management arrangement with CCMD; and
- commit to prepare and implement an effective environmental management system, including the preparation of management plans and the provision of resources commensurate with the level of human-use pressures on the Ningaloo Marine Park, to ensure that the environmental values of the region are adequately protected in the long-term.

The thrust of the EPA's advice is fundamentally related to the challenge of sustainable use of the Ningaloo/Cape Range coastal area in the context of the Government's election commitment to seek World Heritage listing for the Ningaloo Marine Park.

8. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the Coral Coast Resort, which includes a range of short stay tourist accommodation and a residential subdivision centred around an inland marina at Mauds Landing, north of Coral Bay.

2. That the Minister considers the report on the relevant environmental issues of:
   a) impacts associated with the footprint of the proposal;
   b) potential off-site marine impacts;
   c) potential off-site terrestrial impacts; and
   d) long-term management;

   as set out in Section 4.
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives for factors associated with the footprint of the proposal would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 5, including the proponent's commitments.
4. That the Minister notes that the EPA has concluded that, with respect to potential water quality impacts, the proponent should undertake additional work to ensure that construction and operation of the proposal does not cause detectable changes in key indicators of ecosystem health in the Mauds Sanctuary Zone, determined by the MPRA.
5. That the Minister notes that the EPA has considered a proposal by the proponent for a draft site-specific Specific Area Marine Management Plan to manage potential off-site environmental impacts associated with the visitation to the proposed facilities in the Ningaloo Marine Park.
6. That the Minister notes that the EPA considers that while the Plan referred to in 5 above broadly covers the most relevant environmental issues, the proponent's authority to implement the Plan is limited and that the authority and responsibility for managing human-use pressures in the Ningaloo Marine Park resides with Government agencies.
7. That the Minister notes that the EPA considers there is likely to be a need to extend any site-specific management of people associated with the proposal to include land areas as well as sea areas.
8. That the Minister notes that the EPA has considered, at a broad level, a draft Natural Resources Management Agreement for the provision of support to management agencies with responsibilities in the Ningaloo Marine Park. However, the EPA considers the current draft document is unlikely to provide assistance to the Government's natural resource management agencies for environmental management commensurate with the obligations the proposal creates.
9. That the Minister notes that the EPA's overarching advice is that, while the impacts associated with the footprint of the proposal could be managed to meet the EPA's environmental objectives with satisfactory implementation of environmental management commitments and recommended conditions, and while the proponent has made commendable efforts to address issues of wider management, it is beyond the proponent's authority to undertake the management of people's activities outside of its development area, and such management is necessary to ensure that the values of the Ningaloo Marine Park and adjacent coastal areas are protected.

10. That, noting the EPA's advice in recommendation 9 above, the proposal should not be approved for implementation unless the Government is able to:
    - identify and confirm the environmental management resources required across the natural resource management sectors to adequately protect all values of the Ningaloo Marine Park and its adjacent coastline, as well as having regard for potential World Heritage values from the impacts of additional people pressure;
    - confirm that any commitments by CCMD to support environmental management are legally and financially sound in terms of their capacity to deliver the necessary environmental management in the long-term;
    - make a whole-of-Government commitment to any environmental management arrangement with CCMD; and
    - commit to prepare and implement an effective environmental management system, including the preparation of management plans and the provision of resources commensurate with the level of human-use pressures on the Ningaloo Marine Park, to ensure that the environmental values of the region are adequately protected in the long-term.
11. That the Minister notes that the EPA has provided a set of conditions and procedures pursuant to Section 44(i)(b) of the *Environmental Protection Act 1986.*
12. That, if the proposal is approved for implementation, following consideration of the EPA's recommendations set out above, the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

State and local government agencies

Western Australian Museum
Department of Conservation & Land Management
Fisheries Western Australia
Marine Parks & Reserves Authority
Main Roads Western Australia
Department of Transport
Ministry for Planning
Water & Rivers Commission
Department of Minerals & Energy
Gascoyne Development Commission
Aboriginal Affairs Department
Water Corporation
Shire of Carnarvon
Shire of Exmouth
Department of Environmental Protection

Organisations:

WA Naturalists' Club
Active Community Environmentalists
Busselton-Dunsborough Environment Centre
Conservation Council of Western Australia
Recfishwest
Australian Marine Conservation Society – WA Branch
NSW Field Ornithologists Club Inc
Greenpeace Australia Ltd
Carnarvon Tree Society
Humane Society International
Australian Conservation Foundation
Institution of Engineers, Australia
Boating Western Australia Inc
Ningaloo Action Group

Individuals:

J Gilmour
N Pastalatzis
L Smith
S Folks
S & S Cary
J & J Tuffin
J Glover
C Knott
D Webb
P May
T & S Woodward

D Clarke
D Bobridge

B Goodwin
M Chandler
R R & W J Winfield
R Westerberg
P R Wycherley
F Martin
J F Walsh
B Perriam
E Sankey
C A Knudson
V Forbes

J Hughes
T Garde

J Hunt
G & S Clarke
A Brown
D Williams
K Penney
T Williams
S Rossetti
D Tilly
B Murphy
R Goonan
M Calpaledjian & T Lorraway
R Halliday
D Perret

E Friedman
H Jackson
K Curwen
N Wild
A Harris
J McCauley
G & N Collinson
S Wylie
R & J Rigg
A Walsh
R & M Shaw
Confidential
M L Cambridge
A Brearley
R D Walsh
F Orr
A McColl
G Cossil
N Taylor & G Taylor
S Varney
D Mangili & B Baker
D A Preest
D Baldwin
B & B Bolitho
I Parker
R Jack, A McTaggart & A McTaggart
F Symonds
R W Baker
Mr Chris Baker MLA
L S Owen
R Wharton
E Gwynne
G & V O'Sullivan
T & J Cooper
M Bullard
T Wootton-Leeuwenburg
K Pether
K L Atkinson
M Gregson
P de Cuyper
V Law
D Oliver
T Farquhar
J Cooper
P Mioduszewski
R Tapp
R Flanagan
C Pike
E Manolas

D J McMillan
I Lovegrove
P de Cuyper
A Stubber
S Mitchell
P Martin
L Stacker
J Tasma
R Hobbs
R Lemin
B Dufall
R May
J Hawkes
N McLeod
J Cammack
D Green
J Payne
H Shave
B Norman & R Bennett
K Edyvane
B Saunders
P Hird
A Black
D Pang
W J Dale
M Rogers
C Swift
K Buck
R Chandler
Confidential
P Dupen
L & Ms J McCain
A Carter
H Peerless
T J Wheatley
K McGinty
F Pryce
J Hutchison
J Monaghan
J R Hill
P Roeth
S Day
O Mueller
R Swainston
D & G C O'Sullivan
M Hume
A Lewis
C Jones
C Conceicao

D Green
T Taylor
W F Brogan
H Paine & W Binks
D Moir
M Hudson
K English
M Westera
W Tubman
L Stubbs
L Brideson
L Rowney
Poulter OAM
T Leeuwenburg
J Foss
S Lance
S Vincent
A & M Imison
D Holtsclaw
A Kruger
J Wilde
Snorth
J & D Edwards
M Lambert
C Ball
K Simpson
D Kuret
Sophia
G Walton
A Willemson
B Fleming
D Beck
S Roytowski
B Hill
S Kelly
P Seaglove
D van Straalen
J McCoy
L Moore
I Mofflin
J Bain
C Canny
A Ramelet
D Spillane
S Whalley
A Wasylkewycz
J Kuret
A Hindinger
H C Finn

C Farrell
C Langmann
R Crake
M Beswick
S Greener
S Elverd
M Hansen
P Green
L Corredor
P Cullen & Family
A C & M McDermott
J Cary
A Halford & J McIlwain
G Locke

Appendix 2

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Appendix 3

Summary of identification of relevant environmental factors

Appendix 3: Summary of Identification of Relevant Environmental Factors

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Marine Fauna **General issues**	The proposal could result in a shift in the current focus of boating activity from southern Bills Bay (Coral Bay) to Mauds Landing (ATA 2000a) and will generally lead to an increase in the numbers of visitors to the Mauds Landing/Coral Bay in the long term. The proposal potentially provides an avenue to improve current management of issues that can impact marine fauna that utilise Bateman Bay beaches as a breeding site. The proposed draft Specific Area Marine Management Plan (SAMMP) could provide a framework for area-specific monitoring and management of potential impacts on marine fauna brought about by the proposal, initially to be undertaken by Coral Coast Marina Development Pty Ltd (CCMD) and then, as proposed by the proponent, by Department of Conservation and Land Management (DCLM) in the longer term.	**Government agency submissions – general marine fauna issues** The Western Australian Museum notes that there is no consideration given to invertebrate marine fauna in the PER, particularly the fauna that inhabits sand areas. Even though the PER stresses the extent of sand communities in the Development Impact Area, no effort appears to have been made to examine the fauna or the important part they play in the biology of the area. **Public submissions - general marine fauna issues** Common issues raised in public submissions regarding the impact of the proposal on marine fauna, included: • Concern about the level of baseline information gathered by the proponent both at the local and regional levels is not adequate to judge the impacts of the proposal on marine fauna species or to predict the effectiveness of proposed management strategies; • no assessment was made of the environment's capacity to sustainably support additional impacts from people; • concern was expressed regarding the cumulative impact of the proposal across a range of scales from global-scale impacts (e.g. threats to marine fauna which are declining world-wide) to local impacts (localised impacts on fauna as a result of additional local tourism). • there is sufficient uncertainty about the conservation significance of several marine species which use Bateman Bay and the potential consequences of any impacts that the proposal should not be allowed to proceed; • a risk assessment is required to establish the manageability of impacts on marine fauna threatened by increased visitor activity; • shifting the focus of boating activity to Bateman Bay may increase the risk of boat strikes on marine fauna which utilise Bateman Bay; • the proponent's commitments in relation to the management of potential impacts on marine fauna from people in boats and on beaches are inadequate; • the proponents commitments would be difficult to implement; • suggestions regarding management of vessel movements, speed and mooring to protect marine species and habitats; • the potential impacts of the proposal on habitat (direct loss of beach), food resources (water quality impacts on algae, benthic invertebrates) and population ecology generally of marine fauna are unacceptable, particularly in light of significant threats to migratory species in other parts of their distribution; • it is unacceptable that the proposal, by the proponent's admission, could impact on several marine fauna, including listed species; • dispersal of litter and debris from the proposal has the potential to impact on marine fauna; and • shark nets proposed in the marina may injure or kill marine wildlife.	**Marine fauna is considered to be a relevant environmental factor that will be discussed in the context of the relevant environmental issues:** • **the proposal footprint; and** • **off-site marine impacts..**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
Marine Fauna: Sea turtles	In addition to boating-related issues, increasing the focus of tourist activity on the beaches of Bateman Bay could impact on turtle nesting behaviour and hatchling recruitment. Light-spill emanating from the proposal could affect turtle nesting behaviour and the sea-finding response of hatchlings. Breakwaters could affect beach alignment and profile, particularly followings storm events. Cyclone season and turtle breeding times occur at similar times of the year.	**Government agency submissions regarding sea turtles** In regard to sea turtles, DCLM advised that: • the PER document provides no assessment of the importance of this section of beach relative to the extent of the known turtle nesting area along Bateman Bay. • the Bateman Bay beach is a very important nesting area for turtles. Within the Ningaloo Marine Park, the Bateman Bay beach is the most significant nesting area for loggerhead turtles and for hawksbill turtles, the area is the southern-most nesting area in WA. • there have been no targets or specific commitments set with respect to minimizing the impact of lighting from the resort development on turtle nesting areas. This needs to be addressed and there should be specific commitments to include shielding of lights and use of sodium vapour lights where these will be visible from beach areas. • effective off-road vehicle control and hardened beach access have the potential to reduce the current impacts on these nesting sites. It is acknowledged that construction of the breakwater will provide a barrier to access from the south along the beach, but other measures will be required to ensure the impacts from the increased numbers of people are minimized. The Department of Environmental Protection (DEP) raised issues regarding potential impacts on turtles as a consequence of any changes in beach conditions which may occur as a result of the proposed breakwaters. The Department of Planning and Infrastructure (DPI) recommends that any development adjacent to turtle rookeries should be screened from the foreshore to prevent the disorientation of hatchlings. **Public submissions regarding sea turtles** In addition to the general issues outlined above, public submissions argue that: • the proponent will be limited in its ability to effectively manage lighting, particularly from private residences; • the impacts of sedimentation associated with construction and breakwaters have not been considered adequately given that these factors could affect beach characteristics, which are known to be important factors influencing turtle breeding behaviour; • the proposal will increase the already considerable impacts on sea turtles from feral / domestic animals; • visitors to the proposal are likely to disturb nesting sea turtles; and • there is a high abundance of sea turtles in Bateman Bay and it is unacceptable to many submitters that these list threatened animals will be threatened by increased boat traffic as a result of the proposal.	

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Marine Fauna: Dugongs		**Submissions regarding dugongs** In addition to the general issues outlined under the factor of marine fauna above, some or all of which were raised specifically in relation to dugongs, public submissions suggest that: • increased boating activities are likely to have an unacceptable impact on dugongs through disturbance (noise), pollution, anchor damage to habitat and direct strikes; • in view of threats faced by dugongs elsewhere in the world, it is considered unacceptable to subject dugongs to risks from human activities in what should be an environment managed primarily for conservation; • groups of dugongs commonly enter Bateman Bay during the winter months to feed on seagrass in the area and the significance of the area for dugongs has not been adequately considered by the proponent; and • dugongs are regularly observed in Bateman Bay and their occurrence is thought to be related to seagrass meadows found near Point Maud and within the basin of Bateman Bay. Concern was expressed that little consideration was given to down-stream impacts on dugongs which may occur as a result of impacts on food resources including seagrass and macroalgae. Specific issues raised in relation to marine flora are outlined under the factor of marine flora.	
Marine Fauna: Whales and dolphins		**Submissions regarding whales and dolphins** In addition to the issues outlined under the factor of marine fauna above, some or all of which were raised specifically in relation to whales and dolphins, public submissions suggest that: • insufficient research has been carried out to determine the importance of Bateman Bay to migrating whales and calves; • there is significant uncertainty regarding populations of cetaceans which use Bateman Bay as habitat; • the proposal will increase the risk of disturbance to cetacean populations in Bateman Bay as a result of boat noise and collisions. No information has been provided as to the potential impact of disturbance on cetacean populations. Before any development which increases boat traffic in this area, detailed analysis of whale movements and behaviours in Bateman Bay must be undertaken; and • the proponent's management commitments are inadequate to avoid impacts on whales and dolphins. In particular, submitters consider interactions between whales and private pleasure craft will be very difficult to manage effectively.	
Marine fauna: Whale sharks and sharks		**Submissions regarding whale sharks and sharks** In addition to the general issues outlined above, some or all of which were raised specifically in relation to whale sharks and sharks, public submissions suggest that: • Ningaloo Marine Park is one of the only places in the world where a predictable aggregation of whale sharks occurs close to shore, and where whale sharks are not threatened by fishing impacts. Public submissions consider that the potential impacts of increased boat traffic, which will coincide with whale shark migration routes disturbing or injuring whale sharks is unacceptable; • there is uncertainty about the effects of increased boat traffic on whale shark migration though the Marine Park. Some submissions claim that the potential impacts will cause whale sharks to be displaced from the area; • the proponent has not clearly demonstrated that it or Government agencies would be able to manage the increased pressure placed on whale sharks as a result of the proposal; • the proposal does not make a significant difference to any need to further regulate whale shark interactions; • information presented in the PER about the locations where whale sharks are commonly encountered is incorrect; and	

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		• there is concern that the proposal considered here is Phase 1 of a larger proposal which could accommodate more boats dissecting the sharks' path. Concern was expressed about the potential impacts of the proposal on aggregations of reef sharks which are observed south of Point Maud. These aggregations are thought to be unique and would be significantly impacted be increased visitation if the proposal were to proceed. The proponent has not proposed management to address this matter. The issue of public safety was raised in respect to large sharks commonly observed off the beach are Mauds Landing.	
Marine Fauna: Manta rays		**Government agency submissions regarding manta rays** DCLM suggests that data presented in the PER on manta rays forms an inadequate basis by which to assess the extent of potential impacts from increased pressures associated with the proposal. The Department of Fisheries (Fisheries) also indicated that there is limited information available about the biology and behaviour of species such as manta rays, which may be expected to be increasingly the focus of tourist attention. Fisheries suggest the impact of increased nature observation tours on Manta Rays will need to be researched and managed, perhaps to the extent that has been introduced for whale shark interactions in the Ningaloo Marine Park. **Public submissions regarding manta rays** In addition to the issues outlined above, some or all of which were raised specifically in relation to manta rays, public submissions suggest that: • insufficient research has been carried out to determine the distribution of, and areas of importance to, manta rays in Bateman Bay. It is argued that without this information, the regional significance of manta rays in Bateman Bay can not be established with any certainty; • concern was expressed that once the marina is established, and boat traffic to Cardabia Passage and elsewhere in Bateman Bay is increased, the only management tool available will be monitoring manta ray responses to the increased interactions. This is considered to be unacceptable; • concerns have been expressed about potential direct (boat strikes) and indirect (disturbance, displacement) impacts on manta rays in Bateman Bay. Little is known about the possible consequences of potential impacts of increased boating and tourism activities; • the proponent will be limited in its ability to manage private pleasure craft and accordingly the potential impacts on manta rays; and • there will be an inevitable (and generally unacceptable) decline in manta numbers in the area if the proposal were to proceed.	

