

Harbour City canal estate, Mandurah

Esplanade (Mandurah) Pty Ltd

**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
Bulletin 656
October 1992**

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's recommendations.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of \$10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
18th Floor, Allendale Square
77 St George's Terrace
PERTH WA 6000

CLOSING DATE

Your appeal (with the \$10 fee) must reach the Minister's office no later than 5.00 pm on 6 November, 1992.

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Summary and recommendations

Esplanade (Mandurah) proposes a canal/urban residential estate development proposal on Cockburn Sound Location 16, south of the Mandurah bypass road and immediately east of the bypass bridge.

This is the same site as was proposed for the Waterside Mandurah Stage 2 Canal Estate (proposed by John Holland Pty Ltd). That proposal was assessed by the Authority in 1982 and found to be environmentally acceptable subject to a number of recommendations, but was never commenced.

On receipt of the new proposal the Authority decided that in view of the ten years which had elapsed since the previous assessment, the additional information which was now available, the changes to the development as now proposed and the level of public interest in the proposal, a new assessment was warranted. The proponent described the environmental aspects of the proposal in detail in a Consultative Environmental Review document (CER) which was released for public review. A total of 1185 submissions was received. The EPA summarised the issues raised, and the proponent responded to them in detail (Appendix 1).

In this new assessment, before addressing the issues of the environmental acceptability of the design of the proposal, the Authority first gave its attention to the acceptability of the site for such a development, with the loss of environmental values which that necessarily entails. In considering this proposal the Authority was mindful of its previous assessment and the expectations that may have created that the site had the potential for a canal development.

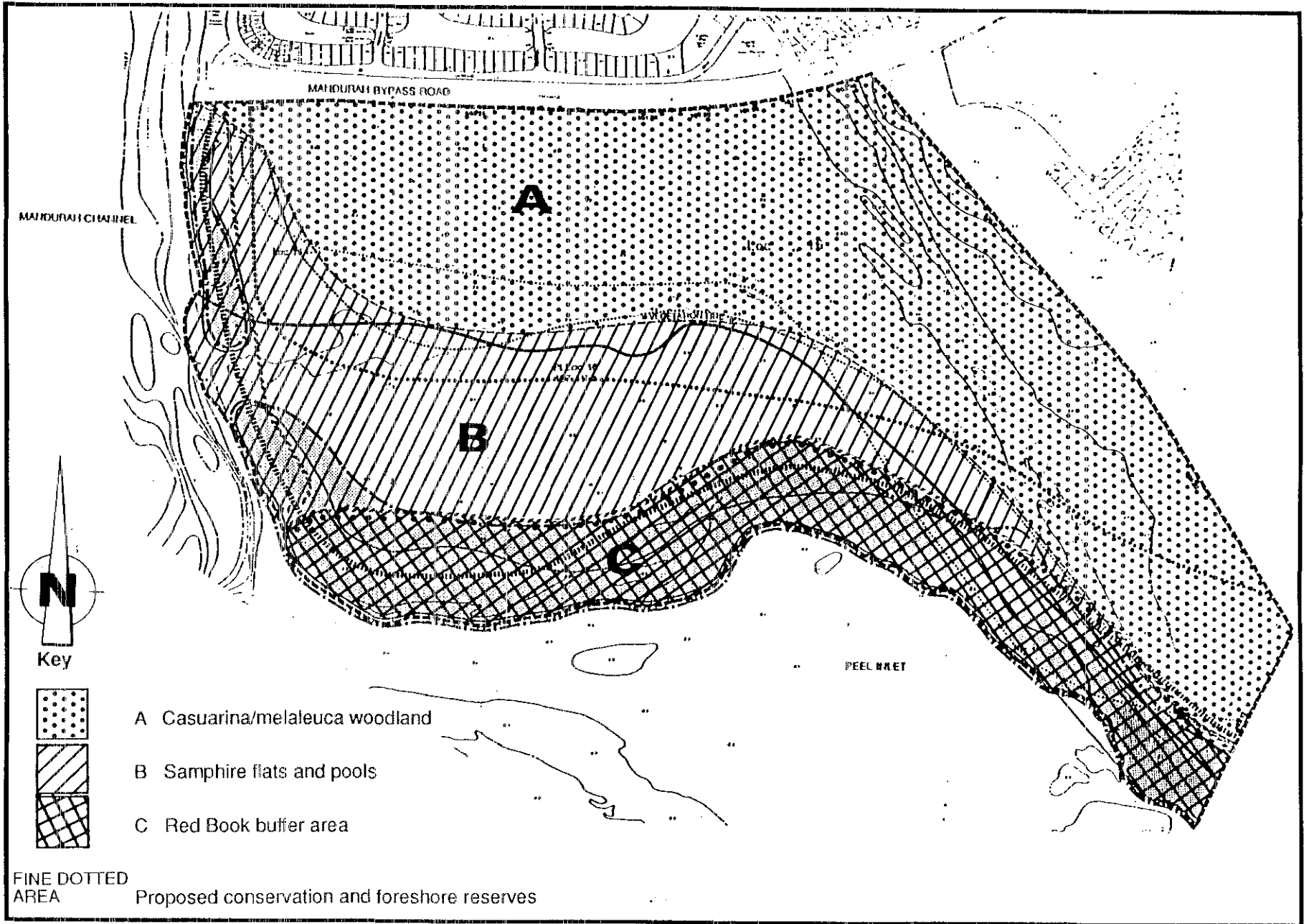
The site can be divided into three broad areas with different environmental values:

- i) The Casuarina/Melaleuca woodland to the north and the area of rushes to the east. This land is shown as Area A in Figure 1, and is stippled. It has some spoil dumps and some degraded samphire; its inherent environmental value is not high. The Environmental Protection Authority has concluded that development of this area could proceed, with appropriate conditions. In the CER this land is proposed for both dry land and canal development.
- ii) The area at the southern extremity of the site included within System 6 Recommendation C50 and intended to act as a buffer to the estuarine shallows further south. This area is shown as Area C in Figure 1, and is crosshatched. In 1982 the Authority considered development of this area environmentally unacceptable and this new assessment confirms that conclusion. In the CER it is proposed that this area be ceded to the Crown free of cost, reserved and managed in a way intended to preserve its inherent environmental values and protect it from the impacts of the development.
- iii) The area between these two — a low-lying, seasonally inundated area composed of samphire and some open pools. This area is shown as Area B in Figure 1, and is shaded. In the CER it is proposed that most of this land be subject to a canal development, similar to that approved by the Authority in 1982, though some areas of samphire are to be retained in a foreshore reserve.

