

GERALDTON FORESHORE REDEVELOPMENT
DEPARTMENT OF MARINE AND HARBOURS, WESTERN AUSTRALIA

Report and Recommendations
of the
Environmental Protection Authority

Environmental Protection Authority
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i. **SUMMARY AND RECOMMENDATIONS**

The Geraldton Foreshore Redevelopment is proposed by the Department of Marine and Harbours, Western Australia (referred to here as the proponent) in association with the Town (now City) of Geraldton, Westrail, and the Geraldton Mid-West Development Authority, to redevelop a seafront site of approximately 17 ha in the Geraldton townsite presently used by Westrail as a railway marshalling yard, into a recreation and tourist facility and small boat harbour.

The Notice of Intent prepared by the proponent for the Environmental Protection Authority addressed three options for redevelopment which were an outcome of a Design Development Study for the site. These were:

- (1) development of the site as it is, with no foreshore improvement;
- (2) development of the site together with improvement of the foreshore in front of the existing town beach; and
- (3) integrated development of the site with a new marina and improvement of the foreshore.

The Notice of Intent discussed, in particular, the third option, this being the option most favoured by the proponent. In doing this, the proponent has addressed several issues relevant to the redevelopment including a description of the project, statutory requirements and responsibilities, justification for the development, the existing environment, including marine habitats, the anticipated impact of the redevelopment on the existing biological and human environments and management and monitoring procedures and commitments to be adopted in both the construction and operational phases of the development.

The Notice of Intent was provided to the Environmental Protection Authority for assessment in May 1988. The proponent regarded public involvement as a key component of the redevelopment project and in formulating the proposal, the opportunity for input from the community was provided on a number of occasions. This influenced the Authority's decision to assess the proposal at Notice of Intent level.

This assessment was carried out using information available from the Notice of Intent, consultants reports made available by the proponent or submitted as appendices with the Notice of Intent, including information gathered by the proponent through the public participation programme.

RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposal by the Department of Marine and Harbours to construct a marina and re-nourish the foreshore at Geraldton is environmentally acceptable and recommends that it could be implemented subject to appropriate management, the commitments in the Notice of Intent, and the recommendations in this Report.

RECOMMENDATION 2

The Environmental Protection Authority recommends that the proponent satisfy Schedules 5 and 16 of the document "Water Quality Criteria for Marine and Estuarine Waters of Western Australia" pertaining to use of water for passage of fish and for navigation and shipping. If swimming is proposed in the marina waters, then the proponent should adopt, along with Schedules 5

and 16 already outlined in the Notice of Intent, Schedule 1 of the report "Water Quality Criteria for Marine and Estuarine Waters of Western Australia" for direct contact recreation.

RECOMMENDATION 3

The Environmental Protection Authority recommends that planning and operation designs for location of refuelling facilities, stormwater drainage and runoff containment and diversion for the marina site be forwarded to the Authority for approval when these are finalised by the proponent and before construction commences.

RECOMMENDATION 4

The Environmental Protection Authority recommends that before site clearing and development commences on the marshalling yard, the proponent should identify any dumping, stockpiling or accumulation of oil, or other potential pollutants which could enter the marina and these should be managed to the Authority's satisfaction and in such a way so that they do not create a threat to the adjacent marine environment.

RECOMMENDATION 5

The Environmental Protection Authority recommends that a detailed monitoring programme should be prepared by the proponent and submitted to the Authority for approval before construction commences. In addition to the parameters identified in Table 4 of the Notice of Intent, the monitoring programme should provide for:

- (1) monitoring of the extent and impact of any plume created from rock dumping during construction work or from dredging, for the duration of the plume;
- (2) monitoring of the extent of changes to the beach and any consequent effects on the adjacent offshore communities until such time as the beach stabilises;
- (3) monitoring of heavy metal concentrations in the sediments at sites both within and outside the marina (the latter as a control to enable long-term effects to be assessed), commencing before the marina starts operating and continuing for an initial period of five years;
- (4) monitoring of dust levels during the construction phase of the operation;
- (5) monitoring being carried out for a period of five years initially, then reviewed, with interim reports on monitoring and management submitted to the Environmental Protection Authority by the proponent or managing agency on an annual basis; and
- (6) reporting after five years of operation of the marina, with reference to the monitoring results obtained during the full five year period, including interpretation of the results, recommendations relating to future requirements and with a commitment to amend management in accordance with the monitoring results.

1. INTRODUCTION AND BACKGROUND

The State Government has approved the relocation of the Geraldton Marshalling Yards from their existing townsite location to the "Narngulu Industrial Estate" 15 km east of the Geraldton townsite. Following this decision, a committee headed by the Department of Regional Development and the North West, in consultation with the Department of Marine and Harbours, Westrail, State Planning Commission and the Town (now City) of Geraldton, appointed a consultant, headed by Horwath and Horwath Services Pty. Ltd. and the Geraldton Building Company Pty. Ltd., to undertake a "Design and Development Study" of the railway marshalling site on the seafront at Geraldton.