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Coral reefs: Natural reefs	**Natural coral communities** The proposal could result in a shift in the current focus of boating activity from southern Bills Bay (Coral Bay) to Mauds Landing (ATA 2000a) and generally lead to an increase in the numbers of visitors to the area in the long term. During construction, the proposal has the potential to reduce water quality (particularly by generating turbidity plumes) over a broad area for a period of 5 years. The proposed draft SAMMP could provide a framework for area-specific monitoring and management of potential impacts on coral reefs brought about by the proposal, initially to be undertaken by CCMD and then, as proposed by the proponent, by DCLM in the longer term.	**Public Submissions** Concern was expressed that coral reefs would be impacted as a result of deterioration in water quality and changes to sediment dynamics, which would occur as a result of the proposal. These concerns were raised in relation to both construction and operational aspects of the proposal. An increased level of boating activity will increase the risk of impacts on coral reefs through anchor and diver damage, fishing pressure, loss of fishing gear, litter and increased risk of hydrocarbon spills from boats. Many submitters considered that these types of impacts are unacceptable. Concern was expressed that the proposal and increased pressures it could bring (water quality and people pressure) would impact in a cumulative way with other factors such as greenhouse-related impacts reduce the resilience of the reef to recover from natural disturbances such as cyclones and predation. Submitters consider that it is not appropriate to subject the corals of the Ningaloo Reef to pressure from boating-related impacts, pollution and human activities, considering documented impacts on coral reefs world-wide from inappropriate fishing practices, climate change, coastal run-off, pollution and tourism. No assessment was made of the carrying capacity of the marine environment near the proposal.	The results of surveys undertaken by the proponent suggest that no coral reefs will be directly impacted by the proposal. Notwithstanding, the EPA considers that there is a potential for coral reefs to be in directly impacted by deterioration in water quality, particularly associated with the construction and early operation phases of the proposal. The EPA has given attention to the potential impacts on corals as a result of the proposal footprint in the context of marine water quality management. A condition has also been recommended for monitoring and management of seagrass and corals (condition 5). The proposal also has the potential to impact on corals via the additional off-site human use pressures it will create. The EPA notes the proponent's commitment to undertake habitat mapping and coral monitoring as part of the proposed SAMMP. **The EPA has given attention to the risks of off-site impacts on coral reefs in the context of off-site marine impacts.**
Coral Reefs: Constructed snorkelling reef	**Proposed constructed snorkelling reef** The proposal includes the provision for an artificial substratum for colonisation by corals.	**Government agency submissions regarding the proposed constructed snorkelling reef** The WA Museum raised several issues in relation to the proposal to create an artificial reef in the marina. Specific issues raised include the: • proponent's ability to successfully achieve its proposed objective; • proponent's apparent limited knowledge of the science associated with reef reseeding; • potential requirement to source live coral to maintain any artificial reef created in the marina; and • real value of creating an artificial reef and whether is would satisfy the needs of tourists and result in real environmental benefits. DCLM point out that any works to establish and maintain an artificial reef would be the responsibility of the proponent **Public submissions regarding the proposed artificial reef** Public submissions also raised issues regarding the uncertainty about the success of an artificial coral reef within the marina. Several submitters with experience in coral reef research anticipate establishment of a coral reef in marina is unlikely as this has not be achieved elsewhere, except under highly controlled environments in aquariums. The major limiting factors likely to influence the success of the proposed reef were considered to be related to water quality (e.g. temperature, water clarity, oxygenation, nutrients). The diversity of any corals, which may become established on the proposed reef structure, would significantly reduce compared to the diversity found in natural systems. The source of corals for the reef was of concern to some submitters.	**Constructed snorkelling reef** The proponent suggests that it does not intend to replicate a natural coral reef ecosystem with the proposed artificial reef. Rather, CCMD suggest that the artificial reef will provide an alternate shore based snorkel/dive experience in a convenient location in a safe environment, which will: • reduce pressures in the natural environment; and • provide additional opportunities for learner divers and snorkellers. The EPA considers that the effectiveness of the proposed constructed reef in reducing the pressures on the natural environment has not been determined. Notwithstanding, it can be expected that many people who visit the proposal would want to experience the Ningaloo Reef. Accordingly, an adequate level of management by relevant Government agencies will be necessary to protect the important values of the Ningaloo Reef from the impacts of tourism if the proposal is allowed to proceed. In its responses to submissions the proponent advised that that the source of coral larvae and techniques for the establishment of biota on the artificial reef will be developed as the proposal proceeds. The proponent has confirmed that living corals will not be transplanted. The EPA is of the opinion that the degree to which corals and

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			other sessile coral reef biota become established and grow on the artificial substrate to be provided in the marina, will be partially a function of the proponent's ability to maintain and achieve reasonable Environmental Quality Objectives for water quality in the proposed marina. Any other initiatives by the proponent, which may include collaborative research with the Australian Institute of Marine Science may also possibly contribute to the rate of colonisation and survival of corals on the artificial substratum. As the EPA considers that the success of the artificial reef is likely to be influenced by the proponent's ability to manage water quality, **the EPA is of the view that the artificial snorkelling reef does not require further investigation.**
Marine flora	The proposal will result in the direct removal of 5ha of sand / pavement habitat. Construction of the proposal will has the potential to reduce water quality over an area of 9 km^2 over a period of 5 years. *Posidonia coreacea* is found in patchy meadows in Bateman Bay. This species is at or near its northern extent of its geographical range at this location. *Halophila ovalis* is found in shallow clear waters in Bateman Bay. This species is an important food resource for dugongs throughout their distribution.	**Government agency submissions** DPI advised that: • the proponent should implement the SAMMP in such a way that it will be able to mitigate the impacts of the proposed dredging on seagrasses; • the proponent's conclusion that any loss of seagrass would not be significant, is underpinned by the assumption that seagrass is not locally significant (as food for dugong or green turtles etc); and • the proponent should establish whether the capital dredging and any subsequent maintenance dredging could be managed to avoid serious levels of degradation to marine flora and benthic habitat. **Public submissions** Submissions focused on issues, including: • the inadequacy of information collected by the proponent for the purposes of assessing potential impacts; • concern about the proponent's proposal to complete habitat mapping after approval is granted; • the impact of the proposal on seagrass and macroalgae which are known in some areas to be critical habitat for dugongs and turtles; • the potential impacts on seagrass as a result of deterioration in water clarity due to construction activities and ongoing operation; and • the potential impacts on seagrass from changes in the nutrient status of Bateman Bay.	**Marine flora is considered to be a relevant environmental factor and is discussed in the context of:** • **the footprint of the proposal; and** • **off-site marine impacts.**
Fish Stocks	The proposal includes an inland marina with: • a sealed 2-lane boat launching ramp; • 140 bay car/trailer parking area; and • 100 marina boat pens. Provision of the marina has the potential to provide operational benefits for the enforcement of fishing regulations by providing a single point of entry/exit to and from the waters of	**Government agencies submissions** Fisheries advised that the major impacts on fish stock in the area through the proposal will occur through: • increased numbers of visitors and the presence of more people over longer periods of time; and • improved boat launching and mooring facilities which will allow larger and better equipped boats to operate for longer periods of time with the capability of extending the zone of high exploitation (likely to extend in a 20km area around the proposal). Of particular concern to Fisheries is the impact of increased fishing pressure on localised fish stocks of reef species. There is currently limited baseline biological and stock assessment information for most of these species, but previous experience (e.g. snapper stock in Shark Bay) points clearly to a high risk of stock collapse for some species as a result of increased fishing	**Fish stocks is considered to be a relevant environmental factor and is discussed in the context of the issues:** • **off-site marine impacts; and** • **long-term management.**

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	the Marine Park. Accommodation for 2500 people at 100% occupancy (based on 2.54 people per unit).	pressure associated with improved visitor facilities and coastal access. As a result there will be a need for increased and ongoing management to ensure sustainability of fish stocks. Any approval should be conditional on the proponent entering into a legally binding agreement with the Government which outlines arrangements for management. The details of the management requirements should be developed with advice from Fisheries and DCLM. The WA Museum suggests the PER did not adequately discuss the impact of 240 boats on fish stocks. The WA Museum suggests that an increase in sanctuary zones to a size which is adequate for fish replenishment areas is needed. **Public submissions** Public submissions raised concern about the limited information presented by the proponent on the current status of recreational fish stocks and the impacts of the anticipated increases in fishing pressures which will occur as a result of the proposal. Insufficient information is available to support the proponent's conclusion that the impacts of the proposal can be managed. Many submitters considered that the level of information provided was inadequate. Many submitters consider that the proposal will result in more stringent fishing regulation. Some submitters consider this outcome is not desirable. Concern has been raised regarding the proponent's ability to manage impacts and ensure compliance with fisheries regulations, particularly once boats leave the marina. Some submitters believe the proposal provides an opportunity to enhance the management of recreational fishing in the area. Most recreational fishing occurs outside the reef and for the large number of anglers using Cardabia Passage the area fished from the Coral Coast Resort would be the same as that from Coral Bay. There is currently a particularly high fishing pressure inside the reef for those operating from Coral Bay. To the extent that these anglers shift to the Coral Coast Resort as a base, will reduce the localised pressure inside the reef. There should not be a problem with localised pressure on fish close to the new marina entrance. The area has a generally flat sandy bottom and those fish present in the area would be expected to range over a wide area. Recfishwest believe that the Coral Coast Resort will not greatly increase total visitation to the area because it should divert many visitors from Coral Bay. If an increase in fishing effort does occur it would only be a part of the overall increase in fishing effort, which has to be managed.	
Coastal processes	Two 200m long breakwaters, which extend into Bateman Bay. The breakwaters have the potential to block long-shore sediment transport, particularly during storm events. The proponent suggests that breakwaters will not cause significant	**Government agency submissions** The DPI Maritime Division advised that: • coastal processes appeared to have been well researched and appropriately evaluated; • the proponent's commitments were limited to 'identification of remedial actions'; and • the proponent should commit to the implementation of appropriate remedial actions to the satisfaction of DPI Maritime Division and DCLM. The WA Museum noted that no modelling has been undertaken of the effect of the breakwaters on longshore sand drift and suggested it would be questionable to consider there would be no impact.	**Coastal Processes is considered to be a relevant environmental factor and is discussed in the context of the issues:** • **footprint impacts; and** • **long term management.**

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	changes to beaches or shoreline in Bateman Bay due to the approach of swell waves parallel to the shore under normal conditions.	The DEP noted that: • no wave measurements were made in Bateman Bay; • the proponent's assessment of coastal processes did not appear to address the impact of the breakwaters under ambient conditions; and • more information was required to substantiate the proponent's assumptions that natural wave processes would realign beach profiles if impacted. The submission by the Shire of Carnarvon focused on: • concern that the work presented in the PER did not adequately address the issue of littoral drift; and • concern regarding the impacts of the breakwaters under conditions other than severe cyclones as modelled by the proponent and how sediment would be redistributed and the potential impacts of recurrent storm events. **Public submissions** Submissions focused on issues including: • limited faith in the proponent's modelling and predictions about impacts on beaches; • concern that the construction of the marina and breakwaters are likely to have significant and unacceptable impact on coastal processes; • concern about the impact of the proposal on coastal processes and possible downstream consequences of other important values of the Ningaloo Marine Park (eg birds and turtles); • why any impacts on coastal processes as a result of a built structure should be acceptable in a Marine Park; and • concern that the proposal would require maintenance dredging with resultant impacts.	
Terrestrial flora	The proposal will result in the clearing of approximately 114 ha of habitat for native flora including coastal dunes, saline flats and seasonally inundated salt flats.	**Government agencies submissions** The DPI suggest that: • the loss of native vegetation should be kept to the minimum; • replanting strategies should be investigated to replace vegetation lost during the development of the site; and • landscaping should incorporate local native species where possible. DCLM and the DEP noted that the PER did not make an assessment of the potential impacts of stormwater runoff on terrestrial habitats, including the lake habitat. **Public submissions** Public submissions focused on: • concern about the adequacy of the proponent's flora surveys and whether the surveys provide certainty in regard to the impacts of the proposal on native flora on the site, particularly priority species. In particular, it was considered that the proponent's surveys do not account for all species on the site nor were they likely to have accounted for seasonal variation in plant abundance and diversity. Some submitters consider this reason enough to reject the proposal; • a preference for the saline flats to be conserved as it does not appear that the system is well represented/conserved in the Carnarvon Biogeographical Region; • concern regarding the impact of the marina (particularly construction) on shallow groundwater and the potential for draw-down effects which may impact on vegetation; and • concern that the proponent has not fully considered the impact of stormwater runoff on terrestrial flora.	**Terrestrial flora is considered to be a relevant environmental factor and is discussed in the context of footprint impacts.**

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Terrestrial fauna	The proposal will result in the clearing of approximately 114 ha of potential fauna habitat within the proposal area, including: • Beach front; • Coastal heath; • Samphire flats; and • Salt lake. Increased visitation to the area could increase the risk of off-site impacts on important fauna including bird species listed under international agreements.	**Government agencies submissions** The submission by DCLM focused on issues including: • the original fauna survey undertaken by the proponent is inadequate for the purposes of drawing meaningful conclusions about the impact of the proposal on terrestrial fauna; • limitations in the information provided on terrestrial fauna are confirmed by a review by A.R. Bamford which is included as Appendix 9 of the PER. This view was also expressed by the DPI; • the PER did not give attention to potential impacts of the proposal on the important bird roosting area at Point Maud. DCLM suggested that for this issue to be managed, strategies and targets would need to be developed in consultation with DCLM to the satisfaction of the MPRA; and • the PER did not make an assessment of the impact of stormwater runoff on terrestrial habitats and on the lake habitat. The Western Australian Museum: • noted that only vertebrate fauna have been considered in the PER; • noted that there was no mention of molluscan fauna (terrestrial or aquatic) in the proposal area; • suggest that in the absence of this information, it is impossible to assess the potential impact of the proposal on biodiversity in the area; and • recommend that a fauna survey of the site should include an assessment of invertebrates so that an adequate evaluation of the site's fauna can be made. **Public submissions** Public submissions focused on: • concern about the potential impacts of feral and/or domestic animals introduced as a result of the proposal; • the view that the proposed landfill site and other elements of the proposal, including litter, will help to support existing populations of feral animals which will impact on native fauna; • concern about the level of information collected by the proponent on fauna, in that its work only presents an expected list of fauna. Many submitters considered this to be inadequate and that it would be inappropriate to grant approval to the proposal before a survey was undertaken; and • concern about the potential impact of the proposal footprint on migratory birds, particularly those listed under agreements between Australia and Japan and China.	**Terrestrial fauna is considered to be a relevant environmental factor and is discussed in the context of footprint impacts.**
Coastal dunes	The proposal will result in the direct loss of 4 ha of foredune due to the construction of the breakwaters and marina entrance channel. Approximately 15 ha and 13 ha of relic foredune plain and parabolic dunes respectively will be directly impacted by the footprint of the proposal. No development will occur on approximately 40% of the gazetted townsite area. Undeveloped dune areas within development lease area will be set aside for dune conservation.	**Government agency submissions** DCLM focused on issues including: • that provided appropriate strategies are developed and implemented in consultation and to the satisfaction of relevant agencies and stakeholders, it is of the view that the proposal has the potential to improve the current, largely uncontrolled nature of access to the beach and foredunes in the vicinity of Mauds Landing; • regulation of beach access and dune protection is considered to be essential as visitor pressure increases; • that the proposed Foreshore Management Plan should be developed in consultation with and to the satisfaction of DCLM and other stakeholders; • highly management-dependent nature of the proposal; and • that the proponent has not attempted to predict activity patterns for visitors and residents of the resort, and therefore, it is difficult to determine the extent and focus of the main pressures on the environment.	CALM (2000) suggests that Mauds Landing is currently a major day use site. The site is mainly accessed by four wheel drive vehicles and four-wheel motorcycles, however, two wheel drive vehicles can access within 100 m of the beach. In the PER, the proponent suggested that the significant impacts on dunes in the southern part of Bateman Bay within the Mauds Landing townsite have occurred as a result of unmanaged coastal access by 4WD vehicles adjacent to the former Mauds Landing jetty. In this area, vehicle parking and access have caused localised disturbance to dunes and dune vegetation. The EPA considers that without adequate management, continued disturbance of coastal areas will increase the risk of dune erosion. Surveys undertaken by the

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	Adequate management of the Mauds Landing site has the potential to control vehicle and pedestrian access to beaches and dune areas which is currently causing impacts. The proposal has the potential, by facilitating increased visitation, to lead to greater pressure on coastal dunes in the area and region generally.	DPI raised issues including: • that development on stable and mature hind dunes may be acceptable however, any loss of frontal dunes should be avoided. It was noted that the proposal would directly impact on relic foredune plain; • that there is no clear mechanism presented in the PER as to the ongoing management of foreshore areas; and • that the proponent's assessment of coastal set backs appears to be acceptable. Main Roads WA advised that: • visitors to the proposal are likely to travel along the coast in the region and that there is potential for impacts of unmanaged access along the coast; • the PER is limited with respect to management of off-site visitor impacts identified as being likely if the proposal proceeds; and • commitments to address of-site impacts of traffic on road be consideration by the proponent. The MPRA noted that the PER contained little in the way of information about the likely impacts of the proposal away from the proposed development site. The Gascoyne Development Commission (GDC) suggests that a commitment by the proponent to prohibit the hire of quadbikes from within the facility would be a positive initiative to the control of impacts on coastal dunes outside of the Mauds Landing townsite. **Public submissions** Public submissions focused on issues regarding: • the current impact of off-road hire operations and privately owned off-road vehicles on coastal dune systems; • the increase in pressure on dune areas as a result of increased visitor activities; • the proponent's limited ability to manage coastal impacts from increased visitation in areas outside of the townsite to the north and south of the proposal; • the pressure that will come to upgrade the coastal track between Coral Bay and Yardie Creek; and • the impact of the proposal on public access to beaches.	proponent indicate that the remainder of the coastal dunes and associated vegetation within the Mauds Landing townsite are intact. The EPA understands that pedestrian access to beaches would be maintained within the Mauds Landing townsite and managed in a way to minimise risks to important and/or sensitive environmental attributes. The proponent has indicated in the PER that management of access may include signage, fencing, traffic control devices and provision of parking. As a means of managing environmentally sensitive dune areas within the Mauds Landing townsite the proponent has: • designed its proposal such that development will not extend into foredune areas, with the exception of 4 ha of dunes which will be removed to develop the marina entrance channel; • set aside an area seaward of proposed developed areas for dune conservation and other non-development areas; • indicated in its PER and responses to submissions that management of dune areas can be achieved through a combination of education, limits to access to fragile areas, provision of formalised access and rehabilitation or maintenance of areas impacted; • committed to develop and implement a Landscaping Management Plan (commitment N4); • committed to develop and implement a Foreshore Management Plan (commitment 26); • indicated that it will work with DCLM, the Shire of Carnarvon and the Baiyungu Aboriginal Corporation to limit or exclude access to beaches from and nearby the proposal; and • committed to prohibit the operation of quad bikes from the Coral Coast Resort. The EPA is mindful that there are other matters associated with the coastal zone which require further consideration and assessment. The factors of terrestrial flora and coastal process are assessed separately and are presented elsewhere within this table. In view of the proponent's commitments relating to this factor and provided that the proponent implements these commitments satisfactorily, the EPA considers that it is unlikely that the footprint of the proposal would compromise its environmental objective for this factor. In the context of the proposal footprint, the EPA considers that this factor does not require further discussion.