The Authority has considered the environmental values of this area in the light of new information which was not available at the time of the previous assessment. The Authority considers that this area is an environmentally valuable part of the Peel-Harvey Estuarine system, and that it would be preferable, from the environmental viewpoint, if it could be procured and protected.

However, taking into consideration the issue of equity arising out of the Authority's 1982 recommendation and the decision not to include the area within the conservation recommendations of System 6, the Authority has concluded that the development of this area could be allowed if it is not procured for reservation. There is the opportunity in the near future for a decision to be made under statutory planning processes as to whether this land should be procured or not. There are no provisions for the procurement of the land under the Environmental Protection Act.

Figure 1: Map of project area showing three major ecosystem areas



Recommendation 1

The Environmental Protection Authority recommends that the proposed development of Area A as shown in Figure 1 is environmentally acceptable and could proceed subject to the recommendations in this Report and the proponent's commitments (summarised in Appendix 2).

Recommendation 2

The Environmental Protection Authority recommends that Area C as shown in Figure 1 should be acquired for conservation prior to any rezoning and regardless of whether or not the development proceeds.

Recommendation 3

The Environmental Protection Authority has identified Area B as shown in Figure 1 as having high conservation values as part of the Peel-Harvey Estuary, and has concluded that it would be environmentally preferable if these values could be protected. The Environmental Protection Authority also has recognised that this area was in 1982 deemed as acceptable for a canal development, and was excluded from conservation recommendation in System 6.

The Environmental Protection Authority recommends that prior to the Minister for the Environment making a decision with regard to this proposal under Section 45 of the Environmental Protection Act, a decision be made through appropriate statutory planning processes as to whether or not this land (Area B) will be procured for conservation and recreation.

Recommendation 4

The Environmental Protection Authority recommends that if the appropriate statutory planning processes determine that Area B as shown in Figure 1 is not to be procured and incorporated into an appropriate conservation reserve, the development of the area in line with the present proposal could proceed subject to the proponent's commitments (summarised in Appendix 2) and Recommendations 5, 6, 7 & 8 of this Report.

The Environmental Protection Authority advises that, should this proposal not proceed, any subsequent assessment of proposed development of the site would be assessed in the light of the Authority's recommendation that it is environmentally preferable that the area referred to in Recommendation 2 be procured and reserved.

De-watering and groundwater impacts

The construction of Waterside Stage 1, north of the bypass road, involved de-watering which had significant but temporary impacts on groundwater levels in nearby suburbs. The CER outlines a groundwater monitoring programme which should detect any unacceptable impacts, and a commitment to refund excess water bills in local areas if bores run dry as a result of canal dewatering. The Authority considers these commitments adequate to address the impact on nearby residents.

The proponent claims that vegetation in the conservation and foreshore reserve areas is unlikely to be affected by the lowered groundwater. The responsibility for ensuring this should rest with the proponent, as provided for in Recommendation 5.

Canal construction is also expected to lead to the landward migration of the saltwater interface, but as the development has dryland development backing the canal area the impacts of this migration should be contained within the development.

Recommendation 5

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, then prior to and during dewatering of each stage of the development the proponent should ensure that the dewatering does not destroy the vegetation of the conservation and foreshore reserve areas.

Water quality in the canals

The development is in a similar location to Waterside Mandurah Stage 1 which experienced problems with the entrapment of algal wrack and scum formation in the spring of 1991. The proponent claims that design of the canals in this proposal will ensure better circulation and resolve this problem but the Authority is not certain of this.

The Authority is satisfied with the design in terms of general water quality criteria for most of the proposed canals, but has some concerns regarding the flushing of the south-eastern section (Stage 6) and the remaining potential for the entrapment of algal scum. These issues need further attention. In response to concerns raised in submissions the proponent has committed to further modelling work to ensure water quality is acceptable at all stages of development.

Recommendation 6

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, prior to construction of Stage 6 (the south-eastern section, furthest from the canal entrance) the proponent should conduct and report on a detailed flushing analysis of the canals in that Stage.

Recommendation 7

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, prior to construction the proponent should prepare a contingency plan for the prompt removal and disposal of accumulated algal wrack and scum.

Long term management of the waterway

Canal estates present a problem in terms of ongoing management since they require additional maintenance requirements different from dryland lots (eg maintenance dredging). The Government has acknowledged this and endorsed a policy requiring that agreement on long-term management had to be in place before the appropriate rezoning could proceed.

The CER discusses a proposed 'Management Entity' to be responsible for long-term management of the waterway. This Entity is proposed to include representatives of City of Mandurah, land owners, PIMA and Department of Marine and Harbours. The issue has yet to be resolved to the satisfaction of all involved agencies.

Recommendation 8

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, then it would be desirable if, prior to rezoning, the proponent should reach agreement with the relevant agencies on the structure, funding and operation of a long-term management entity whose responsibilities will include water quality monitoring, maintenance of canals and canal walls, groundwater monitoring, and management of the conservation area, and public open space.

1. Introduction

Esplanade (Mandurah) Pty Ltd referred to the Environmental Protection Authority in March 1992 a canal/urban residential estate development proposal on Cockburn Sound Location 16, south of the Mandurah bypass road and immediately east of the bypass bridge.

1.1 Background

This is the same site as was proposed for the Waterside Mandurah Stage 2 Canal Estate (proposed by John Holland Pty Ltd). That proposal was assessed by the Authority in 1982 as part of a two-stage canal development (see Figure 1). Both stages were found to be environmentally acceptable by the Authority, subject to 32 recommendations. Stage 1 was completed approximately five years ago, however Stage 2 was never commenced and the zoning of the area remained 'rural'.