This study was aimed at examining various redevelopment opportunities integrated with possible development of either a recreational small boat harbour or foreshore improvements or both. The study identified three possible options:

1. no foreshore improvement and limited commercial, residential and recreational development;
2. foreshore improvements, including beach establishment, commercial, holiday and recreational development; and
3. integrated development of the site, including a new marina, commercial, hotel and residential development.

Public written submission and views on the options were sought early by the proponent, who called for submissions from the inception of the proposed redevelopment. In addition, a public workshop was held in June 1987 at which the options and planning issues were explained by the consultants. Further comments were gathered through private interviews with local traders, commercial outlets and government authorities, and following a public review of the proposal held in August 1987.

In November 1987 the proponent commissioned a consultant to develop a physical model of the Geraldton foreshore area, to assess the engineering feasibility of the options.

In late November 1987 the proponent notified the Environmental Protection Act of the options for development and were informed by the Authority that the proposal would be assessed formally, under Part IV of the Environmental Protection Act.

In early 1988 the proponent began physical and mathematical modelling of the coast, based mainly on the third option, this being the preferred one, with the aim of assessing the impact of the proposed structures on the coast and establishing design criteria for foreshore re-nourishment.

The Environmental Protection Authority subsequently received a draft summary and conclusions of the Coastal Engineering Studies undertaken by the proponent, as well as a draft report of the results of the public participation programme. In response to this, the Environmental Protection Authority considered that the second option would not require formal assessment, while the third option would be assessed as a Public Environmental Report (PER). This decision was amended to a Notice of Intent in April 1988, in view of the extensive public consultation which took place during preparation of the options.

The proponent submitted the finalised Notice of Intent to the Environmental Protection Authority in May 1988, along with appended consultants reports.^(1,2,3,4) A further report on physical monitoring of coastal wave climates and sediment transport mechanisms, completed in February 1988, was also included.⁽⁵⁾ Advice and comment on the Notice of Intent was sought from the City of Geraldton.

Following consideration of the Notice of Intent, incorporating results of written submissions, public comments and opinions from the public participation programme, the Environmental Protection Authority has prepared this Assessment Report. It addresses, specifically, the environmental implications of the third option this being the preferred and finalised proposal submitted for assessment and described in the Notice of Intent.

2. THE PROPOSAL

2.1 DESCRIPTION

The proposal involves the redevelopment of the entire Westrail marshalling yard site at Geraldton, foreshore work and the eventual construction of a small boat harbour and associated hotel and recreational complex (Figures 1 and 2).

The marshalling yards are located on foreshore land aligned south west-north-east and adjacent to the Geraldton town centre, 2 km east of the existing Fishing Boat Harbour (Figure 1). The development encompasses about 5.9 ha of land (exclusive of railway reserve), a further 4.5 ha of reclaimed land on the foreshore and about 5 ha of water within the breakwaters of the marina complex.

South of the marina an 80 m long groyne would be constructed and the 'enclosed' beaches re-nourished to form swimming beaches.

A further reclaimed beach, designated for boating, water skiing, is proposed for the modified shoreline adjacent to, and north of the marina complex.

2.2 STAGES OF DEVELOPMENT

The proposal has been divided into two stages separated by the proposed re-aligned railway line passing through the development:

Stage 1, involving an area of nearly 6 ha exclusive of the railway reserve, is common to all the options proposed for the development. The proponent recognises nine key elements:

1. relocation of Westrail operations to the new site, clearing of the site, construction of a single railway line to service the Port of Geraldton;
2. the extension of Foreshore Drive through the site to link with Chapman Road;
3. retention of the railway station for historic value;
4. construction of a rail spur line to link the railway station to the main line;
5. development of land around the station to include a lake, a replica of the "Batavia" wreck and a museum;

Figure 1. Location of redevelopment proposal for Westrail Marshalling Yard, Geraldton (reproduced from the Notice of Intent).

Figure 2. Development concept for Geraldton Foreshore Redevelopment
(reproduced from the Notice of Intent).

6. landscaping around the Court House;
7. development of commercial buildings on the corner of Chapman Road and Forrest Street;
8. widening of Chapman Road; and
9. development of pedestrian crossings on Chapman Road.

Stage 2 covers the redevelopment of 6.9 ha of the site west of the realigned railway and encompasses some 4.5 ha of reclaimed land. Four key elements are recognised by the proponent for Stage 2:

1. construction of a small craft harbour;
2. development of residential and tourist accommodation and associated parking, access roads, landscaping;
3. development of hardstand areas for car/trailer parking, dry boat storage, yacht club etc;
4. foreshore improvement work along the town foreshore.

The proponent considers the focal point of Stage 2 to be a resort hotel at the south of the marina site. Land-backed areas would accommodate ancillary activities such as a fuel and service wharf, dry storage areas.

Two boat ramps are planned initially, with an area set aside for rigging/derigging.