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			The EPA considers that matters relating the potential impacts of people's activities beyond the proposed development area which are beyond the direct control of the proponent require further consideration. **Accordingly, the EPA considers that coastal dunes is a relevant environmental factor and is discussed in the context of** • **off-site terrestrial impacts; and** • **long-term management.**
Subterranean fauna	Development on the site has the potential to impact on subterranean fauna.	**Government agency submissions** At the time that the PER was released, the Chairman of the EPA requested that an assessment be carried out on the potential impacts of the proposal on stygofauna. DCLM advised that the treatment of stygofauna in the PER was inadequate for the purposes of assessing the potential impacts of the proposal. DPI suggested that insufficient detail was provided in the PER on stygofauna. The WA Museum noted that: • no data was provided in the PER; and • in light of some information presented in the PER, the appropriateness of management commitments and integrity of predicted outcomes are questionable. The Gascoyne Development Commission suggested that the proposed stygofauna monitoring should be ongoing in order to measure future impacts. **Public submissions** Public submissions raised issues including: • concern regarding the proponent's limited assessment of impacts on stygofauna. This was considered by many submitters as generally unacceptable, particularly given the recognised importance of these fauna elsewhere on the North-West Cape; • that it would not be appropriate to grant any approval to the proposal until it was established with reasonable certainty that stygofauna were not present at the site; • the potential impact of stormwater runoff on stygofauna and the lack of specific conditions relating to stormwater management to protect stygofauna; and • that any stygofauna monitoring should be ongoing.	During the course of the assessment, the proponent undertook a drilling and sampling program to assess the extent of stygofauna within the proposal area. The EPA sought advice on the proponent's stygofauna report from the Western Australian Museum **The EPA considers that subterranean fauna is a relevant environmental factor and is discussed in the context of the footprint of the proposal.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Marine water and sediment quality	Generation of turbidity plumes during construction of the marina entrance and breakwaters has the potential to impact on marine water quality. Under some conditions, water from the marina, which is likely to be of a reduced quality to waters in the marine park may impact on water quality in an area around the proposal. The proposal could provide an opportunity to address wastewater treatment and solid waste management practices at Coral Bay which potentially impact groundwater, and ultimately marine water quality.	**Government agency submissions** DCLM advised that: • the management of nutrient loads is critical to maintaining the quality of water in the marina and in the Ningaloo Marine Park; and • acceptable zones of influence and water quality parameters for marina flushing within the Ningaloo Marine Park will need to be negotiated with the Marine Parks and Reserves Authority. The DEP advised the proponent that its proposed management should be consistent with the *National Water Quality Management Strategy* (ANZECC and ARMCANZ 2000) and the EPA's position regarding the management of marine water quality (EPA 2000). The DEP considers that the marine waters in the Ningaloo Marine Park should be managed to achieve a total level of ecosystem protection (i.e. there are not detectable changes in ecosystem processes, biodiversity, abundance and biomass of marine life and levels of contaminants in water and sediment). In order to meet this objective, a total level of ecosystem protection should be met at the boundary of any impacted area within the Marine Park. **Public submissions** Public submissions raised issues including: • it is considered unacceptable that construction of the proposal will result in water quality impacts over a 9 km^2 area for a period of up to five years; • concern that water quality impacts during construction, particularly those caused by turbidity plumes, are likely to impact on corals, seagrasses and other marine wildlife; • concerned that the proposal will result in an increased flux of nutrients and contaminants into the Marine Park. The potential impacts of this on water quality in the Marine Park are considered unacceptable. • concerns that the provision of improved boating facilities in the Marine Park may encourage more international vessels, particularly cruising yachts, to visit the Ningaloo Marine Park which pose risks to the Marine Park in terms of marine pest incursions; and • concern about the limited consideration given to the potential for acid sulphate soils to be exposed as a result of construction, particularly given that the proposal is located on a Holocene mangrove system.	Water quality issues associated with construction are considered in the context of construction impacts. **Marine water and sediment quality is considered to be a relevant environmental factor and is discussed in the context of the issues:** • **footprint impacts; and** • **long-term management.**
Marina water and sediment quality	The proposal includes a 46 ha marina. The residency time varies throughout the marina and during different times of the year from approximately 2 days near the marina entrance up to 19 days in the northern lagoons under worst-case conditions.	**Government agency submissions** Concern was expressed by a variety of Government agencies on this issue. DCLM, DEP, DPI, the WA Museum and the Shire of Carnarvon raised issues in regard to the proponent's assessment of water quality in the marina. Government agency submissions focused on: • concern about the worst case flushing time of 17 to 19 days in the upper reaches of the marina and contingencies for managing algal blooms; • further consideration should be given to the influence of density gradients on marina flushing; • the effects of differential heating and vertical temperature structure on marina flushing; • the ecological consequences of limited flushing of the marina (eg potential for algal blooms, deoxygenation of the water column and potential release of nutrients from sediments); • the effect of marina water on the Ningaloo Marine Park and the definition of acceptable zones of influence; • the influence of marina water temperature on the ability to grow and sustain corals within the marina; and	**Marina water and sediment quality is considered to be a relevant environmental factor and is discussed in the context of the issues:** • **footprint impacts; and** • **long-term management.**

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		• the proponent's ability to manage nutrient inflow to the marina which will be fundamental to maintaining water quality generally. The DEP advised that the management of the marina should be consistent with the National Water Quality Management Strategy (ANZECC and ARMCANZ 2000) and the EPA's position on marine water quality management (EPA 2000). The DEP considered that the marine waters in the marina be managed to achieve no less than a moderate level of ecosystem protection (i.e. small – moderate changes in ecosystem processes, biodiversity, abundance and biomass of marine life and levels of contaminants in water and sediment beyond limits of natural variation may occur but not exceed agreed criteria). **Public submissions** Public submissions raised issues in several key areas relating to water quality, including: • the scope of the proponent's assessment of water quality within the proposed marina (consideration of temperature, biogeochemical cycling, sediment colour, and ecological processes including phytoplankton blooms); • limited confidence in the proponent's predicted nutrient inputs; • concern about pollution related to boating (sewerage/nutrients, spills and engine exhaust); • concern about contamination of the marina with material transported via stormwater (fertilisers/nutrients, hydrocarbons and metals); • concern that irrigation with nitrogen-rich Birdrong groundwater may impact on water quality; • concern about the flushing characteristics of marina design and the effects on water quality; • concern that water quality could not be maintained at a level which would support the growth of corals as proposed; • the ability of the proponent to manage the marina to ensure that the ecological and social values of water quality are protected both within the proposed marina and within the adjacent waters of the Ningaloo Marine Park, particularly considering the proposed uses of the marina and the long residency times; • monitoring and management of marine pest incursions; and • the ability of the proponent to implement the undertaking made in the PER to prohibit vessels from the marina which utilise tributyltin antifouling paints.	
Liquid waste management	The proposal includes reticulated sewerage and an inland wastewater treatment plant (WWTP) to be located at the Services Area, approximately two kilometers from the Coral Bay townsite. The footprint of the proposal will require clearing of native vegetation. The proposed WWTP will dispose of treated wastewater by evaporation from lined ponds sized for total evaporation of all treated effluents. It is proposed to be designed to be expanded to accommodate the staging of the proposal and the requirements of Coral Bay at the expense of ratepayers and/or the Government.	**Government agency submissions** The submissions by the Water Corporation focused on: • its preferred method of treatment in the area would be a traditional facultative lined pond treatment plant which could be staged to suit development rates; • the need to include the capacity to treat wastewater from the existing Coral Bay settlement; • its opinion that reuse options in the PER may be limited due to the high salinity of the wastewater, however, reuse may become an option in the longer term; • its view that the site proposed by CCMD for a WWTP is a suitable location; and • the need to design the Services Area to accommodate the required buffers for the proposed WWTP and landfill sites. **Public submissions** Public submissions raised broad issues including: • concern about the level of information provided regarding the quality and volume of water to be treated at the proposed WWTP; • the proponent's level of consideration of opportunities for wastewater reuse and that Best Practice wastewater treatment should include water reuse; • concern about the risks of contamination of marine waters with wastewater;	A description of the proposed wastewater treatment plant (WWTP) was provided in Section 2.6 of the PER. As part of its response to public submissions, the proponent provided further information regarding liquid waste management in the form of a *Preliminary Environmental Assessment and Management Plan* for the Services Area. The proposed WWTP will treat wastewater from the proposal (domestic wastewater, material from the services area and material from the vessel pump out facility). Brine from the reverse osmosis (RO) water plant will not pass through the WWTP. Instead, it is proposed to either evaporate brine from the RO plant using the ponds at the WWTP or using a separate set of ponds constructed specifically for this purpose. The proponent has advised that the WWTP will be designed to allow for the expansion necessary to accommodate the

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	and/or the Government.	• concern that the proposal should not be seen as the only option to address wastewater management issues at Coral Bay; and • that the proposal is an appropriate option to resolve management problems associated with current wastewater treatment practices in Coral Bay.	to allow for the expansion necessary to accommodate the needs of Coral Bay. The EPA understands that it will be the responsibility of Government to provide the any plant upgrades and sewerage headworks to connect Coral Bay to CCMD's proposed wastewater treatment plant. The EPA notes the advice of the Water Corporation with regard to the proposed siting of the proponent's WWTP. In its draft guidance No. 3 *Industrial – Residential Buffer Areas*, the EPA (1997) recommended that for a traditional facultative pond system to accommodate a capacity of <5000 people, a 700 m buffer should be in place to minimise impacts on surrounding sensitive land uses. The Services Area where the WWTP is proposed to be located is approximately 2 km east of Coral Bay and approximately 3 km south east of the proposed Coral Coast Resort. Although a reasonable buffer distance is provided for, the EPA is of the view that careful planning of the Services Area will be required to avoid impacts on future commercial/industrial land uses. With regard to the reuse of wastewater, the proponent has made an undertaking to assess the suitability of treated wastewater for reuse within the CCR. Any decision to implement reuse options will need to be made to the requirements of the WRC, the Department of Health and the local Shire. With respect to concerns about contamination of groundwater as a result of wastewater produced at the proposed CCR, proponent has made a commitment to prepare and implement a Shallow Groundwater Management Plan (commitment 40) which is proposed to include groundwater monitoring at strategic locations around the services area and contingencies. The EPA is of the opinion that lining the wastewater treatment plant will minimise the risk of groundwater contamination and ultimately the marine environment. The WWTP would also be managed via Works Approval and licence under Part V of the *Environmental Protection Act*. In view of the proponent's undertakings, commitments to monitoring in regard to liquid waste management and other approvals required for the wastewater treatment plant, **the EPA is of the view that liquid waste management does not**

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			require further discussion.
Solid waste management	The proposal includes a landfill site with a projected 25-year capacity. The proponent will construct the first cell of an unlined landfill facility. The footprint of the proposal will require clearing of native vegetation.	**Government agency submissions** The Water Corp., WRC and DEP raised concern about the proposal not to line the proposed landfill facility. Advice from the Water Corp and WRC suggested the facility be lined to prevent leachate from entering groundwater and eventually the marine environment. **Public submissions** Public submissions focused on issues including: • that the proposal should not be seen as the only option to address solid waste management issues at Coral Bay; • that the proposal could address the waste treatment problems at Coral Bay; • concern about the impact of the landfill site on populations of feral and domestic animals, including birds, foxes, cats, rats and other feral animals; • the proponent's justification for an unlined landfill cannot be substantiated because groundwater flows towards the sea and rainfall infiltrates readily at the site; • the potential impact of leachate from the proposed unlined landfill facility (nutrients and other contaminants) on groundwater and marine water quality. Matters related to frequency and intensity of precipitation events, soil types, depth to groundwater, ground water flow and distance to the marine environment were raised as factors affecting leaching from the proposed landfill facility; • the management pressures associated with increased litter resulting from additional visitation; • the views that disposal of sludges from the WWTP to landfill is considered unacceptable; • the level of information provided in relation to contingencies if groundwater monitoring indicated that the landfill site was causing contamination; and • how and who would manage litter at the CCR site.	A description of the proposed landfill facility was provided by the proponent in Section 2.6 of the PER. As part of its response to public submissions, the proponent provided further information in the form of a *Preliminary Environmental Assessment and Management Plan* for the Services Area. The EPA notes the advice of Government agencies regarding lining of the proposed landfill site. The proponent did not amend its proposal to line the proposed landfill facility in view of the submissions received. The proponent argued that lining the proposed landfill facility would not be warranted because: • drilling at the site established that depth to groundwater from the surface layers is between 10.5m and 15.5m; • groundwater flows are very low; • rainfall at the site is very low and is greatly exceeded by evaporation; and • there is a relatively high degree of cementation of the geological strata beneath the site. The EPA notes that the DEP has advised that the proposed landfill facility is required to be managed under Part V of the *Environmental Protection Act*. Accordingly there are opportunities for the DEP to require specific design parameters when it considers the proponent's application for a Works Approval if the proposal is allowed to proceed. The EPA notes that CCMD have made an undertaking to the effect that leachate generating capacity and movement rates of material from the landfill will be modelled prior to the application for Works Approval under Part V of the *Environmental Protection Act*. The proponent has also indicated that it will undertake detailed investigations to address specific issues regarding soil types and groundwater prior to lodging a Works Approval application. In its responses to public submissions the proponent has also made undertakings to implement management associated with the landfill facility, including: • fencing of the active cell; • minimising the size of the working face, with regular cover; • a rodent control program; • management of standing freshwater at the surface; • erecting and maintaining litter screens if required; • regular collection of wind blown litter; and

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			• disposal of odorous waste by immediate deep burial. The EPA notes the proponent's proposed refuse management system outlined in the PER, which includes: • weekly collection service; • public waste minimisation eduction programs; • implementation of a kerbside collection program incorporating residences, commercial properties, public facilities and boat mooring areas; • provision of bulk waste collection services from any construction and/or demolition sites; • optimum and effective use of the proposed landfill facility consistent with relevant approvals and guidelines; and • maximisation of recycling benefits, including green waste collection and treatment. The EPA understands that that resort waste management would be undertaken by a third party Service Provider through a business arrangement with the proponent. The EPA expects that the proponent will carefully consider and implement its undertakings to minimise the amount of material disposed to landfill. The EPA recommends that if a licence is issued for the landfill facility, the DEP adopts its advice and include a Containment Failure Management Plan as part of the approval process under Part V of the *Environmental Protection Act.* In view of the proponent's undertakings, commitments to monitoring in regard to solid waste management and other approvals required for the wastewater treatment plant, **the EPA is of the view that solid waste management does not require further discussion.**
Surface and shallow groundwater	The proposal includes gardens, landscaped areas, roads and parking areas, which have the potential to impact groundwater quality and terrestrial biota from leaching and surface runoff. A wastewater treatment plant with lined ponds and the first cell of an unlined landfill facility are proposed in a services area east of Coral Bay. The proposal could provide an opportunity to address wastewater treatment and solid waste management practices at	**Government agency submissions** WRC require that the proponent develop and implement a Shallow Groundwater Monitoring Program. To protect groundwater the WRC recommends that: • turf and grassed areas be consistent with *Guidelines for the Establishment and Maintenance of Turf and Grassed Areas*; • stormwater management should be consistent with *A Manual for Managing Urban Stormwater quality in Western Australia*; and • application of biosolids should be consistent with WRC *Water Quality Protection Note: Biosolids Application to Land*. The DEP advised that: • the proponent should develop and implement shallow bore-monitoring programme prior to	The proponent has advised that a shallow unconfined aquifer extends beneath the proposed development site, including the Services Area. Due to the proximity of the shallow groundwater aquifer to the surface and the direction of flow towards the marine environment, protecting the quality of this resource is important to the EPA. The proponent has identified three key project-induced factors that have the potential to impact on groundwater, including: • sewage discharge; • contaminated groundwater inputs; and • surface run off.

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	Coral Bay which potentially impact groundwater.	construction, with bores positioned such that water quality influences from the proposed landfill and WWTP sites can be distinguished; and • "failure of containment at landfill site" should included in the Emergency Response Plan of the Groundwater Quality and Quantity Commitments. General issues were raised in both public and Government agency submissions about the potential impacts and management implications associated with nutrient application to gardens and landscaped areas, particularly in relation to the protection of groundwater quality. DPI advised that: • the proponent may need to consider soil amendment to minimise leaching to the groundwater and the marine environment; • the PER did not adequately address the issue of stormwater management, particularly discharge of stormwater to low lying areas inland of the proposal. The issues of storm events, contamination and the impacts of fresh stormwater on the salt lake were key issues raised by DPI, DCLM and DEP. **Public submissions** Public submissions raised issues including: • concern that the proposed wastewater treatment plant, landfill and nutrients of gardens and landscaped areas will cause pollution of groundwater; • the sustainability of groundwater use associated with the proposal; • that the proposed development site is largely underwater following heavy rains and that the potential impacts and management implications on groundwater quality should be considered; and • that the proponent should investigate and assess the viability of stormwater treatment prior to its discharge to the environment.	The EPA is of the view that these factors are likely to be key risk factors for the quality of the shallow groundwater in the vicinity of Mauds Landing. The proponent has made a number of undertakings to address these issues, including: • proposed reticulated sewerage and a lined WWTP at an inland location; • develop and implement a Shallow Groundwater Management Plan, including contingencies (commitment 40); • a commitment to manage turf and grassed areas in accord with *Guidelines for the Establishment and Maintenance of Turf and Grassed Areas*; • a commitment to manage stormwater in accord with the principles laid out in *A Manual for Managing Urban Stormwater quality in Western Australia*; and • development and implementation of a Nutrient and Irrigation Management Plan (commitment 38). Notwithstanding the commitments made by the proponent, the EPA is of the view that the long-term management of these issues is important and will be considered further in the context the proponent's management arrangements. With respect to the potential for the proposed WWTP and landfill facilities to contaminate the environment, the EPA considers that these matters have been adequately addressed (see discussion of factors of solid and liquid waste management). The EPA has given detailed attention to issues such as the potential contamination of shallow groundwater and impacts on terrestrial flora and fauna as a result of stormwater runoff in Section 4.1.9 of this report. The proponent indicates that dewatering will result in localised lowering of the shallow groundwater aquifer. Considering the duration of the proposed construction works. Lowering of the groundwater has the potential to impact on terrestrial flora which are dependent on either permanent or temporary access to water. The proponent has not identified the spatial extent of possible impacts of dewatering on the shallow groundwater aquifer. However, the proponent has made a commitment to prepare and implement a Dewatering Management Plan to monitor groundwater levels and implement contingency measures for any impacts on vegetation beyond the proposal's footprint (commitment 30).