1.2 Assessment of the current proposal

The Authority is aware of its previous assessment that Waterside Mandurah Stage 2 was recommended as environmentally acceptable, and that that finding could have created expectations with regard to the environmental acceptability of a canal development on that site. However, there have been a number of significant changes since then:

- additional information is now available on the estuarine wetlands to be affected by the proposal and the prospects for their rehabilitation;
- community expectations with regard to the affected estuarine wetlands have changed;
- the EPA now routinely recommends a five-year life to its assessments; after that if the project has not been substantially commenced a new referral is required; and
- the environmental impact of the new proposal is potentially different from the Waterside Mandurah Stage 2 proposal.

For these reasons the Authority decided that it should give consideration to its previous advice, but also that a new assessment was required. The Authority decided that the level of assessment for the Harbour City development should be Consultative Environmental Review (CER).

The CER was released for public review on 20 April 1992 for a four week public review. Due to the considerable public interest expressed in the proposal and the fact that the document became available over the Easter break when many interested parties could not obtain a copy of the document, the public review period was extended for a week, ending on 25 May 1992.

The EPA received a total of 1185 submissions on the proposal :

- 110 individual letter submissions from public opposed to the proposal;
- 12 submissions from conservation groups and other organisations opposing the proposal;
- 995 'form' submissions opposing the proposal;
- 61 individual letter submissions supporting the proposal; and
- 7 Government submissions.

On 10 June, 1992, the Authority forwarded to the proponent a summary of the issues raised in submissions. In view of the issues raised, the proponent undertook further studies and reported on several matters in detail in addition to responding to the specific issues raised. This response document was received by the Authority at the beginning of September.

The size of the document has precluded its reproduction in full, but the summary of issues raised by submissions and the proponent's responses are in Appendix 1. Copies of the full response document are available for perusal at the Authority's Reading Room, the City of Mandurah Library and the Mandurah office of the Department of Planning and Urban Development.

2. The proposal

The proposal, described in detail in the Consultative Environmental Review document, involves a dry lot subdivision (443 single dwellings and 172 group dwellings) and canal waterway development with residential (639 single dwelling canal lots) and tourist accommodation (4/5 star hotel) and commercial facilities set behind a samphire flat conservation area. Areas of public open space and foreshore reserve are also provided.

Dry land excavation is proposed, involving substantial dewatering, though construction is proposed to be in six stages over an eight to 12 year period. The canal and road layout is intended to maximise wind driven water circulation.

For on-going management of the canals the proponent has proposed a 'Management Entity' with representation from State Government Departments and the City of Mandurah, with the City of Mandurah having overall control. Long-term waterway management would include: water quality, silting maintenance of canal and sea walls, foreshore management, groundwater quality and management of the conservation area.

3. Environmental impacts and their management

3.1 Site characteristics

The site can be divided into three broad areas with different environmental values.

- i) The Casuarina/Melaleuca woodland to the north and the area of rushes to the east. This land is shown as Area A in Figure 1, and is stippled. It has some spoil dumps and some degraded samphire, and its inherent environmental value is not high. There is no environmental reason why development of this area could not proceed, with appropriate conditions. This land is proposed for both dry land and canal development.
- ii) The area at the southern extremity of the site included within System 6 Recommendation C50 and intended to act as a buffer to the estuarine shallows further south. This area is shown as Area C in Figure 1 and is cross-hatched. In 1982 the Authority considered development of this area environmentally unacceptable and this new assessment confirms that conclusion. It is proposed that this area be reserved and managed in a way intended to protect it from the impacts of development.
- iii) The area between these two — a low-lying, seasonally inundated area composed of samphire and some open pools. This area is shown as Area B in Figure 1 and is shaded. It is proposed that this land be subject to a canal development, similar to that approved by the Authority in 1982.

These last two low-lying areas can be classed as wetlands, and it is the potential impact of the development on these wetland areas which proved the issue of most concern in submissions.

The wetland is characterised by samphire salt marsh, mud flats and to a lesser extent sedge/rush land to the east. Islands to the south are separated from the mainland by this low-lying area which is inundated for much of the year and known variously as the 'Creery Marshes', 'Creery Wetlands', 'Creery Island Wetlands' and the wettest parts as the 'Creery Lagoon'.

3.1.1 System 6 Recommendation C50

Part of the wetland area is subject to System 6 Recommendation C50, which identifies the area as being of regional significance because of its high conservation and recreation values.

The boundary of the actual 'wetland' is unclear. Kirke (1986) refers to it as the 'delta land east of the Inlet Channel'. The EPA's System 6 Red Book line cuts across the area of land subject to the development proposal which is inundated for part of the year. The line does not appear to follow a clearly defined ecological boundary, change in land form or vegetation units. Rather it was intended to indicate the approximate extent of a buffer needed to protect the important shallows and island to the south.

3.1.2 Peel Inlet Management Programme Review

The Peel Inlet Management Programme, released in January 1992, recommends that the Peel Inlet Management Authority (PIMA) establish a 'Waterways Protection Precinct' which would include Areas B and C. The purpose of the Precinct is to minimise change to the waterways and adjacent foreshore which the programme recognises as being of high conservation value.

The recommendation requires that PIMA provide advice on any proposed development of the area. The Waterways Protection Precinct boundary in this area follows a line roughly in accordance with the samphire/casuarina vegetation change on higher land.

3.1.3 Lakes Environmental Protection Policy

The Authority is at present preparing an Environmental Protection Policy for lakes on the Swan Coastal Plain between Moore River and Dunsborough. Under this Policy, nominated lakes will be protected from unauthorised filling, mining, pollution and changes to surface drainage. No waterbodies on this land would qualify for protection under this policy.

3.1.4 Draft Peel Regional Plan

The Draft Peel Region Plan prepared by the Department of Planning and Urban Development (DPUD, 1990) indicates in its Land Use Strategy Map (Figure 29) an area which would include all of Area C and part of Area B as "Rural C" with conservation and recreation as the preferred principal land uses. The rest of the site is indicated as Future Urban Land. This Plan is due to be finalised soon and will have implications on long-term land use within this area in the context of the proposed Peel Region Park.

3.1.5 Regional significance

Based on currently available information, the area for the proposed development is the largest and best developed samphire marsh in the whole Peel-Harvey Estuarine system (CALM submission).