Reclamation and beach nourishment would be achieved by dumping of 300 000 m³ of sand supplied from maintenance dredging of the Geraldton Port Authority area. The breakwaters and revetments used to retain reclaimed areas are proposed to be built in advance of reclamation and will be constructed with a limestone core protected with layers of granite armour. The anticipated commencement for construction would be September/October 1988, while the provisional timing of Stage 2 is set at early 1989.

The marina would be enclosed by two breakwater groynes, a longer (~700 m) one extending north and with its tip some 250 m west of the existing shoreline (low water mark). The shorter (~150 m) breakwater groyne would extend due west to form a harbour entrance of a approximately 50 m width (Figure 2).

Harbour construction was viewed by the proponents in four phases:

1. construction of the harbour;
2. construction of jetties and pier to accommodate 200-250 craft;
3. preparation of landfill areas for foundation; and
4. construction of launching ramps, a ferry terminal and charter boat ramps;

Foreshore improvement is also divided into four phases:

1. construction of one short groyne west of the marina;

2. re-nourishment of beaches;
3. construction of car parks to accommodate 400-500 cars; and
4. construction of a pedestrian and cycleway through the area.

2.3 ALTERNATIVES

Alternatives proposed by the proponent relate to the extent of development rather than locating the development at another site. As Stage 1 of the proposal is common to all the options proposed, the proponent discussed alternatives for development for the site west of the railway line (ie Stage 2) only.

Of the three options originally proposed (see Section 1 above), the proponent considered the second better than the first because it allows foreshore access to be improved to the benefit of the town centre and the site itself, and the third option as the most favourable alternative because it:

- . provides a catalyst for an adjacent maritime and resort residential complex catering for boating demands, tourists, public recreation and beaches; and
- . makes best use of the opportunities of the site and would create a development that locals and tourists will use.

The proponent considers a "do-nothing" option has no appeal because of continued limited public access to the town waterfront and ignores the opportunity to develop a site, including beach restoration.

2.4 JUSTIFICATION FOR THE PROJECT

The proponent considers that justification for the project is demonstrated by the report from Horwath and Horwath evaluating the redevelopment potential of the marshalling yard site. This study recognised the positive attributes of the area, including those of the environment, notably an accessible and largely unspoiled coast with extensive coral reefs. The Notice of Intent highlights the following issues raised by the study, emphasising the opportunities to be gained:

- . economic and demographic factors -

the proponent argues that increased development will result in increased population leading to increased demand for quality services and facilities;

- . tourism -

proper presentation of the major attraction of the area (related to climate, beaches, water related activity) will increase visitor numbers and thus tourist demand for facilities;

- . boating -

the redevelopment will alleviate demand for more boating facilities, provide year-round boat pens and related support facilities;

- . increased retail development, increased demand for office space and for multi-unit townhouse residences;
- . opportunity to reinstate a beach in front of the town centre;
- . opportunity to satisfy perceived public demand for public recreation and parks along the foreshore, sea front restaurants, walkways etc; and
- . opportunity to provide beaches with adequate car parking.

2.5 STATUTORY REQUIREMENTS, VESTING, AND MANAGEMENT RESPONSIBILITY

Authorisation for the project will be sought by the proponent from State Government, following the advice of State and local Government agencies.

The site comprises Geraldton Town Lots 229-295 and is set aside for railway purposes, vested with the Minister for Transport. The land is presently zoned for "Recreation, Governmental and Institutional" uses under the Town of Geraldton's District Town Planning Scheme. The proponent notes that this scheme does not include zoning which is applicable to the mixed use development proposed and, as such, a new zone would need to be introduced, which would be site specific. Since this includes reclaimed land within the harbour, the municipal boundary would also need extending to cover the 'new' land. The Town of Geraldton would need to agree to maintain public open space, including the re-nourished foreshore areas and facilities thereon. No foreshore reserves are envisaged for the development but this function will be guaranteed through provision of public recreation facilities and access along the foreshore and through the complex.

The State Planning Commission would need to approve any subdivision of the site, while permission to alter the existing street layout would require approval from the Town of Geraldton and the Main Roads Department. Approval to construct breakwaters and jetties is required from the Department of Marine and Harbours. The Port of Geraldton along with the Department of Marine and Harbours would have jurisdiction over waterways.

The Design Development Study⁽¹⁾ for the proposal recommended that development of the site be controlled by a single body to coordinate private and public activities. The development includes re-vesting of the site with a lead agency, to ensure that there would be coordinated development consistent with the concept plan for the project. As such, the Department of Marine and Harbours was proposed as the lead agency with a project manager to coordinate re-vesting, rezoning to foreshore development land, the development and construction of all facilities, sales and leasing of parts of the sites, and implementation of monitoring and management on a day-to-day basis.

The Authority notes that the proponent is aware that the project manager would be required to comply with "all relevant standards identified by State and local Government Agencies".

3. ENVIRONMENTAL IMPACTS

In preparing the Notice of Intent, the proponent considered several issues pertinent to the redevelopment where it impacts on the existing environment. Topics discussed in the Notice of Intent relate to:

- . the physical environment (geology, meteorology, oceanography, topography, bathymetry, coastal processes, water quality);

- . the biological environment (marine and terrestrial habitats); and
- . the human environment (land and water use, rail and road use, public access, landscape, archaeological sites and System 5 Recommendations).