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			The proponent's commitment to develop and implement a Landscaping Management Plan is also noted. Considering the proponent's undertakings in regard to managing shallow groundwater quality and the impacts of dewatering on the shallow groundwater aquifer **the EPA is of the view that shallow groundwater quality does not require further investigation.** **Matters associated with stormwater management are given detailed attention in Section 4.1.9 of this report.**
Artesian groundwater quantity and water supply	The proposal includes the development of a bore for the abstraction of water from the Birdrong Artesian Formation, at a depth of approximately 800 meters. The projected water requirements are approximately 0.5 million kL/annum. The proposed 'dry' construction of the marina will require dewatering for a period of up to 18 months, resulting in a groundwater cone of depression at the perimeter of the excavated area. Some loss of salt flat vegetation is expected. The proponent proposes a reverse osmosis (RO) plant for the treatment of artesian water for drinking.	**Government agency submissions** WRC suggested that the proponent be required to develop and implement an Artesian Water Operating Strategy. Concern was expressed that abstraction of groundwater for the CCR would impact on other users as well as native flora and fauna. The DEP considered that the proposed RO plant had not been adequately described, particularly matters associated with the management/disposal of brine from the proposed RO plant. **Public submissions** Concern was expressed regarding the impacts of draw-down on other water users in the area, particularly beyond the 20 year time frame considered by the proponent.	The proponent has undertaken work relating to the impacts of groundwater use at the proposed facility. The EPA understands that WRC has indicated to the proponent that the required amount of water is available subject to licensing and conditions, including an Artesian Water Operating Strategy. WRC has advised that the Artesian Water Operating Strategy needs to address issues including: • provision of detailed information on the proposed operating rules, monitoring requirements, environmental provisions, contingency plans, water use efficiency and administrative details; • how the proponent will address any impacts arising from the proposed groundwater abstraction on existing groundwater users in the area and environment; and • addressing water use efficiency in order to minimise water consumption. The proponent has made a commitment to prepare and implement an Artesian Water Operating Strategy in accord with the guidance provided to it by WRC (commitment 42). Due to the depth of the Birdrong Aquifer (approximately 800m), the EPA considers that the risk of contamination as a result of the proposal is small. The proponent proposes a RO plant to treat water from the Birdrong Aquifer for drinking. The proposed RO plant is likely to have an efficiency in the order of 50% treatment to potable standards. The brine is proposed to be either disposed to evaporation ponds at the wastewater treatment plant or to ponds constructed specifically for the purpose of evaporating brine produced from the RO plant. In view of the proponent's undertakings in regard to and artesian groundwater and water supply **the EPA is of the view that groundwater quantity and water supply does not require further investigation.**

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Construction issues	The construction of the proposal has the potential to generate dust and noise at the site.	**Government agency submissions** The GDC noted that the PER did not address issues associated with the management of a construction workforce. The GDC also suggested that the proponent understated the impacts of construction traffic on road maintenance, road safety and flora and fauna. It recommended that commitments be sought from the proponent to address the cost of road maintenance and scheduling to minimise the impacts on fauna. Main Roads Western Australia (MRWA) raised a number of concerns regarding the impact of construction traffic on existing roads and public safety. MRWA suggested a number of commitments for consideration by the proponent to formalise comments made by the proponent in the PER regarding construction impacts and transport risk. The Shire of Exmouth raised concerns regarding the impact of construction traffic on roads and the safety of other road users, particularly tourists. The DEP advised that it was satisfied with the proposed strategies to manage noise and dust during construction. The DEP expressed concern that night time construction activity has the potential to impact on turtle breeding. **Public submissions** Submissions raised concern that the PER only gave attention to issues associated with construction that have the potential to impact humans. No consideration was given to the impact of construction activities on wildlife. Concerns were expressed regarding the impact of construction activities on marine water quality and wildlife. Potential impacts on turtles and kangaroos were of concern. Many submitters raised concerns regarding impacts of dewatering, breakwater construction and dredging on marine water quality. Concerns were expressed that the PER did not consider the impacts associated with sourcing construction materials. In particular, the PER has not addressed the potential impacts on stygofauna that may result from the sourcing of limestone for the breakwaters.	The proponent considers all matters raised in relation to the impacts of construction on biota have been addressed in its PER (Page 284 ATA 2001a). The EPA will examine the potential impacts of construction on marine water quality and fauna in the context of footprint issues as outlined previously for the corresponding factors. It is proposed that the construction workforce will be accommodated in a combination of existing facilities within the Coral Bay settlement, a construction camp developed on site for the purpose and during later stages, at accommodation facilities developed at the CCR. The proponent has advised that the WWTP is proposed to be constructed as soon as all necessary approvals are in place. CCMD have advised that the WWTP will be operational and will receive liquid wastes from the construction workforce. With respect to issues raised about the impacts of construction traffic, the proponent has made commitments to address impacts on public roads due to heavy vehicles, including: • prior to construction, the proponent in consultation with the Shire of Carnarvon, the Shire of Exmouth and MRWA will undertake a road safety audit and implement the findings of the road safety audit, to ensure all roads associated with the proposal are safe; • during construction, the proponent in consultation with the Shire of Carnarvon, the Shire of Exmouth and MRWA will provide funding for additional road maintenance brought about by additional road wear as a direct result of the implementation of the proposal to ensure all roads impacted by the proposal remain safe; and • a Construction Traffic Management Plan (commitment 55). The EPA notes the proponent's commitment to develop and implement a Construction Management Program (commitment 5) to include: • Dewatering Management plan; • Dredge Management plan; • Dust Management Plan; • Noise Management Plan; • Stormwater Management Plan; and • Construction Waste Management Plan. Considering the proponent's undertakings in regard to the

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			management of construction, including risk to human life and impacts on roads and that the EPA will separately consider the ecological implications of construction for marine fauna and water quality, **the EPA is of the view that construction impacts does not require further investigation.**
Storm Surge risk and coastal setback	The proposal is located on the coast in a cyclone risk area and is subject to tsunami events. The proposal includes preparation of finished floor levels to 6 m AHD on the ocean side of the marina and 3.6 m AHD on the landward side on the marina. The design standard adopted is based on 1:100 year storm event, assumed to be equivalent to Tropical Cyclone Hazel.	**Government agency submissions** DCLM advised that: • the return period of 1:100 years as adopted by the proponent for design of the resort may not be an appropriate standard; and • that EPA Bulletin 627 establishes a risk level of $1x10^{-6}$ for residential areas and suggested this may be appropriate for developments to protect against natural risks and this measure of risk equates to a greater than 1:100 year return period. Modelling on a higher return period may be more appropriate and the resort design must incorporate sufficient safe refuges in the development to accommodate all residents/guests. DPI, including the Maritime Division advised that: • it supports the proposal to adopt high finished floor levels of 6.0m and 3.65m AHD, since the probability of occurrence of the nominated 100 yr ARI event for even a 50 year planning period (being 39%) seems unacceptably high; • the setback required to provide an acceptable level of risk of erosion damage to future development has been reasonably assessed for a 100 year planning term, provided that repairs are made after any major cyclonic damage; • based on the analysis by M.P. Rogers (Appendix 8 of the PER) the proposed coastal setback would appear to be acceptable. The actual derivative calculations used in the report differ from the approach that is being developed by DPI, however, the total setback figure provided (of 130m minimum) accords with DPI's current approach; • the proponent's consideration of flood/storm surge risk appeared to be an acceptable approach; • rather than relying on actual floor levels exclusively, the overall design on the development should place habitable development in low risk areas; • the location of the proposal in the centre of a north-facing bay should also be considered; and • the figure of 30cm over the next 100 years used to consider the effects of sea level rise would appear reasonable. The Shire of Carnarvon considers that the proponent's assessment of storm surge risk is inadequate for the purposes of the PER. Concern was raised in relation to data limitations, including the scientific justification for the adoption of Cyclone Hazel as the design standard. Cyclone Vance should be considered by the proponent. **Public submissions** Public submissions focused on: • the methodology for determining storm surge is not clearly explained and there does not appear to have been any specific modelling for the area; • that the area appears particularly vulnerable to tsunami events as it is opposite Cardabia passage, and not protected by the reef; • due to the relative proximity of the likely sub-sea disturbances and the speed at which tsunamis travel, effective tsunami warnings and evacuation may not be possible; • concern regarding the proponent's reliance on the assumptions from data collected in other regions; and	The proponent considers that Appendix 8 of the PER presents the complete coastal engineering study and that Section 6 of the report by M.P. Rogers presents the basis for the building and development levels. Appendix 8 also gives consideration to coastal setbacks. CCMD propose that its proposal will be designed to a 1:100 year return Category 5 storm event standard. CCMD propose a number of control measures to reduce potential damage to infrastructure and human life during cyclones. These include, amongst others: • the construction of the inland marina behind a largely intact primary and secondary dune system; • provision of marina facilities for secure anchorage of vessels; • underground power supply; • assembly areas; • formal Emergency and Disaster Recovery Plans and Procedures; • structures designed to withstand Category 5 cyclones; • trained fire and emergency services; • nursing station and first aid; and • sea search and rescue teams. The proponent's assessment of proposed finished floor levels gave consideration to the combined effects of various physical processes including astronomical tides, severe ocean surge, potential "greenhouse" effects and wave run-up. The proponent concluded that on the basis of its predictions, it would adopt finished floor levels for coastal buildings of +6m AHD (ocean side) and +3.65m AHD (marina side). In association with a coastal set back of approximately 140 m, the proponent is of the view that appropriate measures have been taken to accommodate extreme events, including a direct hit by a Category 5 tropical cyclone. The proponent advised that Tropical Cyclone Vance was considered in its assessment of ocean water levels. However, the EPA notes that this event was considered in relation to its effect on water levels at Carnarvon, a considerable distance from the track of the cyclone. Its effect on ocean levels in Carnarvon would be expected to be considerably greater nearer to its track.

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		• concern regarding the time series of data used in the proponent's analysis of storm surge risk. In particular, there was concern that the proponent's analysis did not give consideration to recent strong tropical cyclones Vance and Steve.	By way of comparison, work undertaken by the Department of Transport on the effects of Tropical Cyclone Vance in Exmouth suggests that water levels peaked at +3.5 m AHD. This work also suggested that Cyclone Vance has a return period in the order of 500 years. In response to public submissions the proponent undertook a qualitative risk assessment for its proposal. This assessment took into consideration storm surge risk. The qualitative risk assessment considered that the likelihood of cyclone-induced storm surge was "unlikely" or may occur once every 100 to 1000 years. The consequence of storm surge was considered to be "major" or having potential to cause single fatality and/or severe irreversible injury to one or more persons. With the control measures proposed by CCMD in place, the qualitative risk assessment concluded that it is "*unlikely that severe flooding, damage to infrastructure, a single fatality and/or serious injury to one or more persons, release of pollutants or environmental harm will occur at the proposed Coral Coast Resort*". Building heights for the previous CCR proposal were less that those proposed for the current proposal. The EPA sought specific advice on this matter during its assessment of the previous proposal. The advice received indicated that the approach used by CCMD to determine minimum building levels was sound. In view of the advice of DoT, DPI and the qualitative risk assessment undertaken by CCMD, **the EPA is of the view that storm surge does not require further investigation.**
SOCIAL SURROUNDINGS			
European heritage	The proposal includes the removal and relocation of the remaining Mauds Landing Jetty pylons to the inland marina.	**Public submissions** **Public submissions** Public submissions raised concern that the proposed treatment of the remains of the Mauds Landing Jetty would be inappropriate and contrary to best heritage conservation practice. It was also considered that the Mauds Landing Jetty, in its present location, represents a valuable heritage resource.	After the close of the public submissions period, the Western Australian Maritime Museum advised that it strongly opposed the relocation of the Mauds Landing Jetty remnants on the basis that the seabed around and under the jetty is a significant maritime archaeological site under the terms of the *Maritime Archaeological Act 1973*. **European heritage is considered to be a relevant environmental factor and is discussed in the context of the proposal footprint.**
Aboriginal heritage	The proposal will result in the clearing of approximately 114 ha of land from which five archaeological sites of significance have been identified.	**Government agency submissions** The Department of Aboriginal Affairs (DAA) advised that • it considered that the attention to Aboriginal issues was generally adequate; and • due to the changing nature of the proposed site and the possibility that additional heritage sites have been exposed since CCMD's heritage surveys, CCMD should act on its commitment to contract a qualified archaeologist sufficiently in advance to provide for the Section 18 process under the *Aboriginal Heritage Act* to be undertaken if necessary.	CCMD have made a number of Aboriginal Culture and Heritage commitments (p167 of the PER) relating to the contacting of a suitably qualified and experienced archaeologist to provide specialist advice, development of a site heritage protocol and finalisation of an agreement between CCMD and the Baiyungu people. CCMD advised that it will confirm the information provided in Appendix 11

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		The GDC considers that the timing for implementation of aboriginal heritage commitments should be amended to include construction and operation. Pressure on the heritage significance may increase as the population increases. **Public submissions** Public submissions raised issues including: • concern about the impact of the proposal on archaeological and cultural significance of the proposed development site; • that the most critical aboriginal site, well within the impact zone, is 'closed' information; • reference to a report by the West Australian Museum on the site in 1985 which notes, "relatives of Aboriginal people now living in Carnarvon are buried in the dunes surrounding Mulanda, however the locations of these burials remains unknown to the author"; and • that it is well established that the original aboriginal peoples of the NW Cape typically used the lee faces of coastal dune areas for burial sites.	of the PER at this time. The proponent has advised that its commitment to prepare and implement a Site Heritage Protocol will be expanded to include operational aspects. In regard to the 'closed' site, the proponent has advised that it is principally set in sand dunes that, with the exception of the entrance channel, will be protected from development. CCMD has been advised that as long as the proposal did not encroach on the dunes it is unlikely to affect significant material and specifically in relation to the entrance channel the elder consulted was not aware of anything of significance which would be disturbed. Since the release of the PER, the proponent has finalised its native title agreement with the Baiyungu people, who manage Cardabia Station. Notwithstanding, the EPA notes the proponent's commitments in relation to Aboriginal heritage, including: • contracting a qualified archaeologist to provide specialist advice; • develop and implement in consultation with the Baiyungu people and DAA, a Site Heritage Protocol; and • provide 'shop front' for a cultural centre to be developed on Cardabia Station for use by the local Aboriginal community. The EPA, noting public submissions, the legislative requirements relating to protection of the heritage values of the proposed development site, the proponent's agreements on Native Title and other specific commitments, **considers that Aboriginal Heritage does not require further investigation.**
Visual amenity and wilderness qualities	The proposal involves the development of approximately 114 ha of land on a currently undeveloped coast for the purpose of a marina, tourism, residential housing and incidental commercial and community buildings.	**Government agency submissions** The MPRA suggests that the proposal will increase people pressure locally and regionally, likely to exceed carrying capacity, and have a significant impact on the Park both north and south. A result of the proposal will be the loss of wilderness values along the entire coast of the Park. The DPI suggests that: • The overall objective should be to ensure that the development offers minimal intrusion into the existing coastal landscape; • the impacts of the development on viewsheds from the Marine Park and foreshore areas should be assessed; and • a well screened, low level development should be the general guiding principle, with materials that are sympathetic to local landforms, rock type and vegetation. This principle should be considered to be as important as the inherent aesthetics of the development itself. DCLM suggest that there is an excellent opportunity for the proponents to be creative in blending	**Visual amenity and wilderness values is a relevant environmental factor and is discussed in the context of the footprint of the proposal.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		the resort into the land and seascape to maintain the visual amenity of the coastline. Visitors to the Ningaloo Reef currently experience a sense of remoteness and 'outback' when looking back to the coast. Imposing an urban design onto this coastal strip is likely to detract from the current visitor experience. Consideration should be given towards a more 'eco-friendly' design and layout. **Public submissions** Submissions considered that the proposal would impact on the intrinsic wilderness values of the Ningaloo Marine Park. Wilderness value is held in high regard in public submissions. Many public submissions consider this value is one of the key reasons for visiting the area. Public submissions reflected the view that the proposal was not in keeping with the landscape, and considered that potential impacts on visual amenity would not be acceptable.	
OTHER FACTORS			
Size and nature of the proposal	The proposal provides for a marina, a range of short stay accommodation, residential housing, services, incidental commercial and community facilities. The proponent anticipates that at 80% occupancy, the proposal will accommodate approximately 2000 people.	**Government agency submissions** The MPRA are of the view that the proposal should not proceed because it is too large and would create a new node of development in the Marine Park. The MPRA consider that the proposal will vastly increase the concentration of people in the Coral Bay/Mauds Landing area, having an effect of focusing "people pressure" likely to be well in excess of its capacity and impacting the park both north and south of the site. The WA Museum considers that the proposal is too large. **Public submissions** Many submissions were received which suggest that the proposal is too large and not in keeping with the environment. Public submissions put forward the view that the proposal is not consistent with the objectives of the Marine Park, does not reflect best practice environmental sustainability in its design and generally imposes a significant burden on the landscape. Many public submissions recommended "sustainable" alternatives or amendments to the proposal including: • stormwater should be filtered at main pipes to avoid litter or contamination entering the marine environment and ground water; • due to the limited water resource in the area, grey water should be recycled for irrigation and laundry needs to preserve the artesian water resource for the future; • composing toilets should be used in the resort as less water would be required and wastes could be utilised as fertiliser (noting that Coral Bay still requires a reticulated wastewater treatment system); • solar passive design should be utilised throughout the resort to minimise the land requirements for a power generation facility; • other eco-tourism aspects that have not been incorporated into this design include: the use of alternate energy systems, water conservative design features and usage limitations, vehicle minimisation / exclusion strategies and design; and • all green waste should be composted and the resort should adopt a policy of purchasing products with minimal packaging. Submitters suggested there is inadequate justification for the scale and form of the proposal on environmental grounds, considering factors including:	**Size and nature of the proposal is given consideration by the EPA Section 3 of this report.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		• past failures of similar proposals at Port Geographe and in Queensland; • the findings of previous studies in the Cape Range/Ningaloo Region; • anecdotal evidence that visitors want a wilderness experience; • absence of commitments to address issues at Coral Bay; and • increased pressures on the NMP. Public submissions consider the proposal is not an "eco-tourism" facility as proposed. Several submitters were of the opinion that a small eco lodge type of development would be preferred, possibly with a small boating facility. Many submissions considered that a proposal of this scale should be sited well away from the coast. Some suggested Exmouth would be a preferred location for large development. Others suggested improved development at the existing Coral Bay settlement would be preferred. Residential development is not considered to be in keeping with the area or its management objectives. Concern was expressed that this is only Phase 1 of the ultimate proposal which may include more tourism and residential development. This was generally considered to be unacceptable.	
Environmental Protection Policy	The proposal envisages development of approximately 114 ha of vacant crown land within the Mauds Landing townsite which covers an area of approximately 250 ha.	**Public submissions** Many public submissions consider that the areas including the North West Cape and the Ningaloo Marine Park should be protection under an integrated Environmental Protection Policy (EPP). The issue of an EPP for the Cape Range/Ningaloo area was a key element of the proforma submissions prepared by the Save Ningaloo Campaign.	Environmental Protection Policies (EPP) are developed under Section III of the *Environmental Protection Act 1986* where the EPA considers it necessary or desirable to protect any portion of the environment. There are currently two statutory management plans over parts of the North West Cape and Ningaloo regions. These are the Cape Range National Park Management Plan and the Ningaloo Marine Park Management Plan. The EPA understands that these Plans are currently the subject of review by DCLM. It is also understood that integration of land and sea management will be considered as part of the planning process associated with the *Carnarvon-Ningaloo Coast Regional Strategy* currently being prepared by the DPI. In order to achieve integrated management of the coast, DCLM is progressing a proposal to excise a strip of coastal land from pastoral leases adjacent to the Ningaloo Marine Park to be incorporated into the conservation estate. The objectives of these plans are to manage the relevant areas of conservation estate for conservation and other activities consistent with plan objectives. Further the existing statutory management plans, the State Government has recently endorsed its election commitment to progress the nomination of Cape Range NP and the Ningaloo Marine Park for World Heritage listing.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
			If successful, World Heritage nomination will require the development of an integrated management plan for the area. In view of the existing management as well as the processes of World Heritage nomination and the proposal to acquire coastal land for conservation management, the EPA is of the view that additional protection by way of an EPP is not warranted at this time. The EPA has provided advice in regard to the broader management requirements of the Cape Range/Ningaloo region in the Other Advice section of this report. **Accordingly, the EPA does not consider that an Environmental Protection Policy warrants further investigation.**
Long-term management	Two aspects of the proposal require ongoing management. Firstly, all areas of land which may form part of any lease issued to CCMD for the CCR proposal will require management in the long term. All infrastructure which has not been converted to freehold will be the responsibility of CCMD. This will include, but be not limited to, elements of the proposal such as, undeveloped land, roads, public open spaces, stormwater systems, power, wastewater, potable water, gas, the Services Area, dune areas/foreshore, breakwaters and the marina and associated structures and revetments. Secondly, the proponent has proposed a framework by which it would contribute to the costs associated with the management of visitors in the Ningaloo Marine Park. There are two key elements to the proponent's proposal. A draft Natural Resources Management Agreement (NRMA) was included in the PER and outlines respective roles of CCMD, DCLM and Fisheries in relation to funding, infrastructure and management of matters associated with the Ningaloo Marine Park.	**Government agency and statutory authority submissions** Concerns have been expressed by the MPRA, relevant Government agencies and the public that the proposal would lead to increased management burdens to protect the values of the marine park. DCLM's submission focused on: • the need for a contribution from the proponent to offset the increased management costs associated with the development and increased visitation and for the commitment to be expressed in terms of a guarantee to meet the costs required to achieve specific and agreed outcomes; • the view that there should not be an extra financial burden placed on DCLM and other agencies as a result of increasing pressures in the area; • the NRMA is an appropriate initiative to detail financial and management arrangements, however, it should be noted that the draft included with the PER is a working document and is far from being finalized; • the inclusion of the Shire of Carnarvon in the natural resource management agreement; • the need to finalise the SAMMP to the satisfaction of DCLM and the MPRA; • given that the proposed development is highly management dependant and the PER is not clear on the cost and who will have the responsibilities for long-term management, and the need for support or commitment from the relevant agencies to accept the increased management obligations; • the importance of educating visitors and residents in minimizing the impact of the development and the increased pressures on the environment; • the need for the proponent to ensure and promote free entry to the public to a section of the Interpretive Centre for it to function in an educational capacity. It is not expected that the facility alone would be adequate to meet all of the public education commitments implied in the document. Other strategies should be documented in an Environmental Education Plan; • if the Interpretive Centre is part of the environmental offsets for the development (through improved public education), this should be an ongoing responsibility for the proponent as part of the conditions of approval; • an option to manage the Interpretive Centre, but exercising the option would be based on a business planning decision. Whilst the Centre is highly desirable, it must be recognized that, under the current proposal, there would be additional long-term costs to DCLM for	**Long-term management of both the proposal footprint and the Marine Park is considered to be a relevant environmental factor and is discussed in the context of long term management.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
	A draft Specific Area Marine Management Plan (SAMMP) was also included in the PER. The SAMMP is proposed to outline management of an area adjacent to the proposal where it is anticipated that impacts associated with activities of visitors to the tourism facilities may occur. The proponent proposes that the SAMMP become an annexe of the Ningaloo Marine Park Management Plan.	management. Management arrangements for the Centre could be incorporated into the draft NRMA; and • the ability to influence the behaviour of residents in the long-term remains a concern with this development. Appropriate mechanisms and conditions would need to be put in place at the outset to ensure that commitments that relate to residents behaviour can be met. These include the keeping of pets, nutrient input to gardens and low water use gardens; and • the management strategies which implicate other agencies include: (a) control of off-road vehicles in the area (Shire of Carnarvon); (b) connection of Coral Bay to the constructed waste water treatment plant (Shire of Carnarvon, Water Corporation); (c) use of the managed landfill site for the Coral Bay townsite (Shire of Carnarvon); (d) Specific Area Rates to contribute to environmental management (Shire of Carnarvon); and (e) reduction of boating-related impacts (Department of Transport). The DPI: • supports the principle of providing an agreement such as the draft NRMA, but advocate the provision of a holding bond to be secured from CCMD so that in the event of the company selling the site or falling into receivership, their obligations can still be met; • advises that the responsibility for management of the waterway is unclear. The Shire of Carnarvon is a small local authority without either the resources or expertise in waterways management. No details are provided of how this shortfall could be overcome. A Deed of Agreement to outline management arrangements for waterways and other areas including foreshores should be developed in conjunction with all relevant agencies; and • advised that it may authorise some of the Authorities operating in the area to administer the Navigable Waters Regulations, but is unlikely to give that authority to the Marina Manager as suggested in the PER. The DEP raised: • issues regarding the proposed responsibilities for long-term environmental management of the site and resort facilities; • concern about the authority and ability of the proponent to manage some aspects of the proposal, particularly matters considered to be best addressed through planning mechanisms or local Government by-laws. **Public submissions** Public submissions focused on: • the proponent's proposal to be responsible for management for a short period (approximately 5 years after the completion of construction of Stage 1); • support for a contribution by the proponent for management in Ningaloo Marine Park; • concern about the financial responsibilities for environmental management; • if the Shire of Carnarvon is to be responsible for managing the environmental matters at the proposed CCR, the Shire should also be required to have an Environmental Management Plan in place for their area of responsibility before being allowed to take control of such an important and environmentally sensitive area as Mauds Landing; • budgets must be allocated to achieve the standards committed to by the proponents;	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		• questions about the capacity/authority of the proponent to implement measures which would effectively manage the potential impacts of visitors; and • the proponent's capacity and authority to implement management of issues including nutrient application, the keeping of domestic animals, lighting controls and control of vessels treated with TBT.	
Planning matters	The proposal envisages development of approximately 114 ha of vacant crown land within the Mauds Landing townsite which covers an area of approximately 250 ha. The area is zoned "Resort Development" under the Shire of Carnarvon Town Planning Scheme.	**Government agency and statutory authority submissions** The MPRA raised matters including: • the view that the fact that Mauds Landing is a gazetted townsite is not relevant to the environmental issues associated with the site and is not relevant to the EPA in its assessment of the proposal; and • That the proposal is premature in the context of the review of the Ningaloo Marine Park Management Plan. DPI raised issues including: • Concern about the proximity of the proposed development in the area in the Structure Plan to the existing airstrip; • that the PER relies on a Structure Plan that has no formal status and the Western Australian Planning Commission has not considered the Structure Plan: and • a number of specific concerns about the Structure Plan. The Exmouth Shire Council believes that the current proposal does not conform to other government department's strategies in relation to development on the west coast. In particular, *Environmental and Planning Guidelines for Tourism Development on the North West Cape* prepared by Ministry for Planning. **Public submissions** Public submissions focused on: • the view that the site is not appropriate for large-scale tourism development; • the view that no further development should be allowed in or adjacent to the Ningaloo Marine Park; • the view that large-scale tourism development should be located in existing centres such as Carnarvon and/or Exmouth. Some considered development of the existing Coral Bay settlement would be preferable; • the way to achieve better development would be to address outstanding matters in Coral Bay and then to cap the number of people allowed to visit; • the inadequate public participation in the planning for the area as large development could impact on public assets; • the view that consideration of the proposal is premature and that an up-to-date and rigorous planning process should be initiated for the Ningaloo Coast; • that the proposal does not appear be consistent with previous Government positions on development along the Ningaloo coast; and • any approvals for development at Mauds Landing should trigger a ban on further development approvals adjacent to the Marine Park for a long period of time (eg. 40 years).	The EPA is aware of a number of planning documents which give attention to the matter of tourism development on the west coast of North West Cape. The EPA has outlined its position in this regard is outlined in the EPA Position Statement No.1, *Environmental Protection of the Cape Range Province*. In that Position Statement, the EPA States that no development should occur on the west side of North West Cape and that the west side refers to Planning Units 2 and 3 in the *Learmonth-Exmouth Structure* Plan prepared by the former Ministry for Planning (MfP). The current proposal is not inconsistent with the EPA's Position Statement No.1 in that it is proposed to be located outside MfP's Planning Units 2 and 3. The *Gascoyne Coast Regional Strategy* (MfP 1996) document provided a broad analysis of CCMD's original proposal against a tourism-only proposal and a "do nothing" option. In summary, the outcome of the development options analysis was that a tourism-only option fully or partly satisfied all assessment criteria, and was the preferred option. The EPA notes that residential development could be considered if it can be established that it will be sustainable and there will be no significant impacts on the reef ecosystem in the long-term. The Strategy document also hypothesised on the future justification, extent and staging of residential development concluding that, as a first stage, a tourism facility with a range of quality accommodation would be supported. The EPA notes that the document *Environmental and Planning Guidelines for Tourism Development on the North West Cape*, was prepared to address small-scale tourism developments from Exmouth to Coral Bay, excluding developments within the designated townsites of Exmouth and Mauds Landing / Coral Bay. The Shire of Carnarvon zoning for the proposed development site is "Resort Development". The current proposal is therefore believed to be broadly consistent with the provisions of the relevant planning scheme. The EPA acknowledges that the draft Structure Plan prepared by CCMD may undergo modification as a result of the planning approvals process. The EPA notes that there are