A study by Kirke in 1986 showed that samphire, then growing in the foreshore areas of the Mandurah Inlet Channel, represented 25% of the samphire areas around the Peel-Harvey system. More than two thirds (18%) of that samphire lay within land proposed for Waterside Mandurah Canal Estates (Stages 1 and 2)

The CER explains that although approximately 50ha of 'relatively dry inland samphire habitat' (in Area B) will be lost, 'approximately 44ha of shoreline samphire habitat will be retained in the proposed conservation and foreshore reserves' (in Areas B and C).

3.2 Waterbirds

The Peel-Harvey Estuarine System is recognised as one of the most important waterbird habitats in the south-west. Trans-equatorial migrant species arrive in early September and remain until March.

Kirke (1986) reports that of all the waterbirds using the Peel-Harvey Estuary, between 13 and 28 per cent use the Inlet Channel. The Royal Australian Ornithologists Union advised in its submission that, of the 80 waterbird species using Peel-Harvey, 58 species use the 'Creery Marshes'.

Bamford (1992) indicates that 50 per cent of the birds using the Creery Marshes/Wetland are trans-equatorial migrant species. There are at least 12 different species of migrant species using the area. Ninnox (1990) indicates that, of the 58 waterbird species known to visit the Peel-Harvey area, 15 of these are trans-equatorial migrant species which are known to visit the project area.

The trans-equatorial waterbirds are protected under existing agreements for 'the Protection of Migratory Birds in Danger of Extinction and their Environment' with Japan (JAMBA, 1981) and China (CAMBA 1986).

Submissions expressed a high degree of interest in this issue. In response, the proponent sought from Ninox Wildlife Consulting an interpretation of the implications of Ninox's 1990 study for the development site.

In its response (Ninox 1992), Ninox explains that the very high significance ranking given to two sampling sites in the project area was biased towards and related mainly "to regularly inundated intertidal zones where most of the waterbird activity takes place ... rather than the bulk of the proposed development area which has relatively low water bird activity."

However, with regard to "the series of periodically inundated samphire/mudflat depressions in the northwest of the development area" (Area B in Figure 1) Ninox states "Royal Australasian Ornithologists Union and unpublished CALM data shows that when these areas are flooded waterbirds use them opportunistically, although at a much lower level than intertidal zones which are richer in benthic invertebrates." The submissions from the Australian National Parks and Wildlife Service, Royal Australasian Ornithologists Union, Peel Inlet Management Authority and the Department of Conservation and Land Management all point to the values of this area and would favour its reservation. The CER proposes the development of much of Area B, though some significant areas of samphire in the western end of the site will be retained in the proposed conservation and foreshore reserves.

3.3 Environmental values of the area

The Environmental Protection Authority concludes on the basis of the above information that Area A in Figure 1 does not have high inherent environmental value and that it could be developed.

Recommendation 1

The Environmental Protection Authority recommends that the proposed development of Area A as shown in Figure 1 is environmentally acceptable and could proceed subject to the recommendations in this Report and the proponent's commitments (summarised in Appendix 2).

The Authority concludes that Red Book Recommendation C50 correctly identified the southern portion of the site (Area C in Figure 1) as of high environmental value, warranting its reservation. The proponent acknowledged this by proposing that this area be ceded to the Crown free of cost, reserved and managed in a way intended to preserve its inherent environmental values and protect it from the impacts of the development.

Recommendation 2

The Environmental Protection Authority recommends that Area C as shown in Figure 1 should be acquired for conservation prior to any rezoning and regardless of whether or not the development proceeds.

The Environmental Protection Authority further concludes that the environmental value of the periodically inundated samphire flats (Area B) is regionally significant, that they are a valuable part of the Peel-Harvey Estuary and that their acquisition and protection is warranted.

Recommendation 3

The Environmental Protection Authority has identified Area B as shown in Figure 1 as having high conservation values as part of the Peel-Harvey Estuary, and has concluded that it would be environmentally preferable if these values could be protected. The Environmental Protection Authority also has recognised that this area was in 1982 deemed as acceptable for a canal development, and was excluded from conservation recommendation in System 6.

The Environmental Protection Authority recommends that prior to the Minister for the Environment making a decision with regard to this proposal under Section 45 of the Environmental Protection Act, a decision be made through appropriate statutory planning processes as to whether or not this land (Area B) will be procured for conservation and recreation.

While the Authority is firmly of the opinion that the environmental values of this area (Area B) warrant its acquisition, there are no land acquisition provisions under the Environmental Protection Act. Acquisition could only occur through the Statutory Planning process and that process may be unable to justify acquisition of the area for reasons other than its environmental values.

In the event that the land cannot be acquired throughout the Statutory Planning process, the Authority believes that, in view of its 1982 recommendation in favour of development in the area and its subsequent decision not to include Area B within Recommendation C50 that, in the interests of equity, the present proposal could be allowed to proceed, subject to the further recommendations outlined in this report.

Recommendation 4

The Environmental Protection Authority recommends that if the appropriate statutory planning processes determine that Area B as shown in Figure 1 is not to be procured and incorporated into an appropriate conservation reserve, the development of the area in line with the present proposal could proceed subject to the proponent's commitments (summarised in Appendix 2) and Recommendations 5, 6, 7 & 8 of this Report.

3.4 Dewatering and groundwater impacts

3.4.1 Lowering of groundwater levels during dewatering

The construction of Waterside Stage 1 involved de-watering which had significant temporary impacts on groundwater levels in nearby suburbs. The CER predicts a temporary reduction of groundwater levels of up to three metres in the southern portion of Dudley Park during construction.

The CER outlines a groundwater monitoring programme which should detect any unacceptable impacts, and a commitment to refund excess water bills in local areas if bores run dry as a result of canal dewatering. The Authority considers these commitments adequate to address this issue.

The proponent claims that this lowering of groundwater levels is not expected to affect the vegetation in the conservation reserve or foreshore reserve. The Authority acknowledges that this is likely, but considers that the proponent should be required to ensure that this vegetation is protected. Recommendation 3 contains an appropriate provision.