The environmental issues have, in most cases, been addressed adequately to allow proper assessment of the likely impacts of this redevelopment proposal. The following key areas are identified in which the proposal had clear or potential environmental impacts. These have been acknowledged by the proponent in the Notice of Intent:

- . seagrass loss;
- . modification/interruption to sediment movement and coastal processes; and
- . water quality reduction.

The proponent has acknowledged that certain impacts will be inevitable (eg loss of some seagrass in the process of providing a marina complex on reclaimed land) while some are intentional (eg considerable modification of the existing foreshore of the marshalling yards). The proponent considers that other than the loss of 20-25 ha of seagrasses, other impacts on the natural environment can be managed, and will therefore be of minor significance.

The Environmental Protection Authority concurs with these views, in general, but raises comments here on particular issues under separate headings.

3.1 HABITAT DISTURBANCE AND DESTRUCTION

The proponent considers that there are no terrestrial habitats of environmental value due to existing extensive site modification. The Environmental Protection Authority agrees in general with this and notes that there has been no rare or endangered species recorded from the site of the proposal⁽⁶⁾.

The major environmental impact to the biological environment is the loss of seagrass community within the marina complex. The proponent acknowledged that there will be a permanent alienation of these habitats involving possible irreversible loss of some seagrass, amounting to 1% of the total seagrass meadows in Champion Bay. This equates to a loss of 20-25 ha of meadows over an area of about 37 ha.⁽²⁾

Other anticipated impacts include temporary degradation of water quality, increased human pressure on the resources of the bay and accumulation of heavy metals and nutrients in the sediments of the bay (see Sections 3.2 and 3.3).

Given that loss of seagrasses represent 1% of these communities in Champion Bay, the ensuing impacts of this loss on the adjacent environment are likely to be insignificant. It is noted here that the marina construction, however, has the potential to place other short-term pressures on adjacent habitats from increased turbidity through sediment resuspension and deposition of construction materials for the breakwaters, dredging of the waterway in the marina, and through release of nutrients and toxic substances generated from disturbance and resuspension of sediments. The extent of dredging has not been clearly outlined by the proponent.

A further potential impact on seagrass meadows is scouring damage inflicted by anchor chains of boats moored above healthy seagrass beds adjacent to the marina complex. The proponents recognise the need for boat anchorage havens and potential for the development to attract increased boat usage, having noted in the Notice of Intent, the increasing boat registrations in Geraldton. Impacts from this problem can be alleviated, however, through ensuring that there is proper design of any mooring in the adjacent seagrass areas which will eliminate the scouring caused by "chain drag" of anchors used to tether moored craft. There can be long-term effects from this type of disturbance since evidence suggests that seagrass re-growth (re-colonisation) from areas denuded by anchor drag is very slow.

3.2 WATER QUALITY AND OTHER POLLUTION

The possibility of some decline in water quality within the marina, localised increase in turbidity during construction and dredging (latter not specified in detail), and contamination of the marina's bottom sediments with heavy metals once operations start, are acknowledged by the proponent.

The Environmental Protection Authority recognises that low generation and input of pollutants in combination with efficient circulation and flushing should ensure good water quality within the marina. However, the proponent's expectation that this water quality is likely to be similar to that of oceanic waters outside seems optimistic.

The marina has been designed to maximise flushing. The proponent indicates an expected flushing time of about 8 days, based on tidal exchange. The Environmental Protection Authority agrees with these conclusions in general although it considers that the analysis of harbour flushing was fairly superficial. The proponent's views that wind-induced currents and currents driven by density gradients between less saline water and seawater are likely to reduce the flushing time, are also reasonable, but it is noted that no evidence is presented to support this.

The harbour design as shown in the Notice of Intent should provide flushing times which give adequate water exchange, and thus adequate water quality, provided strict management of pollutant inputs is maintained (see Section 4 in this report).

Entry and accumulation of heavy metals in the sediments of the marina from antifouling paints is acknowledged by the proponent, and action to control the input of particulates entering the system is proposed (see Section 4). The presence of heavy metals in the water column, as opposed to the sediments, is considered by the proponent to represent an insignificant impact due to high flushing rates providing adequate dilution and dispersal. This is a reasonable view and implementation of the appropriate management practices should minimise any likelihood of adverse impacts on the ecological environment caused by pollution in the marina and adjacent waters.

It is, however, also noted that in addressing water quality, the proponent has not clearly specified the anticipated range of uses to which the water in the marina will be put.

Since adjacent public beaches are an integral part of the project, water quality in terms of human well-being should also be considered outside the marina.

With respect to this, the Authority notes that water quality criteria for direct contact recreation identified in the publication "Water Quality Criteria for Marine and Estuarine Waters of Western Australia"⁽⁷⁾ have not been considered for any part of the development. If the re-nourished beaches are to be regarded as suitable for swimming, then the criteria for direct contact recreation should be adopted (Appendix 1). If direct contact criteria are not adopted, or could not be achieved, the beaches could not be regarded as swimming beaches and appropriate steps would need to be taken by the authority given responsibility to manage them, so that the public was notified of this.