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
			opportunities to address planning matters and for modifications to the proposed layout to occur via the planning process. The EPA considers that matters associated with the broader regional planning, particularly alternative locations for and forms of tourism and residential development, are beyond the scope of the EPA's assessment of the current proposal. However, the EPA understands that as a result of community feedback on the draft Carnarvon Coastal Strategy, a new *Carnarvon-Ningaloo Coast Regional Strategy* will be developed. The *Strategy* is currently being prepared by the DPI. The EPA understands that this strategy will review existing planning in the region and include an inclusive and participatory consultation process on all matters concerning the *Strategy's* preparation. The EPA acknowledges the importance of resolving current boating and infrastructure issues at Coral Bay. These matters are currently being given attention by the Government, independent of this proposal. The proponent's capacity or authority to implement measures to resolve issues at Coral Bay are very limited. If the Mauds Landing proposal is allowed to proceed, the responsibility of relocating boating activity from southern Bills Bay and addressing services infrastructure limitations in Coral Bay will remain with Government. It is the EPA's view that the *Carnarvon-Ningaloo Coast Regional Strategy* is the most appropriate framework within which to give up-to-date attention to regional planning matters. **The EPA considers that planning issues is not a relevant environmental factor.**
Economic issues		**Government agency submissions** DCLM and DPI consider a significant bond should be placed on CCMD as a contingency should the proposal fail to be completed. The GDC consider there is potential for the proposal to compete with existing centres of Carnarvon and Exmouth. **Public submissions** Public submissions expressed concern that the proposal may not be economically viable. Examples were provided where other coastal developments have failed. Submitters consider that proposal will compete with established towns of Exmouth and Carnarvon for tourism business.	The EPA understands that a proposed Land Development Agreement (LDA) is being prepared by the Department of Land Administration for the proposed development area. The LDA provides for a $5,000,000 bond to be lodged by CCMD prior to it gaining access to land for development. Issues regarding economic competition are beyond the scope of matters that can be considered by the EPA under the *Environmental Protection Act.* The EPA does not have the capacity, authority or expertise to assess the financial capability of the proponent or the financial viability of the proposal.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
		A submission considers a considerable performance bond must be secured from the proponent.	In view of the above, **economic factors is not considered to be a relevant environmental factor.**
Transport		**Government agency submissions** Main Roads WA, GDC and Shire of Carnarvon advised that the predicted increase in heavy vehicles has the potential to impact on road maintenance requirements and public safety. Accordingly, it was generally considered that CCMD should contribute towards the maintenance of roads potentially impacted by the proposal. DPI raised concerns about the location of the existing airstrip relative to the proposal. Noise and public safety were key issues raised.	In regard to potential impacts of its proposal on roads, the EPA notes that the proponent advised in its responses to public submissions that it will: • undertake a pre-construction road safety audit in consultation with the Shire of Carnarvon, Shire of Exmouth and MRWA and implement the findings of the audit to ensure all roads associated with the proposal are safe; • prepare and implement a Construction Transport Management Plan (commitment 55) to put in place funding arrangements and procedures to manage heavy haulage transport operations during the construction period of the CCR proposal; and • in consultation with the Shire of Carnarvon, Shire of Exmouth and MRWA, it will provide funding for road maintenance brought about by additional road wear as a direct result of implementation of the proposal to ensure all roads impacted by the proposal remain safe. In its responses to public submissions, the proponent committed to relocate the current airstrip. CCMD have since advised that the proposal to upgrade the existing airstrip at Cardabia Station to meet relevant standards will be the subject of a separate referral to the EPA by the Baiyungu Aboriginal Corporation. Noting the proponent's commitments and advice, **transport is not considered to be a relevant environmental factor.**
Mosquitoes		**Government agency submissions** DPI raised the issue of mosquito problems arising due to the proximity of the proposal to the salt lake and an inland waterway. **Public submissions** No mention has been made in the PER of possible mosquito infestation when salt flats are inundated or as a result of creating an inland waterway. As Ross River virus is prevalent in the area and the virus may pose a serious threat to human health, how does the proponent propose to address this issue?	The EPA notes that in its responses to public submissions, CCMD acknowledged the need to consider the implications of mosquitoes on amenity and public health. CCMD committed to develop and implement a Mosquito and Ross River Virus Management Plan (commitment 22) as part of its Environmental Management Program for the resort. The Plan will address: • the type of mosquito species and an estimate of the size of the adult mosquito population present; • the seasonal distribution of potential mosquito breeding sites (this will necessitate seasonal larval surveys); • potential impacts of mosquitoes on the health, welfare and amenity of future residents; • methods and effectiveness of mosquito control measures; • potential measures to manage mosquito populations; • potential short and long-term environmental impacts resulting from the implementation of mosquito control

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
			measures on the environment necessitated by the proximity of humans to mosquito breeding areas; and • review of control measures. The use of control measures such as the application of larvicides during extreme events will require coordination with the Shire, as portions of the areas likely to be support mosquito breeding extend onto adjoining lands and integrated approach will be necessary. The proponent proposes to develop mosquito management strategies in consultation with the Health Department and Shire of Carnarvon. Other relevant agencies such as the DEP and DCLM should also be consulted as necessary. The EPA considers that the application of pesticides and larvicides would need to be justified with appropriate scientific data which demonstrates that there is no risk to the Marine Park. **Mosquitoes is not considered to be a relevant environmental factor.**

Appendix 4

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No. XXX

RECOMMENDED CONDITIONS AND PROCEDURES

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

CORAL COAST RESORT, MAUDS LANDING, SHIRE OF CARNARVON

Proposal: The proposal is for a tourist and residential development centred around an inland marina adjacent to the Ningaloo Marine Park at Mauds Landing. It includes a 47 hectare marina and associated maritime facilities and services; a maximum of 200 freehold residential lots; a range of short-stay tourist accommodation (caravan park, backpacker hostel, serviced resort apartments; tourist villas and townhouses and timeshare); environment and interpretative centre; entrance and internal roads; open spaces; drainage; potable water treatment and a services area with associated public utilities services (wastewater treatment plant, landfill, power station, gas storage), as documented in Schedule 1 of this statement.

Proponent: Coral Coast Marina Development Pty Ltd

Proponent Address: Suite 1 Poynton House
Corner of Poynton Avenue and Burgess Street
MIDLAND WA 6056

Assessment Number: 1322

Report of the Environmental Protection Authority: Bulletin 1073

The proposal referred to above may be implemented subject to the following conditions and procedures:

Procedural Conditions

1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions in this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

a. The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

- the environmental factors of the proposal have not changed significantly;
- new, significant, environmental issues have not arisen; and
- all relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

Environmental Conditions

5 Seagrass and Coral Management Plan

5-1 Prior to the commencement of construction activities, the proponent shall prepare a Seagrass and Coral Management Plan, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agency and statutory authority will be obtained:

- Department of Conservation and Land Management; and
- Marine Parks and Reserves Authority.

The objectives of this Plan are:

- to protect seagrass and coral from the effects of sedimentation and deterioration in light climate associated with the construction and operation of the proposal.

This Plan shall address management measures to protect seagrass and coral in the 'temporary construction impact area', identified in fulfilling the requirements of condition 10-1, as well as in a broader area of the Ningaloo Marine Park to be agreed in fulfilling the requirements of commitment 9 (schedule 2) of this statement, and shall include:

1. the collection of pre-development reference information on the distribution of seagrass species and coral reef communities;
2. pre-development reference information on seagrass health and coral condition;
3. establishment of the environmental values of seagrass and corals, including a marine fauna usage study;
4. derivation of site-specific 'alert' and 'action' criteria, for the protection of seagrass and coral from the effects of the project-reduced water clarity and sedimentation, which have a temporal component and, which are based on metabolic light requirements;
5. a seagrass and coral monitoring program which includes procedures for monitoring light climate, seagrass and coral health and sedimentation at impact and reference sites over relevant time frames against 'alert' and 'action' criteria developed in 4. above;
6. adaptive management actions where 'alert' and 'action' criteria in 4. above may not be met;
7. contingency strategies; and
8. reporting procedures.

5-2 The proponent shall implement the Seagrass and Coral Management Plan required by condition 5-1, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

5-3 The proponent shall make the Seagrass and Coral Management Plan required by condition 5-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

6 Turtle Breeding Management Plan

6-1 Prior to commencement of ground-disturbing activities, the proponent shall prepare a Turtle Breeding Management Plan, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agencies and statutory authority will be obtained:

- Department of Conservation and Land Management;
- Marine Parks and Reserves Authority; and
- Environment Australia.

The objectives of this Plan are:

- to monitor sea turtles which use Bateman Bay beaches for nesting, and
- to develop and implement adaptive management if monitoring indicates that the proposal is impacting on turtle breeding.

This Plan shall address management measures to protect sea turtles which use beaches in the vicinity of the proposal for breeding, and shall include:

1. area of beach to be monitored;
2. collection and collation of pre-development turtle breeding information for Bateman Bay;
3. establishment of monitoring parameters;
4. derivation of 'alert' and 'action' criteria for each parameter to be monitored;
5. a turtle breeding monitoring programme;
6. investigations into exeedances of relevant 'alert' and 'action' criteria;
7. adaptive management strategies where 'alert' and 'action' criteria in 4. above may not be met; and
8. reporting procedures.

6-2 The proponent shall implement the Turtle Breeding Management Plan required by condition 6-1, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

6-3 The proponent shall make the Turtle Breeding Management Plan required by condition 6-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7 Coastal Management

7-1 Prior to the commencement of construction, the proponent shall prepare a Shoreline Stability Plan, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agencies and statutory authority will be obtained:

- Department of Conservation and Land Management;
- Marine Parks and Reserves Authority; and
- Department of Planning and Infrastructure.

The objectives of this Plan are to:

- protect the ecological and social values of Bateman Bay beaches from the effects of coastal structures associated with the proposal; and
- establish and implement environmentally sound Best Practice coastal management strategies.

This Plan shall address management measures to protect the ecological and social values of nearby beaches and shall include:

1. establishment of the ecological and social values of the Bateman Bay beach;
2. monitoring parameters having regard for ecological and social values of Bateman Bay beaches
3. derivation of appropriate criteria for monitoring;
4. collection and collation of pre-development reference information for Bateman Bay beaches;
5. location, frequency and duration of coastal monitoring programme for nearby beaches;
6. adaptive Best Practice coastal management strategies in the event that criteria derived in 2. above may not be met; and
7. reporting procedures.

7-2 The proponent shall implement the Shoreline Stability Plan required by condition 7-1, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7-3 The proponent shall make the Shoreline Stability Plan required by condition 7-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7-4 In the event that maintenance dredging is required to maintain an adequate navigable depth in the marina or its entrance, or nearby, prior to commencement of maintenance dredging, the proponent shall prepare a Maintenance Dredging Management Plan addressing:

1. volume and quality (ie contamination status) of material to be dredged;
2. timing and duration;
3. assessment of disposal options for dredged material;
4. the type of dredge;
5. procedures to ensure that all material which presents a marine pest risk is removed from the dredge plant prior to the dredge being brought on site;
6. development of ‘alert’ and ‘action’ criteria for turbidity and light levels;
7. a monitoring program for turbidity plumes and light at any nearby light-sensitive benthic communities against criteria;
8. adaptive management strategies to address exceedances in ‘action’ criteria;
9. management of noise, dust and traffic as necessary;
10. environmental performance requirements for dredging contractors; and
11. reporting procedures,

to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agencies and statutory authority will be obtained:

- Department of Conservation and Land Management;
- Marine Parks and Reserves Authority; and
- Department of Planning and Infrastructure.

8 Terrestrial Flora

8-1 Prior to commencement of ground-disturbing activities, the proponent shall undertake a Flora Survey to confirm whether significant flora species identified on the site are represented elsewhere in the vicinity of the proposal site, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agency will be obtained:

- Department of Conservation and Land Management.

The following flora species shall be the focus of this survey:

- *Halosarcia pelata*;
- *Acacia rostellifera*;
- *Austrostipa elegantissima*;
- *Podolepis microcephala*; and
- *Launaea sarmentosa*.

9 Subterranean Fauna

9-1 Prior to commencement of excavation activities, the proponent shall develop a Subterranean Fauna Management Plan for the respective area, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agencies will be obtained:

- Department of Conservation and Land Management; and
- The Western Australian Museum.