3.4.2 Landward migration of the saltwater interface

Canal construction is also expected to lead to the landward migration of the saltwater interface, but as the development has dryland development backing the canal area the impacts of this migration will be contained within the development.

3.4.3 Dewatering settling ponds

During dewatering the water generated is to be directed into settling ponds, but their location has not yet been determined. They need to be placed so that they do not impact on the conservation and foreshore reserve areas. In response to issues raised in submissions, the proponent has committed to submitting a detailed plan to address this issue prior to construction.

Recommendation 5

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, then prior to and during dewatering of each stage of the development the proponent should ensure that the dewatering does not destroy the vegetation of the conservation and foreshore reserve areas.

3.5 Water circulation issues

3.5.1 Water quality in the canals

The Authority has reviewed the flushing/water quality aspects of the proposal. The water quality predictions as presented within the CER appear to be acceptable, however the Authority is concerned that flushing of proposed canals in the eastern section furthest away from the canal entrance to the Estuary could prove inadequate.

There are three principle water exchange mechanisms which contribute to canal flushing:

1. **Density** — Density-driven exchange occurs when the densities of canal and adjacent source waters are different. The magnitude of the density differences will be related to the strength of evaporation (in summer) and river inputs (in winter) in the source waters of Peel Inlet.
2. **Tide** — The tidal range for the area is small (about 30cm) and is expected to have a relatively minor influence on water exchange at this site.
3. **Wind** — Wind is likely to be the main influence on the water exchange in the canals. The proposed layout of canal does not maximise wind induced flushing.

The flushing times quoted in the CER have been based on averages derived from information gathered through the monitoring of the existing 'Port Mandurah' and 'Waterside Mandurah' canal estates. This methodology appears to be sound, although largely predictive with few details justifying the values used. Consequently, while the results are generally acceptable, they are not sufficiently precise to guarantee adequate flushing in the south-east extremity of the canal system. A more detailed flushing analysis for the south-east area is required to give a more precise anticipated flushing rate.

In response to concerns regarding water quality raised by the Department of Marine and Harbours, the proponent has committed to further modelling to ensure acceptable water quality is attained at all stages of development.

Recommendation 6

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, prior to construction of Stage 6 (the south-eastern section, furthest from the canal entrance) the proponent should conduct and report on a detailed flushing analysis of the canals in that Stage.

3.5.2 Algal scum and algal wrack

The development is in a similar location to Waterside Mandurah Stage 1 which experienced problems of poor water quality and odours with the entrapment of wind-blown algal wrack and the generation of an algal scum in the spring of 1991. The proponent claims that design of the canals in this proposal will ensure better circulation and resolve this problem but the Authority is not certain of this.

The Authority is concerned at the potential for such accumulations, especially in the south-eastern corner of the proposed canal estate. In the event of algal wrack accumulation/generation of surface scum the flushing analysis as presented in the CER would not apply, particularly

under calm conditions or when winds are blowing down towards the end of the canals rather than towards the Inlet Channel.

In the response to submissions the statement is made that "In the event that considerable wind-blown material enters the canals through the canal entrance, the proponent will investigate appropriate methods of control." The Authority has two concerns with this statement. Firstly it assumes that the only problem is from wind-blown material when there is the possibility that scum could form within the canals, requiring removal. Secondly, odours can develop quite quickly from the accumulated material, and investigating once the problem has occurred could lead to unacceptable impacts and delays in finding a remedy.

Recommendation 7

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, prior to construction the proponent should prepare a contingency plan for the prompt removal and disposal of accumulated algal wrack and scum.

3.6 Long-term management of the waterway

Canal estates present a problem in terms of ongoing management since they require additional maintenance requirements different from dryland lots (eg maintenance dredging). The Government has acknowledged this and endorsed a policy requiring that an agreement on long-term management had to be in place before the appropriate rezoning could proceed.

The CER discusses a proposed 'Management Entity' to be responsible for long-term management of the waterway. This Entity is proposed to include representatives of City of Mandurah, land owners, PIMA and Department of Marine and Harbours. The issue has yet to be resolved to the satisfaction of all involved Government agencies.

Recommendation 8

The Environmental Protection Authority recommends that, if the appropriate statutory planning processes determine against acquisition of Area B and this proposal proceeds, then it would be desirable if, prior to rezoning, the proponent should reach agreement with the relevant agencies on the structure, funding and operation of a long-term management entity whose responsibilities will include water quality monitoring, maintenance of canals and canal walls, groundwater monitoring, and management of the conservation area, and public open space.

3.7 Aesthetic impact

Many submissions raised the point that a high density canal estate at this location would detract from the natural views from the Mandurah Traffic Bridge and destroy the visual character of the Estuary mouth. This, it was claimed, may destroy the character of the Estuary for most transient tourists in the area and the character of the area for local residents. These submissions therefore conclude that the development as proposed is inappropriate and unacceptable at this location.

In the response to submissions the proponent claims that the aesthetic impact is minimal as the site has long been recognised as a potential canal development site, and the viewshed from the bridge, travelling at speed, is negligible.

At present there is an attractive view from the bridge. The Authority's preference with regard to the conservation values of the area would adequately address the aesthetic issue.

4. References

- Bamford, M J and A R (1992) 'Waterbird Survey Data' Appendix 4 of BSD Consultants Pty Ltd 'Amendment No 183 City of Mandurah District Zoning Scheme No 1A, Harbour City Canal Estate, with supporting Planning and Environmental Reports, Esplanade (Mandurah) Pty Ltd, Perth, Western Australia
- Department of Planning and Urban Development 1990. Draft Peel Regional Plan. Department of Planning and Urban Development, Perth, Western Australia
- Kirke, A (1986) 'A study of the conservation value of three foreshore areas of the Peel-Harvey Estuary' Unpublished report commissioned by DPUD, CALM and WWC for the Peel-Harvey Conservation and Development Committee
- Ninox Wildlife Consulting (1990) The significance of mosquito breeding areas to the waterbirds of Peel Inlet, Western Australia. Report No. 20, Waterways Commission, Perth, Western Australia
- Rose T W and McComb A J (1980) The Peel-Harvey Estuarine System Study (1976-1980) Technical Report: Nutrient Relations of the Wetlands fringing the Peel-Harvey Estuarine System. Bulletin 102, Department of Conservation and Environment, Perth. Western Australia.
- Semeniuk C A and V (1990) The Coastal Landforms and peripheral wetlands of the Peel - Harvey Estuarine System. Journal of the Royal Soc. of WA, 73 (1) pp. 9 - 21
- Waterways Commission 1992. Peel Inlet Management Programme 1992. Report No 27 January 1992, Waterways Commission, Perth, Western Australia.