The water quality criteria to which the proponent intends adhering are those in Schedules 2, 3, 5 and 16 of the above publication. These allow for harvesting of aquatic life (including molluscs) for food, passage of fish and other aquatic life, and navigation and shipping.

3.3 INTERRUPTION AND MODIFICATION OF COASTAL PROCESSES

This centres on:

- . foreshore erosion and maintenance of shoreline stability on either side of the proposed marina complex; and
- . impact of the proposal on prevailing and non-prevailing events which could move sand north and south, respectively.

These issues have been acknowledged and addressed in the Notice of Intent by the proponent. The Notice of Intent describes a comprehensive and systematic set of investigations designed:

- . to obtain an understanding of the natural forces acting, the coastal processes at work, the recent history of the coast; and
- . to enable prediction of coastal changes and outcomes resulting from the proposed development.

These investigations included:

- . determining the wind and wave climates, offshore and inshore, by analysis of wave data and use of mathematical models which have been checked against local data;
- . identifying the key coastal processes of the region, using aerial photography, beach volume, coastal movement and hydrographic survey data, and records of volumes of sediment dredged; and
- . predicting the future alignment of re-nourished beaches once the project is constructed. This was achieved with the aid of a fixed-bed physical model of the area offshore from the proposed foreshore development and the present port facilities at Geraldton. The model also provided data on breakwater design, wave heights, and degree of wave penetration into the proposed marina.

Point Moore Peninsula, the adjacent near-shore Point Moore reefs and the existing harbour provide shelter from prevailing offshore waves, approaching from the quadrant south to west. Waves arriving at the proposed foreshore development site are generally incident, from west to north west. The investigations of coastal processes have shown that presently there is

potential for sand movement at the proposed site. However, the main north-west drift of sand which occurs south of the Point Moore Peninsula is denied to the proposed site by the presence of the Geraldton Fishing Boat Harbour and Port Authority development. There has been little or no maintenance dredging required in the shipping access channel which traverses the inshore waters just south of the proposed development site. As recognised by the proponent, it is also noted that the presence of the old jetty "scars" in the seagrass meadows suggest a long-term stable environment in the location of the proposed marina.

Numerous physical modelling tests were conducted involving different wave directions and alternative design configurations for groynes and the marina breakwaters. These tests were used to address the question of future beach stability and alignment, response of the beaches to storm waves and the need for subsequent beach re-nourishment. It was concluded that a single groyne of approximately 80 m in length situated between the Fitzgerald Street Groyne and the proposed marina would provide for a stable beach to the south of the marina. The Environmental Protection Authority acknowledges that the proponent also recognises that these re-nourished beaches will be subject to change in their early lifetime, but agrees that this can be adequately controlled through the appropriate management and rejuvenation of these areas. The proponent's contention that there will be little impact of the marina on the north shore is also consistent with Environmental Protection Authority's views on this, in that both the "shadow" created by the proposed marina adjacent and south of this beach, and the occasional influx of sands south, under non-prevailing condition, should make a stable beach in this location a realistic proposition.

Advice the Environmental Protection Authority has received indicates that the work undertaken to understand the coastal processes is generally adequate and addresses the main issues. It concurs with the view that the likelihood of the marina exacerbating the existing coastal erosion is likely to be low, and that mobilisation of sands will be reduced due to the binding capacity of the extensive seagrasses.

However, there may be some localised impacts relating to the ecology of the system which will require monitoring and management. For example, the relative action of scouring as opposed to back wash of waves on erosion of seagrasses adjacent to the long breakwater is not clearly resolved in the Notice of Intent.

3.4 HUMAN IMPACTS

The proposal has various implications for the human environment and the Environmental Protection Authority is satisfied that most of these issues have been adequately addressed or can be controlled by proper management.

With respect to the effects of air and noise emissions, notably during the construction phase of the development, the proponent has acknowledged that noise, dust and vibrations will occur through dumping, demolition, building and cartage to and from the site. The proponent's response is that where possible, these activities will be limited to normal working hours and within statutory limits. The proponent has indicated that dust in summer will be suppressed by watering and, if necessary, spraying with a stabilising material. The proponent has stated a willingness to comply with statutory regulations in force with respect to noise and vibration, and to consult with the appropriate State agency in taking action to reduce these effects. In view of this, serious problems are unlikely to arise. It is

suggested that the proponent maintain close liaison with local and state agencies on the timing, hours of operation and routes to be used by service and construction vehicles during the construction of the development. These issues are further addressed in Section 4.1 of this Report.

3.5 HISTORIC, ETHNOGRAPHIC, CONSERVATION SITES

It is noted that no historic wrecks are registered from the site of the marina. If such remains were to be uncovered, then the provisions of the Maritime Archaeology Act would need to be complied with.