The objective of this Plan is:

- to increase scientific knowledge of subterranean fauna in the vicinity of the proposal to assist in the conservation of this element of the environment;

This Plan shall address:

1. subterranean fauna surveys of the area to be excavated for the construction of the marina;
2. characterisation of subterranean fauna habitats beneath the marina site;

3. subterranean fauna surveys of similar habitats outside the project area to assist in establishing the conservation significance of fauna within the project area; and
4. specific measures to record and preserve biological information on any species collected in the project area.

9-2 The proponent shall implement the Subterranean Fauna Management Plan required by condition 9-1, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

9-3 The proponent shall make the Subterranean Fauna Management Plan required by condition 9-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

9-4 The proponent shall submit the results from the Subterranean Fauna Management Plan to the Environmental Protection Authority, the Department of Conservation and Land Management and the Western Australian Museum, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

10 Marine Waters Management (Construction and Operation Phases)

10-1 Prior to the commencement of ground-disturbing activities, the proponent shall undertake a detailed Marine Water Quality Study to define a 'temporary construction impact area' associated with construction and early operation phases of the proposal, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agency and statutory authority will be obtained:

- Department of Conservation and Land Management; and
- Marine Parks and Reserves Authority.

The objectives of this Study are to:

- accurately predict the spatial extent and persistence of changes in marine water quality associated with the construction and early operation phases of the project;
- determine, in liaison with the Marine Parks and Reserves Authority, the temporary water quality objectives for a 'temporary construction impact area'; and
- allow for appropriate management measures to be identified and implemented such that the project will not cause long-term impacts on environmental values of the determined 'temporary construction impact area'.

This Study shall:

1. characterise pre-development water quality in the vicinity of the proposal;
2. include detailed modelling of the zone of influence associated with construction and early operation phases (a 'temporary construction impact area'), with regard for turbidity, suspended sediment, light reduction, nutrients; and physicochemical parameters;
3. determine the boundary and persistence of a 'temporary construction impact area';
4. establish, in liaison with the Marine Parks and Reserves Authority, environmental values and objectives for a 'temporary construction impact area'; and

5. define a ‘total’ level of protection for ecosystem health in marine waters beyond the boundary of the determined ‘temporary construction impact area’.

10-2 Having regard for the findings arising from condition 10-1, prior to ground-disturbing activities, the proponent shall prepare a Water and Sediment Quality Management Plan (Construction Phase) for the period of time determined in fulfilling the requirement of condition 10-1, and which is in addition to the requirements of condition 5, commitment 47 (Dredging Management Plan) and commitment 30 (Dewatering Management Plan) in schedule 2, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agency and statutory authority will be obtained:

- Department of Conservation and Land Management; and
- Marine Parks and Reserves Authority.

The objectives of this Plan are:

- to ensure that the proposal is managed to meet the objectives established for the ‘temporary construction impact area’ arising from condition 10-1;
- to achieve a ‘total’ level of ecosystem protection in waters beyond the boundary of the ‘temporary construction impact area’;
- to protect seafood quality and recreational values in the Ningaloo Marine Park;
- to ensure that construction activities and opening of the marina does not unreasonably impact on the aesthetic and recreational values of Ningaloo Marine Park; and
- to minimise the persistence of the ‘temporary construction impact area’.

This Plan shall address management measures to protect the quality of Ningaloo Marine Park waters during construction and early operational phases, and shall include:

1. type of marine-based construction plant to be used;
2. timing and duration of construction and marina opening;
3. derivation of ‘alert’ and ‘action’ criteria for:
    - physicochemical parameters;
    - nutrients; and
    - protection of aesthetic values of Ningaloo Marine Park waters;
4. procedures for monitoring against all ‘alert’ and ‘action’ criteria developed in 3. above, as well as relevant seafood quality criteria shown in Environmental Protection Authority document *Draft Environmental Quality Criteria Reference Document* (2001) and its updates and revisions;
5. adaptive management actions and contingency strategies to be implemented where ‘alert’ and ‘action’ criteria as well as designated Environmental Quality Criteria monitored in 4. above may not be met;
6. confirmation that sediments which may become suspended in marine waters during dredging meet appropriate environmental quality criteria;
7. contingency measures where appropriate criteria are not met, including alternative spoil containment and disposal options;
8. return water control; and
9. reporting procedures.

10-3 The proponent shall implement the Water and Sediment Quality Management Plan (Construction Phase) required by condition 10-2, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

10-4 The proponent shall make the Water and Sediment Quality Management Plan (Construction Phase) required by condition 10-2 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

10-5 Prior to ground-disturbing activity, the proponent shall prepare a Water and Sediment Quality Management Plan (Operations Phase) for the marina and surrounding waters, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agency and statutory authority will be obtained:

- Department of Conservation and Land Management; and
- Marine Parks and Reserves Authority.

The objective of this Plan is to monitor and manage water quality of the marina and the Ningaloo Marine Park during the Operations Phase, such that the following Environmental Quality Objectives as defined in the Environmental Protection Authority document '*Perth's Coastal Waters: Environmental Values and Objectives*' (EPA 2000) are achieved:

- Maintenance of ecosystem integrity;
  The levels of protection to apply are as follows:
  a. 'total' level of protection for the waters of the Ningaloo Marine Park outside the determined area of influence of the marina; and
  b. 'Moderate' level of protection for the waters of the marina, including conditions required for establishment and survival of corals within the marina.
- Maintenance of aquatic life for human consumption;
- Maintenance of primary contact recreation values;
- Maintenance of secondary contact recreation values; and
- Maintenance of aesthetic values.

This Plan shall:

1. provide a 'Total' level of protection to waters in the Ningaloo Marine Park, except for the 'Moderate' protection area surrounding the marina entrance;
2. restrict the location of the 'Moderate' protection area surrounding the marina entrance to within the area included in any lease for the project;
3. establish ecosystem health and social value indicators appropriate to the marina and the surrounding waters of Ningaloo Marine Park based on the threats to environmental quality and the likely cause-effect pathways;
4. cause site-specific guidelines and standards to be developed for the indicators if available generic environmental quality criteria are not appropriate;
5. include a water and sediment quality monitoring program for the marina and adjacent waters of the Ningaloo Marine Park to assess ambient environmental quality against site-specific guidelines and standards; and
6. include adaptive management strategies to ensure that the Environmental Quality Objectives are achieved and maintained in the event that agreed guidelines and standards may not be met; and

7. include reporting procedures.

10-6 The proponent shall implement the Water and Sediment Quality Management Plan (Operations Phase) required by condition 10-5, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

10-7 The proponent shall make the Water and Sediment Quality Management Plan (Operations Phase) required by condition 10-5 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: The Environmental Quality Objectives referred to in condition 10-5, the areas to which they apply, and the draft Environmental Quality Criteria are subject to review, and may be varied from time to time by the Environmental Protection Authority.

11 Drainage and Stormwater

11-1 During the detailed design phase, the proponent shall prepare a Site Drainage and Stormwater Management Plan, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: In preparation of advice to the Minister, the Environmental Protection Authority expects that the advice of the following agencies will be obtained:

- Water and Rivers Commission;
- Department of Conservation and Land Management; and
- Department of Planning and Infrastructure.

The objectives of this Plan are to manage stormwater to:

- ensure that the rate, quantity and flow regime of any surface water leaving the marina development site and the Services Area site will be maintained at pre-development levels; and
- ensure that quality of surface water is maintained or improved.

This Plan shall:

1. provide measures to facilitate the removal of nutrients and contaminants;
2. incorporate best practice Water-Sensitive Urban Design principles to maximise on-site water infiltration generally;
3. ensure that the quantity of surface water leaving the site is largely unchanged from pre-development levels;
4. ensure that the natural water relations and inundation patterns of the saline flats and the hypersaline pool are largely unchanged from pre-development levels conditions;
5. provide measures to minimise erosion during and after the development phase;
6. ensure that the quality of water leaving the site meets relevant criteria specified in the Australian and New Zealand Environment Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand document *Australian and New Zealand guidelines for fresh and marine water quality* (ANZECC and ARMCANZ 2000);
7. include a monitoring and reporting program to measure and report on the performance of the implemented Plan against relevant criteria;
8. address flood diversion; and

9. include adaptive management strategies in the event that relevant criteria are temporarily not achieved.

11-2 The proponent shall implement the Site Drainage and Stormwater Management Plan required by condition 11-1, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

11-3 The proponent shall make the Site Drainage and Stormwater Management Plan required by condition 11-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

12 Public Availability of Environmental Management Programmes and Plans

12-1 Prior to the implementation of the environmental management programmes and/or plans referred to within the commitments (schedule 2), the proponent shall make the following programmes and plans publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority:

1. Construction Phase Environmental Management Program (See commitment 5); and
2. Operations Phase Environmental Management Program (See commitment 7).

13 Decommissioning

13-1 Prior to completion of the construction phase, the proponent shall prepare, and subsequently implement, a Preliminary Decommissioning Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The Preliminary Decommissioning Plan shall address:

1. rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;
2. a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders;
3. a conceptual plan for a care and maintenance phase; and
4. management of noxious materials to avoid the creation of contaminated areas.

13-2 At least six months prior to the anticipated date of closure, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

1. removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
2. rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and
3. identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

13-3 The proponent shall implement the Final Decommissioning Plan required by condition 13-2 until such time as the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, that the proponent's closure responsibilities have been fulfilled.

13-4 The proponent shall make the Final Decommissioning Plan required by condition 13-2 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

14 Compliance Audit and Performance Review

14-1 The proponent shall prepare an audit program in consultation with, and submit compliance reports to, the Department of Environmental Protection which address:

- the implementation of the proposal as defined in Schedule 1 of this Statement;
- evidence of compliance with the conditions and commitments; and
- the performance of the environmental management plans and programs.

Note: Under Sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the Statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this Statement.

Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the proponent, if required, to prepare an audit program to ensure that the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

14-2 The proponent shall submit a performance review report prior to the completion of stage 1 of the proposal described in schedule 1, and each five years thereafter, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;
2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;

3. significant improvements gained in environmental management, including the use of external peer reviews;
4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed;
5. the proposed environmental targets over the next five years, including improvements in technology and management processes; and
6. consideration of future environmental management option, entities, bodies and/or arrangements, including timing.

15 Long-term Management

15-1 Prior to the commencement of construction, the proponent shall enter into a legal agreement with the Shire of Carnarvon which addresses management of land, facilities, infrastructure and services within an area described by a Land Development Agreement as negotiated by the Minister for Planning and Infrastructure in the role as Minister for Lands, to the requirements of the Minister for the Environment and Heritage on advice of the Minister for Local Government and the Environmental Protection Authority.

This agreement shall include the following provisions:
1. delineation of management responsibilities;
2. acceptance of responsibilities by appropriate parties;
3. arrangements for the provision of resources for the management and maintenance of the project, including the use of rating;
4. forecasts of the future availability of resources;
5. planning and approval procedures; and
6. preliminary arrangements for long-term management.

Note: This agreement will have effect until amended or revised as agreed between the parties with any amendment or revision being to the requirements of the Minister for the Environment and Heritage.

Any such agreement in no way derogates the proponent's obligations set out in any development lease granted under the Land *Administration Act 1997.*

15-2 Any new legal agreement intended to change management, or responsibilities for land, marine waters, facilities, infrastructure and services within an area described by a Land Development Agreement shall, in addition to the requirement for any amendment to the Land Development Agreement or development lease to the satisfaction of the Minister for Lands, is to be subject to the outcome of the Performance Review required by condition 14, to the requirements of the Minister for the Environment and Heritage on advice of the Minister for Local Government and the Environmental Protection Authority.

This agreement referred to in this condition shall include the following parties:
- the Shire of Carnarvon; and
- the Department for Planning and Infrastructure, Maritime Division,

and shall contain the following provisions:
1. delineation of long-term management responsibilities for the land-based aspects of the proposal;

2. delineation of long-term responsibilities for the maintenance of facilities and infrastructure, and monitoring and management of environmental quality in the marina;
3. detailed arrangements for the provision of resources for the long-term management and maintenance of the project, including the use of rating;
4. planning and approval procedures; and
5. acceptance of responsibilities by appropriate parties.

16 Work Practices

16-1 Prior to the commencement of the Construction Phase, the proponent shall submit a written prescription for contractor work practices which addresses:

1. environmental management requirements; and
2. protection of sensitive marine and terrestrial environments,

to ensure that work practices are carried out at the level of international best practice, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

16-2 The proponent shall ensure that the prescription of work practices required by condition 12-1 is implemented to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Procedures

1. Where a condition states 'to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority', the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

3. All parties required by conditions 15-1 and 15-2 to enter into legal agreements will need to have regard for the terms of the Land Development Agreement or development lease granted under the *Land Administration Act 1997* between the proponent and the Minister for Planning and Infrastructure, in the role as Minister for Lands.

   The terms of the agreements required by condition 15-1 and 15-2 shall not be in conflict with the terms of the Land Development Agreement between the proponent and the Minister for Planning and Infrastructure.

4. The Minister for Planning and Infrastructure, in the role as Minister for Lands, in modifying the Land Development Agreement will have regard for the requirements of the *Environmental Protection Act 1986* with respect to this proposal.

Notes

1. The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2. The proponent is required to apply for a Works Approval and Licence under the provisions of Part V of the *Environmental Protection Act 1986* for certain activities associated with the proposal, including the wastewater treatment plant, the land fill facility and any other activity prescribed under Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal (Assessment No. 1234)

The Coral Coast Resort at Mauds Landing will provide a range of short-stay and holiday accommodation, as well as free-hold lots for residential development. The residential, tourist and other commercial elements are centred around an inland marina and lagoon system which occupies approximately 47 hectares. The project will occupy approximately 114 hectares of land at Mauds Landing, north of Coral Bay in the Shire of Carnarvon.

The Coral Coast Resort project consists of elements including:

- an inland marina including artificial snorkelling reefs, boat ramp (2 lane) and catwalk, shark nets, oil booms, absorbents and skimmer and navigation aids;
- works to ensure the remains of the Mauds Landing Jetty are made safe for navigation;
- breakwaters and revetments;
- a marina village comprising a serviced resort complex, convenience retail, food and beverage facilities, Environment Interpretive Centre, including office spaces for the Department of Conservation and Land Management and the Department of Fisheries;
- tourist accommodation including a caravan and chalet park, beach 'annex' to the marina village resort providing serviced suites, a backpackers hostel, tourist villas, townhouses and timeshare units;
- a residential subdivision;
- a coach terminal, auto / marine, boat launching and parking facilities;
- a sports and community centre;
- staff accommodation;
- an access road and internal roads, verges and parking areas;
- artesian bore and desalination facilities; and
- a services area for the provision of services such as power, landfill, gas supply, telecommunications and wastewater treatment.

The development will take place in at least two stages.

Stage 1 involving site works and associated development works is described in Table 1. Site works include but are not limited to the excavation of the marina and entrance channel, site preparation and associated bulk earthworks, construction of breakwaters, revetments and walls, provision of boating facilities as part of the marina, works required to mark the remains of the Mauds Landing Jetty, road works, site stormwater drainage, landscaping of public areas and development and provision of services and utilities.

Associated development works include provision of remaining maritime facilities in the marina (service jetty, wharf and boardwalks), development and landscaping of areas such as open spaces, main entrance road/statement, road verges and resort centre, propagation of a coral garden in the marina, construction of buildings for aboriginal culture centre, environmental research and visitor centre and administrative facilities for relevant government agencies and development of a caravan park, a backpacker hostel and an apartment complex comprising 60 serviced apartments and associated food and beverage facilities.

Other stages, involving the development of tourist elements such as villas, townhouses, timeshare units and staff accommodation outlined in Figure 1 may or may not be implemented by the proponent after completion of Stage 1 (i.e. site works and associated development works). The proponent can exercise an option to develop these elements of the project if it meets acceptable milestones for Stage 1.

These development milestones are detailed in a proposed Land Development Agreement negotiated between the proponent and the Department of Land Administration.

Table 1: Key Characteristics Table – Stage 1 Coral Coast Resort

Element	Description
Stage 1	Site Works and Associated Development Works (ADW).
Breakwaters	Two (2) armoured limestone breakwaters designed to withstand Category 5 cyclones. Breakwaters extending approximately 200 metres from the shoreline covering an area of approximately 2.5 hectares currently in the Ningaloo Marine Park in Bateman Bay.
Inland marina and beaches	Approximately 50 hectares with depth ranging between 1.5 metres and 4.5 metres. 250 metre long entrance channel dredged to approximately 5 metres depth. Public swimming beaches within the marina protected by shark nets. Boating facilities including a double lane boat launching facility, service jetties and wharfs, dedicated boat fuelling and sullage pump-out facilities and a total of 100 boat pens for public and commercial use. Limestone base for the establishment of a diving/snorkelling reef. Spill response equipment including oil booms, absorbents and skimmer. Navigation aids. Boardwalks.
Preparation of the land elements of the site for development and subsequent subdivision. Note that all elements of the ultimate Phase 1 proposal may not be developed by CCMD in the long term.	A total of approximately 86 hectares. Raised ground level to approximately 6 metres Australian Height Datum (AHD) on the ocean side of the marina and approximately 3.6 metres AHD on the landward side of the marina. Provision of Services and Utilities including: • water supply; • power; • wastewater treatment; • telecommunications; • gas supply; and • refuse disposal.
Caravan and Chalet Park	Approximately 4 hectares. 100 bays with supporting camping and coach camping facilities. 20 chalets/park cabins.
Backpackers Hostel	Approximately 1 hectare. 60 beds.
Permanent residential	Approximately 12.6 hectares. No more than 200 serviced freehold lots, each ranging between 420m^2 and 700m^2 in size for private sale.
Marina Village and Resort	Approximately 4 hectares. Buildings including: • environmental research and visitor centre and contribution towards fit out; • Aboriginal heritage and cultural centre; and • administrative facilities for relevant government agencies; • 60 two bedroom strata title serviced resort apartments (First Stage); and • associated food and beverage facilities.

Access and internal arterial roads, public parking	Approximately 20.7 hectares. Road access from the existing Coral Bay road. Internal arterial roads and road reserves. Stormwater drainage. 120 boat trailer parking bays, with secure boat-parking area.
Water storage, cooling and use	Approximately 0.5 hectares. Reverse osmosis desalination plant. Water storage area. Use of approximately 0.52 million kilolitres per annum.
Services Area	Approximately 62 hectares of rural zoned land located 1.5 km east of Coral Bay to be developed for service utilities including: • a wastewater treatment plant of 575 ML/day prescribed under Part V of the *Environmental Protection Act 1986*; • a managed landfill site prescribed under Part V of the *Environmental Protection Act 1986*; • <10 MW gas-fired power station (not prescribed under Part V *Environmental Protection Act 1986*); and • a light industrial area.
Emergency Services	CCMD will provide for volunteer-operated services including: • Fire and emergency services; • Nursing station and first aid; and • Sea search and rescue.
Parks, open space and northern access reserves	Public open space areas. Main entry – access road and entry statement. Road verges. Resort centre landscaping. Management controls (fencing, pathways and car park).
Mauds Landing Jetty	Works to make the remains of the Mauds Landing Jetty remains safe.