Appendix 1

Proponent's response to submissions

On 10 June 1992 the Authority forwarded to the proponent a summary of the issues raised in submissions. In view of the issues raised, the proponent undertook further studies and reported on several matters in detail in addition to responding to the specific issues raised. This response document was received by the Authority at the beginning of September.

The size of the document has precluded its reproduction in full, but the summary of issues raised by submissions and the proponent's responses are reproduced in this Appendix. Copies of the full response document are available for perusal at the Authority's Reading Room, the City of Mandurah Library and the Mandurah office of the Department of Planning and Urban Development.

**HARBOUR CITY CANALS ESTATE
RESPONSE TO PUBLIC SUBMISSIONS OPPOSING THE DEVELOPMENT**

1. Destruction of the Wetlands (109)

1.1 SUMMARY OF SUBMISSIONS

Various letters expressed concern regarding the destruction of wetlands in principle. Some also made reference to the fact that the continued destruction of wetlands (as a result of construction of the Harbour City Canal Estate) is contrary to the existing Environmental Protection Policy for the protection of wetlands recently released by the EPA.

This area is considered to represent 13-15% of the remaining samphire wetland in the Peel Harvey System and is one of the best remaining productive wetland ecosystems left in WA. The wetland as it exists at present functions a whole ecological unit and should be preserved as such. While some submissions acknowledge the samphire is degraded in some areas, these could easily be rehabilitated.

The CER gives an inaccurate description of the existing natural pools which will be impacted on/destroyed through construction of the development proposal, including extensive areas of shallow seasonally inundated areas which are heavily used by waterbirds.

If development does proceed, it should only be allowed on higher ground, which is consistent with the development boundary as proposed within the Peel Inlet Management Programme (1992). The low lying wetlands south of this boundary should be ceded to the Crown free of all costs and encumbrances.

1.2 RESPONSE TO SUBMISSIONS

The EPA's Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992 has been formulated to protect lakes of the Swan Coastal Plain. Lakes suitable for inclusion must comply with policy criteria prior to being listed. The Creery Marshes are part of an estuarine environment with tidal water movement regimes which exclude them from policy criteria based on water permanence.

The Creery Marshes within the development area of the Harbour City proposal constitutes a significant samphire area which has been identified, using vegetational, hydrological and geological characteristics, and retained as a Conservation Reserve. The waterbird usage is concentrated in the most productive, frequently inundated salt marsh area which will be managed primarily as a waterbird habitat to be transferred to the Crown as a Conservation and Foreshore Reserve. However, it should be noted that the present samphire areas are heavily degraded due to uncontrolled public access, and the need for management exists. Rehabilitation and preservation of the samphire area will be achieved, with the approval of the Harbour City Project, through restricted access to the Conservation Reserve. Retention of the entire development site as a whole ecological unit is a statement possessing variable terms of reference in what one perceives as an

ecological unit. The proponent argues that the Conservation Reserve represents an ecological unit in its own right.

The CER's description of the environment was undertaken by pooling together known ecological information for the Creery Marshes, professional sub-consultant surveys and advice together with extensive site assessments throughout the CER compilation period. The relevant studies and surveys do not support the heavy waterbird use of seasonally inundated areas or the existence of natural pools as submitted. We refer you to the separate report from Ninnox Wildlife Consulting as attached.

The development boundary outlined in Peel Inlet Management Programme (1992 - yet to be released) represents ostensibly the System 6 "Green Book" Recommendations. It is important to stress that:

- (a) The PIMA line is one of a number of different development lines which exist. The CER correctly defines all of these, and concludes that the System 6 Red Book line is the most appropriate development line as it affects the project land.
- (b) Appropriate wording exists in the PIMA document to allow variations to occur as part of the formal assessment of this CER. Therefore there is no strict need to comply with the PIMA line if the ecological values of the samphire can be protected by some other, equally appropriate, line (eg. System 6 Red Book line).
- (c) The System 6 Red Book is the pre-eminent document and in discussions with EPA staff, it is clear that there is an expectation that the System 6 Red Book recommendation C50 is the preferred minimum standard for the protection of samphire areas.

1.3 RECOMMENDATIONS

1. That the submissions made in respect to "the destruction of wetlands" be set aside as being an overstatement of what will in reality occur once the project has been constructed, and do not properly reflect the current degraded nature of the wetland.
2. The proponent through the Management Entity will conduct periodical surveys of the Conservation Reserve in order to determine its performance in terms of ecological functions. The results will be submitted to the EPA as part of the annual environmental monitoring report, and provision will be made in the proposed conservation management plans for variations to be effected based upon this monitoring programme.
3. The formulation and timing of periodical surveys will be undertaken in close liaison with CALM and RAOU.
4. The submissions by CALM and RAOU to support the formation of the Conservation Reserve, its vesting in NPNCA and the Developer's ongoing contribution to Management Funding be accepted.

2. Protection of Waterbirds - Proposed Conservation Reserve is Inadequate (107)

2.1 SUMMARY OF SUBMISSIONS

Many submissions expressed concern that the proposed Conservation Reserve as described within the CER is inadequate for the preservation of a sustainable waterbird habitat. Concern was also expressed regarding its viability and long term management.

The Creery Wetlands are viewed by numerous people and organisations forwarding submissions to the Authority as one of the most important waterbird habitats in south west WA, as they regularly supply refuge and feeding grounds for thousands of waterbirds including rare and trans-equatorial migratory wader species (25). It is also recognised as having the highest waterbird conservation significance in the Peel-Harvey estuarine system.