The proponent acknowledges that the site does not conflict with any Environmental Protection Authority System 5 Recommendation for conservation. The proponent also considers that any archaeological sites would have been destroyed during construction and operation of the marshalling yards and existing retaining rock walls. No results of surveys for aboriginal sites have been presented in the Notice of Intent and they have presumably not been carried out. If aboriginal sites do exist here then the provisions of the Aboriginal Heritage Act would need to be complied with.

RECOMMENDATION 1

The Environmental Protection Authority concludes that the proposal by the Department of Marine and Harbours to construct a marina and re-nourish the foreshore at Geraldton is environmentally acceptable and recommends that it could be implemented subject to appropriate management, the commitments in the Notice of Intent, and the recommendations in this Report.

RECOMMENDATION 2

The Environmental Protection Authority recommends that the proponent satisfy Schedules 5 and 16 of the document "Water Quality Criteria for Marine and Estuarine Waters of Western Australia" pertaining to use of water for passage of fish and for navigation and shipping. If swimming is proposed in the marina waters, then the proponent should adopt, along with Schedules 5 and 16 already outlined in the Notice of Intent, Schedule 1 of the report "Water Quality Criteria for Marine and Estuarine Waters of Western Australia" for direct contact recreation.

4. MANAGEMENT AND MONITORING

The overall environmental suitability of a project like the redevelopment proposed for the foreshore at Geraldton will be influenced by:

- . the degree to which anticipated environmental impacts can be managed; and
- . a demonstrated capacity for implementation of the necessary management initiatives.

The latter requires:

- . identification of the responsibilities of the respective management agencies and acceptance of those responsibilities;
- . definition of clear, legally enforceable mechanisms to ensure implementation of the management measures;

- . identification of the resources required for management and clear commitments to the allocation of these resources (including contingency funding);
- . initiating of a monitoring programme and incorporation of results in management strategies implemented;
- . submission of periodic reports to the appropriate authorities; and
- . implementation of all approved management condition and commitments given.

As indicated earlier in this report many of the impacts likely to arise from the development could be regarded as acceptable subject to appropriate management. In broad terms the proponent has addressed those of the above requirements applying to the redevelopment proposal. Particular management related requirements (including monitoring) arising from the proposal are examined below under separate headings related to the timing of the development stages.

4.1 CONSTRUCTION PHASE REQUIREMENTS

In this phase the proponent has identified the management objectives as being to minimise dust, noise, vibration, turbidity from rock dumping, and to minimise changes to the traffic system. Proposed safeguards against the effects of dredging and spoil disposal operations appear adequate. The proponent, though recognising the potential problems created to adjacent natural environments by the turbidity arising from the sediment plume during construction, considers the effects to be temporary only.

The Environmental Protection Authority agrees with this but also notes that, beyond turbidity and loss of water clarity for photosynthesis of seagrasses, the potential effects of fine silts on the filter feeding animals on the reef and in the seagrass meadows is not addressed. There are concerns related to the potential adverse effects of fine sediments and other contaminants created by any plume arising from dredging and rock dumping on all facets of these communities and the impact of this would need to be monitored during this part of the operation.

The requirements for liaison between the proponent and appropriate State and local Government bodies with regard to controlling noise, dust and vibration has already been discussed (see Section 3.4) and the proponent has indicated an intention to do this. The proponent has given some commitments regarding the control of dust. However, the Authority considers that these are not entirely adequate. It is the Authority's view that dust levels must be controlled within acceptable limits throughout this phase of the project. The Authority expects that this will occur but if it does not, the Authority will take such action as is necessary to ensure that acceptable limits are met.

4.2 POST-CONSTRUCTION REQUIREMENTS

The proponent considers that the following require managing once construction is complete:

- . water quality in the marina, including input of contaminants;
- . maintenance of shoreline stability;

- . maintenance of depth in the waterways; and
- . the "living resources" in Champion Bay.

The objectives of the management in the operational phase are;

- . maintaining water quality to meet criteria set down in Schedules 2, 3, 5 and 16, (see reference 7);
- . maintaining the shorelines of re-nourished beaches;
- . maintaining navigable depth in the marina; and
- . maintaining the "living resources" in Champion Bay.

The proponent considers entry of floating seagrass to be a potential management problem as there is abundant wrack in Champion Bay. The proponent anticipates that this will accumulate in a particular spot where it can be physically removed. The Environmental Protection Authority suggests that disposal of this wrack should be to the land, with the material being used as a stabilising mulch.

It is the Environmental Protection Authority's view that all runoff from car parks, landscaped areas, hard stand areas, and service areas should be either contained or treated. It should be noted that deliberate discharges of effluents to the marina or adjacent environment from the site would require approval through the effluent discharge licencing provisions of the Environmental Protection Act 1986.