Table 2: Key Characteristics Table – Remaining Stages Coral Coast Resort

Additional Stages	The following elements may be developed as part of the Coral Coast Resort proposal described in Section 2 of the PER (ATA 2000a). These elements may be developed by CCMD or they may be developed by third parties as demand requires.
Serviced apartments	Approximately 3.5 hectares. 130 two and three storey serviced resort apartments to form the second apartment complex.
Timeshare	Approximately 3.6 hectares. 100 timeshare units.
Tourist villas and townhouses	Approximately 6.7 hectares. A combined total of 180 resort villas and townhouses.
Staff Residential	Approximately 1.7 hectares. 40 managed freehold lots, each 420m^2 in size.
Staff – group housing	Approximately 3.8 hectares. A combined total of 130 managed villa and duplex units.
Community centre	Approximately 1.6 hectares.
Auto, marine and coach services	Approximately 0.9 hectares. Service station and auto services site.

Figures (attached)

Figure 1: Locality of the Coral Coast Resort project.

Figure 2: Property plan for the Coral Coast Resort project, showing the Services Area (Area 1), entry road corridor (Area 2), Marina Site (Area 3) and breakwater site (Area 4).

Figure 3: Layout of the Coral Coast Resort project.

Figure 4: Layout of the Services Area.

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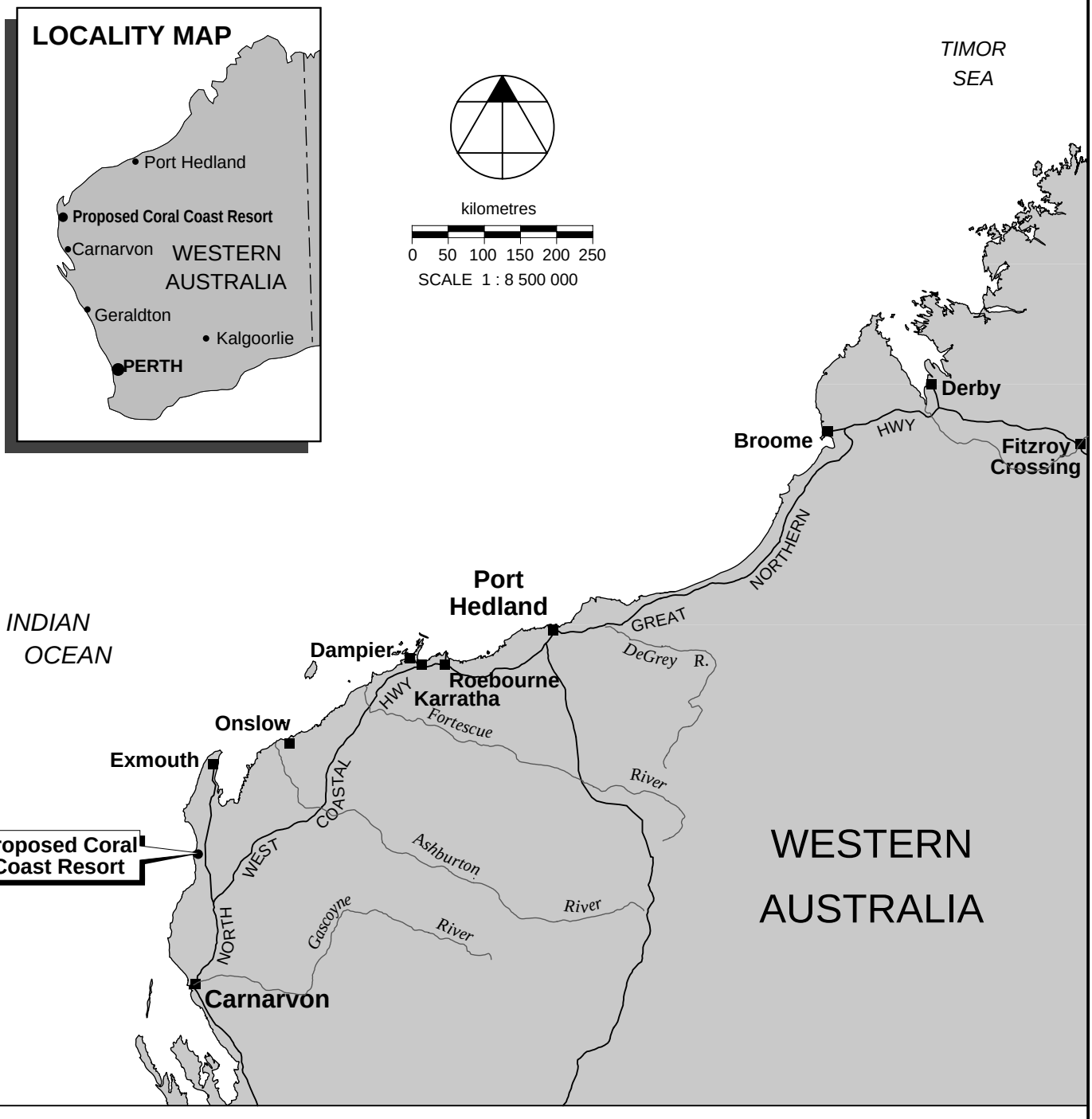
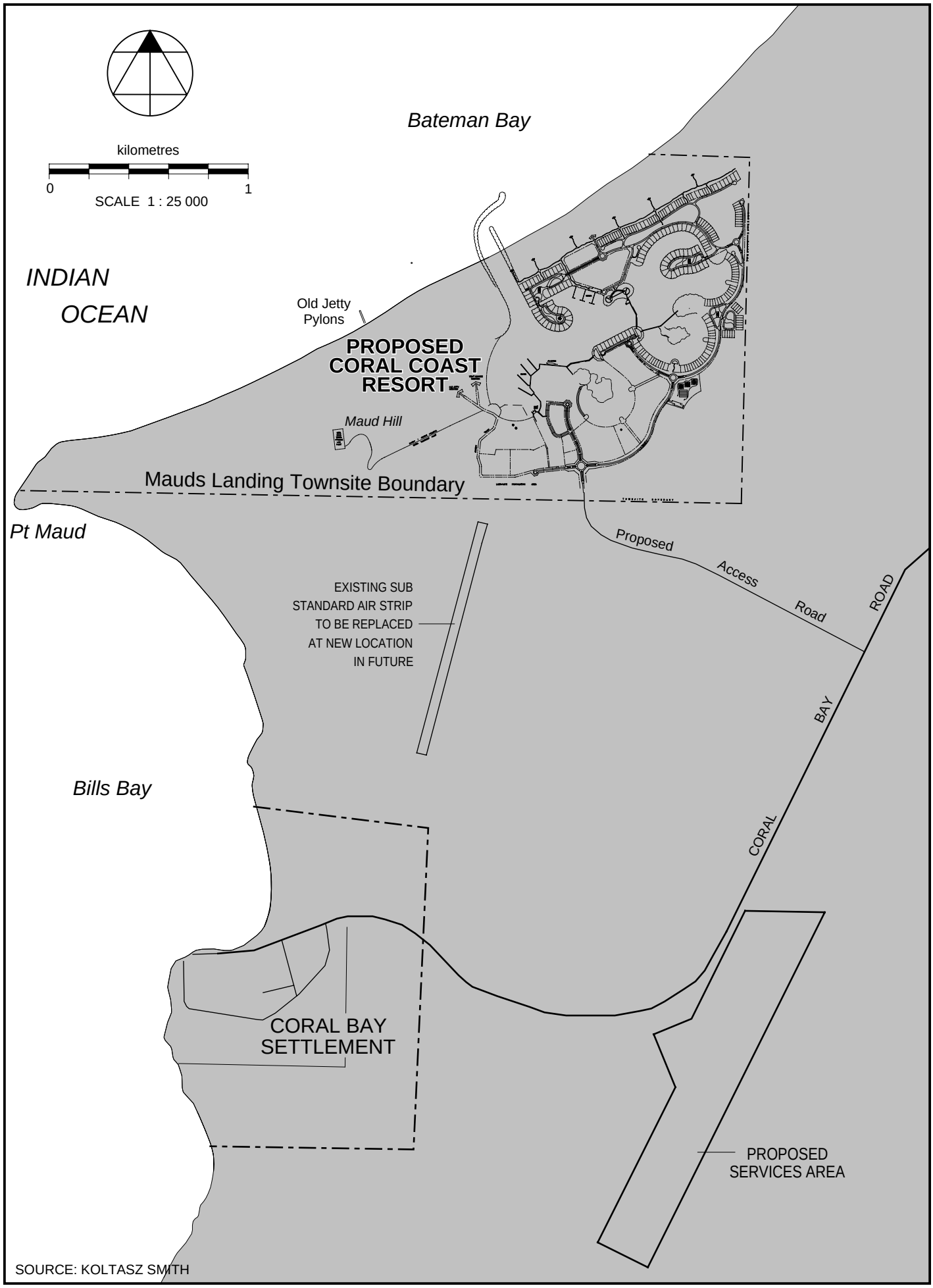


CORAL COAST RESORT, EPA ASSESSMENT NUMBER 1322

REGIONAL LOCATION

FIGURE 1



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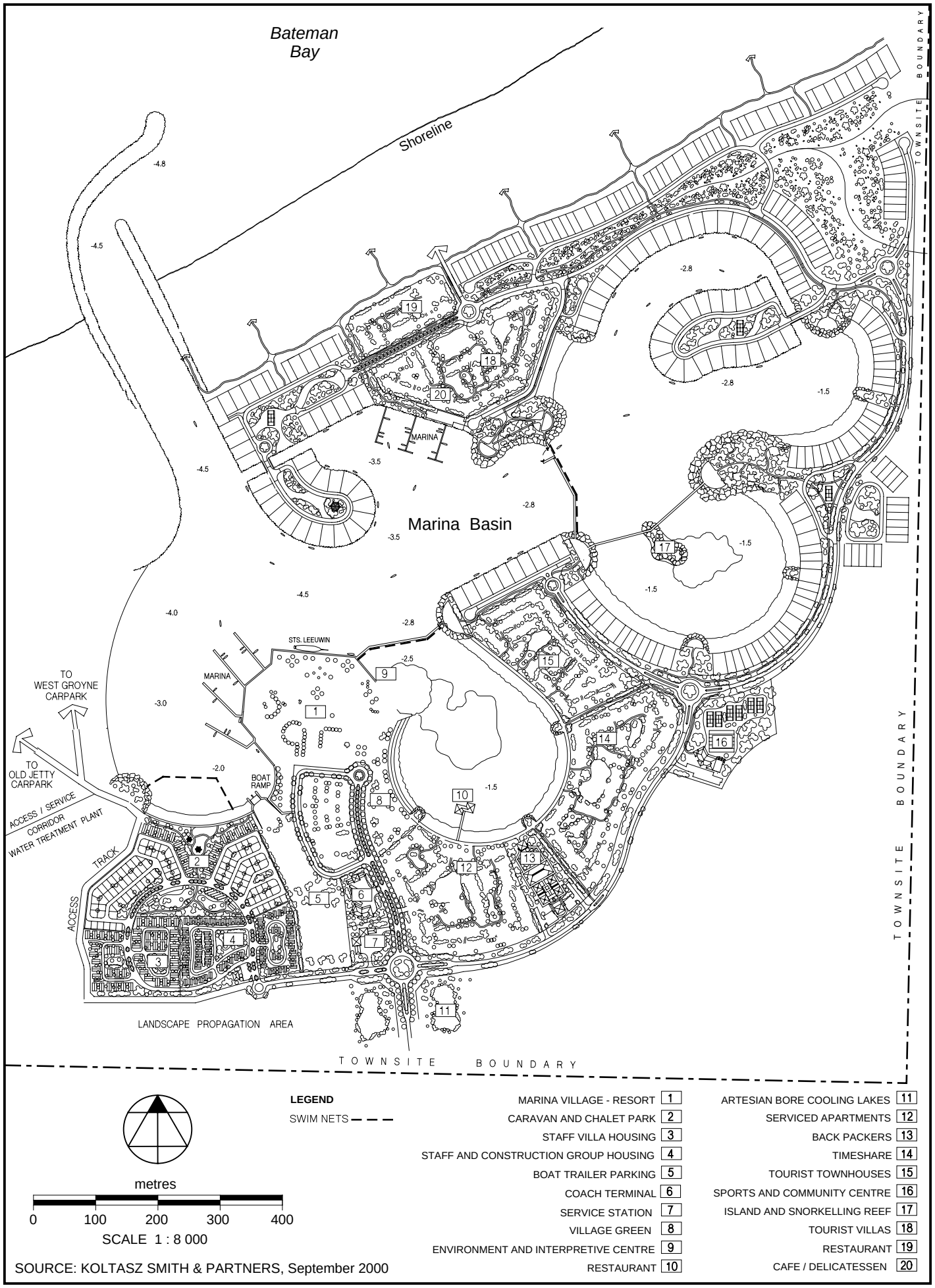
CORAL COAST RESORT, EPA ASSESSMENT NUMBER 1322

SITE LOCATION

FIGURE 2



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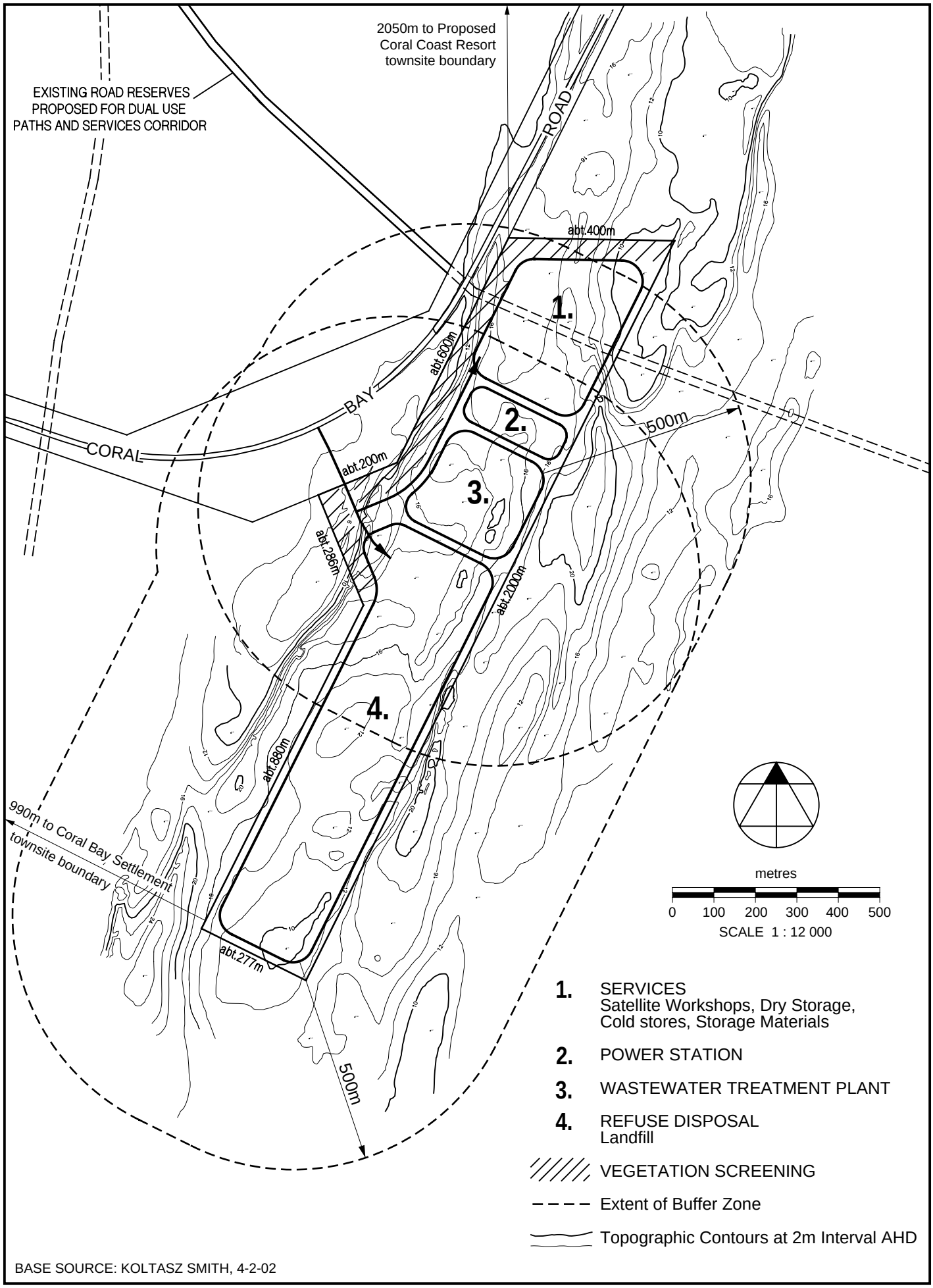
CORAL COAST RESORT, EPA ASSESSMENT NUMBER 1322

CORAL COAST RESORT STRUCTURE PLAN

FIGURE 3



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CORAL COAST RESORT, EPA ASSESSMENT NUMBER 1322

SERVICES AREA LAYOUT

FIGURE 4

Schedule 2

Proponent's Environmental Management Commitments

25 October 2002

CORAL COAST RESORT,
MAUDS LANDING, SHIRE OF CARNARVON
(Assessment No. 1322)

CORAL COAST MARINA DEVELOPMENT PTY LTD

CORAL COAST RESORT – PROPONENT'S ENVIRONMENTAL MANAGEMENT COMMITMENTS
(ASSESSMENT NO. 1322)

No.	Topic	Action	Objective	Timing	Advice
1.	Environmental Management System	Prepare a Construction Phase Environmental Management System (EMS) for the development, to include: 1. Environmental policy and corporate commitment to the EMS 2. Specify a construction phase environmental Code of Conduct for all staff and contractors; 3. Planning to meet environmental requirements; 4. Specification and implementation of actions to meet environmental requirements; 5. Measurement and evaluation of environmental performance; and 6. Review and improvement of environmental outcomes.	To manage the relevant environmental factors.	Prior to construction.	
2.		Implement the Construction Phase EMS for the development.		During construction.	
3.		Prepare an Operations Phase EMS for the development, to include: 1. Environmental policy and corporate commitment to the EMS; 2. Specify an operations phase environmental Code of Conduct for all staff, contractors, residents and visitors; 3. Planning to meet environmental requirements; 4. Specification and implementation of actions to meet environmental requirements; 5. Measurement and evaluation of environmental performance; and 6. Review and improvement of environmental outcomes.	To manage the relevant environmental factors.	Prior to operations.	
4.		Implement the Operations Phase EMS for the development.		On completion of civil construction.	

No.	Topic	Action	Objective	Timing	Advice
5.	Environmental Management Program	Prepare a Construction Phase Environmental Management Program (CEMP), which will contain plans and procedures to manage environmental issues associated with construction of the development, and will include: 1. Turtle Management Plan (commitments 12 & 13); 2. Marine Mammal Management Plan (commitments 14 & 15); 3. Bird Management Plan (commitments 18 & 19); 4. Terrestrial Fauna Management Plan (commitments 20 & 21); 5. Mosquito and Ross River Monitoring Plan (commitments 22 & 23); 6. Shoreline Movement Management Plan (commitments 24 & 25); 7. Foreshore Management Plan (commitments 26 & 27); 8. Vegetation Management Plan (commitments 28 & 29); 9. Dewatering Management Plan (commitments 30 & 31); 10. Stormwater Management Plan (commitments 32 & 33); 11. Site Heritage Management Plan (commitments 44 & 45); 12. Dredging Management Plan (commitments 47 & 48); 13. Dust Management Plan (commitments 49 & 50); 14. Construction Noise Management Plan (commitments 51 & 52); 15. Construction Waste Management Plan (commitments 53 & 54); 16. Construction Traffic Management Plan(commitments 55 & 56); and 17. Fuel and Chemical Spill Management Plan(commitments 57 & 58).	To manage and minimise potential impacts of the construction phase of the development.	Prior to construction.	DCLM, WRC and DHWA (depending on the development component).
6.		Implement the approved CEMP.		With the initial stages of construction.	