A canal development at this site is not only adjacent to, but would also involve the destruction of a considerable area of wetland used by the waterbirds. The proposed development is considered to be in breach of Australia's commitment for protection of these waterbird feeding sites under the existing Japan-Australia and China-Australia Migratory Birds Agreements (JAMBA and CAMBA). Australia is also a contracting party to the 'Convention on Wetlands of International Importance (Ramsar Convention).' The Peel-Yalgorup System was included within this list in 1990. Australia would not be fulfilling its international obligations as defined under these agreements in allowing this type of development within the Peel-Yalgorup Wetlands.

The proposed rock pitch wall on the north side of the Conservation Reserve is unsuitable and would unnecessarily destroy more samphire. If the proposal does proceed, this boundary should be left as a natural beach, stabilised by scour protection strips.

2.2 RESPONSE TO SUBMISSIONS

The proposed Conservation Reserve area isolated from the proposed development amounts to over 41 hectares of the most valuable and productive samphire flats. The Conservation Reserve, which ranges in width from 110-240 metres, is significantly large and considered more viable than many other samphire remnants existing throughout the Peel-Harvey System which are more extensively degraded. The isolation and subsequent management of the Conservation Reserve will be formulated in liaison with CALM, resulting in a wildlife refuge requiring managed maintenance and no financial outlay by the long-term Reserve managers, and will benefit from very limited public accessibility.

The proponent recognises the importance of Creery Marshes as a regional waterbird habitat and as stated in the JAMBA and CAMBA agreements is "taking measures for the management and protection of the migratory birds and their environment." This and other agreement criteria will be achieved with the establishment of a managed sanctuary to preserve and enhance the current unmanaged, degraded samphire environment.

Although the privately owned site is not subject to Ramsar obligations, the conservation considerations and objectives of the Convention have been properly met by the proposed

isolation and management of the area most utilised by migratory birds. The proposal is to cede to the Crown the most used habitat area (ie. Conservation and Foreshore Reserves) in accordance with the EPA's System 6 Recommendation C50 which will then be bound by the terms of the Ramsar Convention.

The rock pitch wall on the north side of the Conservation Reserve does not impinge upon the protected samphire area and possesses the following advantages over scour protection strips:

- More efficient at controlling erosion;
- Provides an hostile environment thereby deterring public access to Conservation Reserve area from boats;
- Is a more permanent, more natural barrier that blends into the environment and requires little structural maintenance;
- There is a need to raise the level of the Conservation Reserve along its northern edge to protect the canal development from ingress water from the Peel Inlet. This is seen as an important attribute of the Project as a means of minimising the effect of algal movement in the Canal Estate;
- Creating a beach edge along the northern side of the Conservation Reserve will encourage public access and thus the potential to increase erosional problems.
- Enabling branches and other roosting perches to be positioned in the rockwork providing resting perches for waterbirds.

2.3 RECOMMENDATIONS

1. That the public concerns about the adequacy of the Conservation Reserve be noted. However, on balance, as the proposed reserve represents the most valuable samphire on the project land which are to be transferred to the Crown on a free-of-cost basis, to be vested in the National Parks and Nature Conservation Authority; the public concerns appear to have been fully addressed in the CER.
2. Upon approval of the proposed development, the proponent in liaison with CALM and the RAOU will submit a Conservation Reserve Management plan to the satisfaction of the EPA.
3. The proponent will initiate the necessary steps to include the Conservation Reserve area for listing under the Ramsar Convention.
4. The Conservation and Foreshore Reserves of the Harbour City development be transferred to the Crown, vested in the National Parks and Nature Conservation Authority to be managed by CALM with funds provided by the proposed "Management Entity's" long term management reserve fund.
5. That the fencing of the entire northern boundary of the Conservation Reserve south of the proposed Harbour city entrance canal be undertaken prior to the commencement of Stage 1 construction works. This will involve relocation of the vermin proof fence to extend the conservation Reserve protection area and the construction of temporary fencing 10 metres to the north and parallel with, the existing Reserve boundary along the remainder of the Conservation Reserve.

3. Canal Development will Threaten other Species of Flora/Fauna with Extinction (23)

3.1 SUMMARY OF SUBMISSIONS

Species such as freshwater crustaceans living within freshwater springs within the proposed development area as well as small mammals and reptiles living on the higher ground would be destroyed by the development proposal.

3.2 RESPONSE TO THE SUBMISSIONS

The subject land has been earmarked for "Urban" development since 1979 (see enclosed PIMA plan) and any change to convert the land for residential/urban uses will affect wildlife. It is all a matter of degree.

The potential for habitats of vertebrate or invertebrate species being disturbed due to the Harbour City development is of concern to the proponent, who will endeavour to minimise any direct wildlife impacts. Those animals mentioned in submissions are all important species, and have their place in the near-estuarine terrestrial environment. Vegetation on the site is well represented in the Peel-Harvey system and there are no rare and endangered species recorded on the development site. The staged development approach will create a natural shift of wildlife populations brought about by the gradual change of their habitat due to construction related movements. The early implementation of Conservation Reserve fencing together with appropriate education of the construction labour force will minimise the disturbance of wildlife and provide for their ongoing protection.

3.3 RECOMMENDATIONS

1. That the submissions be received and noted.
2. That the proponent will undertake an additional study of terrestrial animals and investigate methods of achieving a higher rate of relocation to nearby undeveloped sites with similar vegetation complexes or to within the Conservation Reserve. The study will be completed prior to the commencement of Stage 1 of the Harbour City development to the satisfaction of the EPA, in liaison with CALM.
3. That the CER be amended to contain a commitment dealing with Recommendation (2) above.
4. That the proponent will make a commitment to preserve wildlife and their habitat where possible during the construction phase of the project.

4. Incremental Loss of Wetlands (62)

4.1 SUMMARY OF SUBMISSIONS

Several submissions expressed the view that too many wetlands have been lost/destroyed through urban development in the Peel-Harvey and Perth Metropolitan Area already. Already two-thirds of the wetlands on the Swan Coastal Plain have been destroyed since European settlement. This proposed development would add to the destruction.