The proponent has addressed in general terms only the containment of pollutants arising from runoff and wastes. The proponent acknowledges that direct discharge of pollutants into the marina is not desirable, and states that there will be no direct sources of pollutants in the project area apart from car parks, landscaped areas and buildings. Car park design and landscape planning should ensure containment or diversion of runoff away from the marina. The Environmental Protection Authority agrees with the proponent in the need for traps to prevent entry of particulate materials, including heavy metals, and to improve quality of runoff prior to discharge, and recognises that detailed design of the drainage system has yet to be undertaken. Provided the drainage system is properly trapped to deal with floating debris, greases, oils and other hydrocarbons, sediments and other suspended matter, and provided the drainage system was effectively managed, the Environmental Protection Authority accepts that an environmentally suitable drainage system could be achieved. With respect to the likely input of fuels into the marina it is the Environmental Protection Authority's view that the fuelling and service wharf should be located such that it will not impact on the waters of the marina.

With respect to sewage control, the proponent has stated that toilets will be sewerred and a sullage pump-out facility provided. In this regard, sullage disposal should be to an appropriate station not with access to the marina waters. Moreover the sewerred toilets should include an outlet for disposal of wastes from boats using the pens, to reduce the likelihood of illegal discharge of sewage, waste waters and associated bacteria to the marina waters.

RECOMMENDATION 3

The Environmental Protection Authority recommends that planning and operation designs for location of refuelling facilities, stormwater drainage and runoff containment and diversion for the marina site be forwarded to the Authority for approval when these are finalised by the proponent and before construction commences.

Since the proposed site is one which has been used as a railway marshalling yard for years, the accumulation of quantities of oils, grease and other pollutants is possible. For this reason it is the Environmental Protection Authority's view that any significant accumulations of oils or other potential pollutants existing on the site, and which could enter the marina, be identified and action taken to remove or manage them appropriately so that they do not interfere with the objectives for high water quality.

RECOMMENDATION 4

The Environmental Protection Authority recommends that before site clearing and development commences on the marshalling yard, the proponent should identify any dumping, stockpiling or accumulation of oil, or other potential pollutants which could enter the marina and these should be managed to the Authority's satisfaction and in such a way so that they do not create a threat to the adjacent marine environment.

The proponent recognises the need for management and maintenance of the marina structures and beaches, including their re-nourishment. The likelihood of losses of beach through erosion during the early lifetime of the project is acknowledged by the proponent.

The question of whether losses of seagrass on the outside and adjacent to the wall of the long breakwater would occur was not clearly resolved in the Notice of Intent, and there was a difference of opinion as to the cause of this loss, evident at a similar site in the adjacent fishing boat harbour. In view of these differences of opinion the site should be monitored by the proponent during and after construction to clarify the processes involved and to provide early warnings to remedy the problem if this is significant.

4.3 MONITORING PROGRAMME

4.3.1 SCOPE OF THE PROGRAMME

A comprehensive monitoring programme is proposed in the Notice of Intent with the objectives of controlling water quality in the marina, the sandy beaches to the north and south and the "living resources" of Champion Bay. The parameters to be monitored are, in the Environmental Protection Authority's view, generally satisfactory to provide the necessary information for controlling water quality and assessing heavy metal levels.

Besides the factors outlined in the monitoring programme presented in Table 4 of the Notice of Intent, the programme should include the requirements already mentioned (ie the effects of fine and particulate sediments and suspended materials in the plume created during construction and from dredging of the waterway). In this regard the Environmental Protection Authority is concerned with the lack of details from the proponent on the extent and timing of dredging.

It is clear to the Environmental Protection Authority, and to the proponent, that not all parameters would need to be observed at the same time and frequency and, obviously, some parameters would require observation at specific locations only. It is the Environmental Protection Authority's view that a flexible monitoring programme that could respond to the particular requirements arising from the project would fit the objectives for management outlined in the Notice of Intent.

In this regard the Environmental Protection Authority considers that the monitoring programme for heavy metals in the sediments should include sampling of sites within and beyond the confines of the proposed marina.

With respect to the monitoring of "living resources" proposed in the Notice of Intent, the Environmental Protection Authority agrees that they should be monitored to determine whether the proposal is having an affect on these communities. Although, the proponent acknowledges the potential deleterious impacts of increased human pressure on these resources, particularly through over-fishing, the Notice of Intent refers only to the fishery, and its potential exploitation. However, the Environmental Protection Authority considers that there is also a need for monitoring the flora (algae) and fauna (invertebrate animals) of the reef and seagrass meadows, these being key sources of food and shelter to the fish.

The proponent has indicated the intention that results of the monitoring programme and management action will be collated and analysed and made available to the Environmental Protection Authority on an annual basis or as required.

The Environmental Protection Authority agrees with the proponent's implication for review of the monitoring programme after the first year. The Environmental Protection Authority considers it appropriate that the monitoring should be reviewed regularly, and with a major review after five years. Monitoring and management reports, other than interim reports discussed above, should be submitted on this basis. The report on the long-term (five year) review should draw on the data collected, and management undertaken, during the full five year period.

In addition to these annual and long-term reviews, the Environmental Protection Authority considers it important than any unforeseen or extraordinary occurrence that affects environmental conditions within or adjacent to the marina should also be reported as soon as practicable after they occur as well as in the next periodic report.