No.	Topic	Action	Objective	Timing	Advice
7.	Environmental Management Program.	Prepare an Operations Phase Environmental Management Program (EMP), which will contain plans and procedures to manage environmental issues associated with operation of the development, and will include: 1. Turtle Management Plan (commitments 12 & 13); 2. Marine Mammal Management Plan (commitments 14 & 15); 3. Whale Shark Management Plan(commitments 16 & 17); 4. Bird Management Plan (commitments 18 & 19); 5. Terrestrial Fauna Management Plan (commitments 20 & 21); 6. Mosquito and Ross River Monitoring Plan (commitments 22 & 23); 7. Shoreline Movement Management Plan (commitments 24 & 25); 8. Foreshore Management Plan (commitments 26 & 27); 9. Stormwater Management Plan (commitments 32 & 33); 10. Marine Water Quality and Sediment Management Plan (commitments 34 & 35); 11. Marina Water Quality and Sediment Management Plan (commitments 36 & 37); 12. Nutrient and Irrigation Management Plan (commitments 38 & 39); 13. Shallow Groundwater Management Plan (commitments 40 & 41); 14. Artesian Water Operating Plan (commitments 42 & 43); and 15. Dust Management Plan (commitments 49 & 50).	To manage and minimize potential impacts of the operations phase of the development.	Prior to operations.	DCLM, WRC and DHWA (depending on the development component).
8.		Implement the Operations Phase EMP for the development.		On completion of the civil construction.	

No.	Topic	Action	Objective	Timing	Advice
9.	Ningaloo Reef	Prepare a Specified Area Marine Management Plan (SAMMP) for the Maud Specific Management Area (MSMA) and Development Impact Area (DIA) to address: 1. A program for detailed habitat mapping of the MSMA and DIA; 2. A program for monitoring of water and sediment quality including nutrients (chlorophyll a and inorganic nutrients), turbidity and light extinction through the water column, metals, indicators of microbiological extinction, tributyltin and hydrocarbons; 3. Identification of priorities for management of ecotourism target species such as whales, whale sharks, manta rays, marine turtles and dugongs; 4. A recreational fisheries management program to address baseline catch and effort data for areas accessed from the Coral Coast Resort; 5. A program for coral monitoring to identify the condition of habitat types within the area of direct influence, and as an indicator of the likely impacts of broader fishing/utilisation pressure as a consequence of the likely greater level of visitation resulting from the implementation of the proposal; 6. A program for monitoring and development of contingency measures for introduced marine pests; and 7. Reporting requirements.	To avoid or limit impacts on biota (marine flora and fauna) and avoid or limit impacts in the non-living environment (sediments, water quality).	Prior to placement of breakwater materials.	DCLM, DPI, Department of Fisheries, CSIRO and MPRA.
10.		Implement the approved SAMMP.		Prior to placement of breakwater materials and operation,	
11.		Review the SAMMP		Review 5 years after the completion of civil construction.	

No.	Topic	Action	Objective	Timing	Advice
12.	Marine Fauna (Turtles)	Prepare a Turtle Management Plan to address: 1. Turtle nesting surveillance; 2. Lighting pollution and controls; 3. Education, interpretive literature and signage; 4. Feral animals and introduced animal management; 5. Indigenous hunting; 6. Role of Turtle Management Officer; 7. Small boat operations, including consideration of no-go areas, speed limits and response to vessel strikes; 8. Ecotourism; 9. Beach access and control of off road vehicles; and 10. Contingency and response measures.	To avoid or limit impacts on marine turtle populations, especially during sensitive nesting periods.	Prior to construction.	DCLM.
13.		Implement approved Turtle Management Plan.		During Construction and Operation phases	
14.	Marine Fauna (Marine Mammal)	Prepare a Marine Mammal Management Plan to: 1. Record interactions; 2. Record entanglements, boat collisions and strandings; 3. Indigenous hunting; 4. Ecotourism; 5. Small boat operations, including consideration of no-go areas, speed limits and response to vessel strikes; 6. Education, interpretive literature and signage; and 7. Contingency and response measures.	To ensure marine mammals are not impacted by the development	Prior to placement of breakwater materials.	DCLM.
15.		Implement approved Marine Mammal Management Plan.			

No.	Topic	Action	Objective	Timing	Advice
16.	Whale Shark Management	Prepare a Whale Shark Management Plan to: 1. Record interactions; 2. Record entanglements, boat collisions; 3. Small boat operations, including consideration of no-go areas, speed limits and response to vessel strikes 4. Education, interpretive literature and signage: and 5. Contingency and response measures.	To minimise and manage potential impacts of the development on the whale shark population.	Prior to placement of breakwater materials.	DCLM
17.		Implement approved Whale Shark Management Plan.		Prior to operation	
18.	Fauna (Birds)	Prepare a Bird Management Plan to address: 1. Protection of key roosting areas; 2. Ongoing monitoring of bird populations; 3. Restrictions for vehicles accessing the Maud Sanctuary Zone from the Townsite; 4. Feral animals and introduced animal management; 5. Small boat operations including consideration of no-go areas, speed limits; 6. Education, interpretive literature and signage; and 7. Contingency and response measures.	To avoid or limit impacts on bird populations by the development.	Prior to Construction.	DCLM.
19.		Implement approved Bird Management Plan.		During Construction and Operation phases.	
20.	Terrestrial Fauna	Prepare a Terrestrial Fauna Management Plan to address: 1. Survey methods and timing; 2. Education, interpretive literature and signage; 3. Management of species relocation; and 4. Feral and introduced animal management.	To manage and minimise the impacts on the terrestrial fauna population in the area of development	Prior to construction.	DCLM.
21		Implement approved Terrestrial Fauna Management Plan.		During Construction and Operation phases	

No.	Topic	Action	Objective	Timing	Advice
22. .	Mosquito Management	Prepare a Mosquito and Ross River Virus Management Plan to address: 1. The type of mosquito species and an estimate of the size of the adult mosquito population present; 2. The seasonal distribution of potential mosquito breeding sites (this will necessitate seasonal larval surveys); 3. Potential impacts of mosquitoes on the health, welfare and amenity of future residents; 4. Methods and effectiveness of mosquito control measures; 5. Potential measures to manage mosquito populations; 6. Potential short and long-term environmental impacts resulting from the implementation of mosquito control measures on the environment necessitated by the proximity of humans to mosquito breeding areas; and 7. Review of control measures	To manage and minimise the breeding of mosquitoes without adversely affecting other flora and fauna.	Prior to construction.	DHWA. And Shire of Carnarvon.
23.		Implement approved Mosquito and Ross River Virus Management Plan.			
24.	Mauds Landing Shoreline	Prepare a Shoreline Movement Management Plan to address: 1. Characterisation of sediment changes; 2. Coastal (including sediment) accretion and erosion rates; 3. Measurement of beach profiles; and 4. Remedial measures.	To maintain the stability of foreshore areas and Maintain or improve those areas presently degraded.	Prior to placement of breakwater materials.	DCLM, MPRA and DPI (Maritime Division).
25.		Implement approved Shoreline Movement Management Plan.			

No.	Topic	Action	Objective	Timing	Advice
26.	Mauds Landing Foreshore	Prepare a Foreshore Management Plan to address: 1. Provision of paths, boardwalks and coastal facilities; 2. Delineate construction working areas; 3. Formalisation of parking and recreation areas; 4. Definition of dune preservation and fencing areas; 5. Rehabilitation of foreshore areas; 6. Education and signage; 7. Control of vehicle access to beaches from the Mauds Landing Townsite; and 8. Contingency and response measures for foreshore stabilisation.	To avoid or limit impacts on biota (marine flora and fauna) and to maintain or improve those areas presently degraded.	Prior to construction.	DCLM and DPI
27.		Implement approved Foreshore Management Plan.			
28.	Vegetation Management	Prepare a Vegetation Management Plan to address: 1. Management of any Priority Species impacted by the proposal; and 2. Maintenance and protective measures.	To manage and minimise potential impacts to vegetation by the development.	Prior to construction.	DCLM and Shire of Carnarvon
29.		Implement approved Vegetation Management Plan.			
30.		Prepare a Dewatering Management Plan to address: 1. Monitoring of Groundwater levels; and 2. Contingency measures for any affects on vegetation beyond the development footprint.	To ensure dewatering does not impact on the vegetation outside the development footprint.	Prior to construction.	DCLM, WRC
31.		Implement approved Dewatering Management Plan.		Prior to and during marina construction.	
32.	Surface Water Management	Prepare a Stormwater Management Plan to address: 1. Normal surface runoff; 2. Flood diversion works; 3. Monitoring; and 4. Mitigation measures.	To manage the potential effects of the development on surface water regimes; maintain existing catchment flow volumes and quality, and maintain existing flow paths, where	Prior to construction.	Shire of Carnarvon and WRC.

No.	Topic	Action	Objective	Timing	Advice
33.		Implement the approved Stormwater Management Plan	possible.		
34.	Marine Water and Sediment Quality	Prepare a Marine Water Quality and Sediment Management Plan to address: 1. Identification of ecosystem health and social value indicators appropriate to the Maud Specific Management Area (MSMA) based on the threats to the environmental quality and the cause and effect pathways; 2. Development and implementation of site-specific guideline values and standard criteria for the indicators in the event that generic environmental quality criteria are not available; and 3. Development and implementation of adaptive management strategies to ensure that the Environmental Quality Objectives (EQO) are achieved and maintained in the event that the agreed guidelines and standards are not met.	• To maintain ecosystem integrity such that in areas of the MSMA other than the DIA EQO 1: Maintenance of ecosystem integrity (naturally diverse and healthy ecosystems) is achieved, and in the DIA within the MSMA • EQO 2: Maintenance of aquatic life for human consumption (seafood safe to eat) is achieved.	Prior to placement of breakwater materials.	DCLM and MPRA
35.		Implement approved Marine Water Quality and Sediment Management Plan.		Operation with EQO 2 reverting to EQO 1 within 5 years following completion of civil construction.	DCLM and MPRA
36.	Marina Water and Sediment Quality	Prepare a Marina Water Quality and Sediment Management Plan to address the following: 1. Identification of ecosystem health and social value indicators appropriate to the marina water body based on the threats to the environmental quality and the cause and effect pathways; 2. Implementation of generic environmental quality; 3. Development and implementation of adaptive management strategies to ensure that the Environmental Quality Objectives are achieved and maintained in the event that the agreed guidelines and standards are not met; and 4. Compare the monitoring results to those predicted in the nutrient modelling, and make appropriate adjustments annually.	To achieve EQO3 – Maintenance of primary contact recreation values within the Marina Waterbody.	Prior to opening the marina.	DEP and DCLM

No.	Topic	Action	Objective	Timing	Advice
37.		Implement approved Marina Water Quality and Sediment Management Plan.		Operation.	
38.	Nutrient Management	Prepare a Nutrient and Irrigation Management Plan to address: 1. Method of implementation; 2. Zones of applicability; 3. Recommendations for low nutrient and water requirement plants and grasses; 4. Prescribed fertiliser applications; 5. Prescribed fertilising and watering regime; 6. Annual fertiliser application audit; 7. Development of appropriate vegetation and landscaping development approval guidelines; and 8. Contingency and response measures.	To manage and minimise the potential impacts of nutrient losses to the nearshore marine environment.	Pre-operation.	Shire of Carnarvon, WRC and DCLM.
39.		Implement approved Nutrient and Irrigation Management Plan.		Operation.	
40.	Groundwater Quality and Quantity	Prepare a Shallow Groundwater Management Plan to address: 1. Sample bore locations; 2. Parameters and sample frequency; 3. Identify relevant criteria against which results can be compared; 4. Response and contingency measures. 5. Monitor groundwater quality in the unconfined aquifer with a view to identification and mitigation of sources of contamination.	• To monitor groundwater quality in the unconfined aquifer • To identify and mitigate sources of contamination.	Prior to construction.	WRC.
41		Implement approved Groundwater Management Plan.		Prior to construction, during construction and operation.	WRC.

No.	Topic	Action	Objective	Timing	Advice
42		Prepare an Artesian Water Operating Plan to: 1. Provide detailed information on the proposed operating rules, monitoring of hydraulic head flows from surrounding bores into the Birdrong Formation, environmental provisions, water use efficiency and administrative details; 2. Clearly outline how the proponent will address any impacts arising from the proposed groundwater abstraction on existing groundwater users and the environment. 3. Address water use efficiencies to minimise water consumption 4. Response and contingency measures.	To manage and minimise the potential impacts of the development on the Birdrong Formation and existing resource users.	Pre-operation.	WRC.
43		Implement approved Artesian Water Operating Plan.		Operation.	
44.	Heritage	Prepare a Site Heritage Management Plan that will address: 1. Engagement of an appropriately qualified and experienced archaeologist; 2. Induction of all employees and site contractors; 3. Development of educational opportunities on indigenous culture and heritage issues for all employees, visitors and residents; 4. Continued liaison with relevant parties during construction and operation; 5. Protection of known sites of significance and any sites of aboriginal significance that may be uncovered during the construction phase of the development and the conservation procedures for these sites; and 6. Protection of sites relating to European heritage;	To protect any sites of significance uncovered during the construction phase of the development.	Prior to construction.	In consultation with the Baiyungu people the DIA, Western Australian Museum (Maritime Branch). Heritage Council.
45.		Implement approved Site Heritage Management Plan		Construction.	
46.		Retain and mark in the present location the submerged remains of the Mauds Landing Jetty and develop interpretive materials and signage.	To preserve the heritage value of the remains of this submerged jetty.	Construction and operation.	Western Australian Museum (Maritime Branch) DPI

No.	Topic	Action	Objective	Timing	Advice
47.	Dredging of Marina	Prepare a Dredging Management Plan to address: 1. Construction of bunds levees and retaining areas; 2. Construction of drains; 3. Clearing of vegetation; 4. Return water disposal; 5. Dredging and disposal of dredge spoil; 6. Transportation of fill material; 7. Sediment sampling; 8. Management of suspended sediments; 9. Contingency measures for turbidity and contamination; and 10. Monitoring and reporting.	To manage and minimise the potential dredging impacts of the development on surrounding area.	Prior to construction.	DEP
48.		Implement approved Dredging Management Plan.			
49.	Dust Management	Prepare a Dust Management Plan to address: 1. Measures for controlling dust; 2. Monitoring requirements; 3. Reporting requirements; and 4. Remediation measures (if exceedances of the criteria occur).	To minimise dust during the construction and operation phases of the development and to meet EPA dust control criteria.	Prior to construction	DEP
50.		Implement approved Dust Management Plan.			
51.	Noise Management	Prepare a Construction Noise Management Plan to address: 1. Noise controls to minimise the generation and impacts of construction noise; and 2. Procedures to be adopted in the event of noise exceedances.	To minimise noise during the construction and operation phases of the development and to meet EPA noise control criteria.	Prior to construction.	DEP
52.		Implement approved Construction Noise Management Plan.			
53.	Waste Management	Prepare a Construction Waste Management Plan to bases on the principles of reduce, recycle and re-use.	To minimise, re-use or recycle wastes where practicable and to ensure	Prior to construction.	Shire of Carnarvon

No.	Topic	Action	Objective	Timing	Advice
54.		Implement approved Construction Waste Management Plan.	that any wastes requiring disposal are disposed of in an environmentally acceptable and approved manner.		
55.	Traffic Management	Prepare a Construction Traffic Management Plan to address: 1. Construction heavy transport requirements, 2. Management of noise, dust and vibration impacts; 3. Public health and safety; and 4. Contingency measures for road transport	• Protect the amenity of road users and residents along the transport route • Ensure road heavy haulage does not result in unacceptable levels of safety on the existing road network	Prior to construction	MRWA, Shire of Exmouth, Shire of Carnarvon
56.		Implement approved Construction Traffic Management Plan.			MRWA
57.	Spill Management	Prepare a Fuel and Chemical Spill Management Plan to address: 1. Storage and handling requirements; 2. Reporting requirements; and 3. Emergency response procedure for spills.	To ensure that any fuel or chemical spill event does not impact on the environment.	Prior to construction	MPR
58.		Implement approved Chemical Spill Management Plan.			
59.	Ningaloo Marine Park Management	Formalise a Natural Resources Management Agreement for the provision of resources to DCLM and Department of Fisheries for management of the natural resources commensurate with the management burden the development will create. This may include provision of funding toward the construction and fitting out of an environment and interpretive centre.	To provide adequate resources to support agency functions in the area, and in so doing reduce impacts of the proposal.	Prior to construction.	DCLM and Department of Fisheries.

Other Management Strategies

No.	Topic	Action	Objective	Timing	Advice
N1.	Cyclone/ Flood/ Storm Surge/ Fire/ Fuel Spillage	Prepare an Emergency Response Plan to address: 1. Cyclone and flood warning response; 2. Tsunami warning and response; 3. Emergency evacuation procedure; 4. Fuel spillage; 5. Fire and explosion; 6. Collision between vessels; sewage and chemical spills; 7. Failure of containment at the Wastewater Treatment Plant; and 8. Loss of containment at bulk hydrocarbon storage facilities.	Put in place specified procedures to enhance public safety and environmental protection in the event of exceptional climatic/oceanographic occurrences, fire or spills. Provide equipment, put in place and trial specified procedures in the event of a fuel spillage in the marina.	Prior to operation.	DPI, MPR, Police, Fire and Emergency Services Authority, Shire of Carnarvon.
N2.		Implement and trials the agreed Emergency Response Plan.		Prior to operation	
N3.	Resort Management Agreement	Seek a Resort Management Agreement with Shire of Carnarvon that documents agreement on a range of matters including: 1. The use of differential and specified area rating to ensure adequate funding exists to maintain infrastructure important for safeguarding the environment in the vicinity of the Coral Coast Resort; 2. Responsibility for short and long term management of the public infrastructure in the resort and marina; 3. Responsibility for environmental management commitments and coastal and waterways management; and 4. The formation and resourcing of a management committee to oversee the management of the Coral Coast Resort. 5. Development of appropriate Resort development approval guidelines;		Prior to operation.	Shire of Carnarvon

N4.	Landscaping	Prepare a Landscaping Management Plan to address: 1. Development of appropriate vegetation and landscaping development approval guidelines; 2. Selection of nursery and propagation methods of acceptable species; 3. Soil improvement and the use of mulch; 4. Irrigation and water conservation; and 5. Appropriate maintenance and protective measures.	To ensure regional appropriateness of hard landscaping materials and styles adopted and vegetation used.	Prior to operation.	DCLM and Shire of Carnarvon.
N5.		Implement approved Landscaping Management Plan.			

Abbreviations

CSIRO	Commonwealth Scientific & Industrial Research Organisation
DEP	Department of Environmental Protection
DIA	Department of Indigenous Affairs
DCLM	Department of Conservation and Land Management
DPI	Department of Planning and Infrastructure (Maritime Division)
DHWA	Health Department Western Australia
EQO	Environmental Quality Objective
MPR	Department of Mineral and Petroleum Resources
MPRA	Marine Parks and Reserves Authority
MRWA	Main Roads Western Australia
MSMA	Mauds Specific Management Area
WRC	Water and Rivers Commission