RECOMMENDATION 5

The Environmental Protection Authority recommends that a detailed monitoring programme should be prepared by the proponent and submitted to the Authority for approval before construction commences. In addition to the parameters identified in Table 4 of the Notice of Intent, the monitoring programme should provide for:

- (1) monitoring of the extent and impact of any plume created from rock dumping during construction work or from dredging, for the duration of the plume;
- (2) monitoring of the extent of changes to the beach and any consequent effects on the adjacent offshore communities until such time as the beach stabilises;

- (3) monitoring of heavy metal concentrations in the sediments at sites both within and outside the marina (the latter as a control to enable long-term effects to be assessed), commencing before the marina starts operating and continuing for an initial period of five years;
- (4) monitoring of dust levels during the construction phase of the operation;
- (5) monitoring being carried out for a period of five years initially, then reviewed, with interim reports on monitoring and management submitted to the Environmental Protection Authority by the proponent or managing agency on an annual basis; and
- (6) reporting after five years of operation of the marina, with reference to the monitoring results obtained during the full five year period, including interpretation of the results, recommendations relating to future requirements and with a commitment to amend management in accordance with the monitoring results.

4.3.2 CONTINGENCIES

The proponent has addressed most foreseeable contingencies, including fuel spills, fires, stratification of the water mass and the impact of storms. Public liability insurance will be carried by the proponent and individuals will be responsible for their own property and craft.

The Environmental Protection Authority has noted that, in the design of the breakwater for the marina, and in predicting future beach alignment, the proponent has made no allowance for sea level rises which may occur over the long-term as a result of global warming. It is the Authority's view that this should be addressed prior to construction of Stage 2, noting that the anticipated life span of the project is given as one hundred years.

5. CONCLUSIONS

The Geraldton Foreshore Redevelopment project has arisen from an examination of the redevelopment potential of the Westrail Marshalling Yards as outlined in the Design Development Study prepared from an initiative by the Department of Regional Development and the North West, in conjunction with the Department of Marine and Harbours, Westrail, State Planning Commission and the Town of Geraldton.

The proposal examined alternative options for the development and considered the most attractive one to be an extensive redevelopment of the foreshore land area, in combination with the construction of a marina and associated resort hotel, residential complex, and ancillary activities in keeping with the maritime nature of the development. The Environmental Protection Authority accepts the perceived demand for a recreational boating and tourist facility on the Geraldton foreshore.

The major environmental impact of the marina complex would be an unavoidable loss of 20-25 ha of healthy seagrass meadow. The actual area of seagrass lost as a consequence of the marina would depend on the extent of scouring and erosion of communities in the dredged waterway and outside the breakwaters and the extent of diminution of the patchy seagrasses within the breakwater of the marina. Although it is recognised that the seagrass communities adjacent to the development play an important role in the

ecology of the marine communities of the area, the area of loss involves approximately 1% of seagrass meadows in the Bay, and this loss would not cause major ecological disruption.

Having considered the material presented in the Notice of Intent for the redevelopment of the foreshore, including matters raised in written submissions and the public participation programme included by the proponent in the Notice of Intent and in consultant's reports, the Environmental Protection Authority concludes that the project as described in the Notice of Intent is environmentally acceptable subject to the following:

- . compliance by the proponent with the commitments for environmental management contained in the Notice of Intent; and
- . implementations of the Recommendations contained in this Assessment Report.

6. REFERENCES

1. Geraldton Foreshore Study. Horwath and Horwath Services Pty Ltd and Geraldton Building Company Pty Ltd.
2. Masini, R J (1988), Assessment of potential impacts of the Champion Bay marina development on adjacent benthic communities. For the Department of Marine and Harbours. Centre for Water Research, The University of Western Australia. Appendix No 3 in Notice of Intent for Geraldton Foreshore Redevelopment. Department of Marine and Harbours, Western Australia May 1988.
3. Geraldton Foreshore Redevelopment. Coastal Engineering Studies. Report No DMH 4/88. 57 pp and appendix. Appendix 4 in Notice of Intent for Geraldton Foreshore Redevelopment. Department of Marine and Harbours Western Australia May 1988.
4. Report on Public Participation in the Geraldton Foreshore Study. Appendix 5 in Notice of Intent for Geraldton Foreshore Redevelopment. Department of Marine and Harbours, Western Australia, May 1988.
5. Lewis, D P (1988), Geraldton Foreshore Improvement Modelling. Report No WP-88-037. Coastal and Hydraulic Engineering Laboratory. Centre for Water Research, The University of Western Australia, 59 pp and 3 appendices.
6. Kerr, M G (1984), Draft Coastal Management Plan. Town of Geraldton. Bulletin No 185, Department of Conservation and Environment, Western Australia, 80 pp and 2 appendices.
7. Department of Conservation and Environment (1981), Water Quality Criteria for Marine and Estuarine Waters of Western Australia. Report of the Working Group established by the Environmental Protection Authority. Bulletin No 103, Department of Conservation and Environment, Western Australia, 50 pp.