4.2 RESPONSE TO SUBMISSIONS

Many wetlands on the Swan Coastal Plain were filled and drained and were generally seen as an impediment to urban development. This proposal does not advocate the removal of the wetlands on the development site but rather the securing of a significant proportion for conservation purposes, providing a functional landscape feature in the form of canals, and retention of a proportion of the land for public open space. In effect the proposal will create a variety of wetland habitats which will fulfil a greater role in ecological and social terms than existing at present. The submissions relate more particularly to basin-type wetlands of the Swan Coastal Plain which are primarily surface expressions of groundwater. They do not explicitly refer to estuarine wetlands. The submission does not also take account the existing degraded nature of the estuarine wetland and the fact that the Harbour City proposal provides an opportunity to improve and protect the most productive and valuable samphire flats.

4.3 RECOMMENDATIONS

1. That the submissions be set aside as they relate to wetlands that are not analogous to near-shore estuarine wetlands and do not concede that the Conservation Reserve proposed in the Harbour City project will conserve and protect the most significant samphire habitat/estuarine wetland in the north-eastern sector of the Peel Inlet and do not recognise the Conservation Reserve proposed as a distinctive upgrade of the current estuarine wetlands condition.

5. Wetlands Important for Healthy Water Quality

5.1 SUMMARY OF SUBMISSIONS

The samphire area is considered to provide an important role as a biological filter for soluble nutrients contained in water runoff from the adjacent catchment. The proposal would destroy a significant area of wetland area which may result in the reduction of water quality within the Peel-Harvey Estuarine waterbody. This issue has not been adequately addressed within the CER.

5.2 RESPONSE TO SUBMISSIONS

Samphire, as with most vegetation types fringing aquatic environments are productive and stabilise foreshore sediments. The samphire assimilates nutrient rich surface runoff from catchment areas, stores nutrients in living biomass which is later released, upon oxidation of decaying vegetation material, back into the environment. The proponent considers that the loss of samphire resulting from the Harbour City development will not adversely affect water quality in the Peel-Harvey system. The samphire loss can be potentially offset by the reduction in nutrient loads entering the estuary from the proposed change in catchment land use from rural to canals and residential which will have totally controlled runoff.

It is pointed out that the change in land use to a canal estate will significantly reduce nutrient loadings based on:

- a) Sewerage connection for all developments;
- b) Only stormwater from roofed areas will discharge directly into the canals;
- c) All other stormwater will be passed through appropriate sediment traps and filters to remove nutrients; and
- d) A considerable area of the project is set aside for canal/waterways which in turn reduces the potential for increased residential densities which could arise under a conventional single residential development option and therefore considerably reduce the potential nutrient loadings.

It is acknowledged that special care will need to be taken during the construction phase for each stage to remove all existing vegetation from the site where this is necessary, to ensure that the release of nutrients from that vegetation does not impact upon the Peel Harvey system.

5.3 RECOMMENDATIONS

1. That the submission acknowledging the samphire area as a biological filter be accepted and the need to preserve the "wet" samphire areas as the most productive areas for nutrient recycling. The proponent in the management of the Conservation Reserve has acknowledged this fact which is a point strongly made

in the CER.

2. That a further commitment be added to the CER which requires that all existing vegetation where this has to be stripped, is not to be stockpiled and left on the land but is to be taken off-site prior to decomposition and re-release of biomass nutrients.
3. The proponent will endeavour to increase public awareness on the role of samphire vegetation in the estuarine environment as part of its education programme. Particular emphasis on methods which landowners and canal managers can minimise nutrient loss to the estuary will be discussed in detail in the text of education programme pamphlets, including the use of slow release fertilisers.

<p>6. Proposed Canal Development Areas should be Included within a Bird Sanctuary/National Park/Wetland Reserve/"A" Class Reserve/Peel Regional Park (76)</p>
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6.1 SUMMARY OF SUBMISSIONS

Many submissions expressed the view that the State Government should buy the land included within the proposal and set it aside as either a bird sanctuary, National Park, wetland reserve, part of the proposed Peel Regional Park or as an 'A' Class Reserve.

6.2 RESPONSE TO SUBMISSIONS

The project land is currently privately owned. The public has had total access to the property and foreshore areas for recreational purposes for many years, which has resulted in natural vegetation degradation and adversely impacted upon wildlife habitats.

Also of importance is the devastating impact that feral predation has had on native wildlife and breeding areas for waterbirds. These activities will be difficult to manage under normal circumstances, even if the land were to be acquired by the Crown. Under the Harbour City project a significant land area of the proposed development site (41.15 hectares) will become a managed Conservation Reserve which will function as a bird sanctuary with the appropriate isolation measures to control human and animal access.

The status of the Reserve (ie. National Park, 'A' Class Reserve, Peel Regional Park, etc.) will be decided by the relevant government authorities at the appropriate time. The objectives formulated by the proponent to set the Conservation Reserve aside have been adopted from, and are consistent with, similar environmental management plan guidelines pertaining to the protection and preservation of flora and fauna species.

6.3 RECOMMENDATIONS

1. That the submission be dismissed on the basis that Esplanade (Mandurah) Pty Ltd are committed to ceding the area to be set aside as Conservation Reserve to the Crown free of charge, the Department of Conservation & Land Management have confirmed their desire that the Conservation Reserve be vested in the National Parks & Nature Conservation Authority of Western Australia for future management to be undertaken by CALM. In this regard, the proponent is proposed to cede over 25% of the land to the Crown, free of charge, as Conservation Reserve (41.15 ha), Foreshore Reserve (3.75 ha) and POS (12.8 ha).
2. The Government of Western Australia, the City of Mandurah and the people of the area will benefit financially in real terms through the economic flow of factors of the development proposal and the long term employment benefits generated through development of a resort hotel and tourist retail precinct. Those economic benefits should not be eroded by the imposition of an upfront financial burden on the Government to purchase the Conservation Reserve Area on behalf of the people of Western Australia when it is clear that the developers are prepared to cede that area of private land to the Government at no cost.

The long term management commitment set out in the CER clearly identifies that management of the Conservation Reserve area is covered under the overall funding structure. The Reserve Fund to be established by the developers and augmented annually with Specified Area Rates payable by all land owners within the development shall further boost the environmental gains to all parties by underpinning the future cost of management of the Conservation Reserve. The required monitoring programmes to be conducted annually in the context of wildlife audits shall also be funded by the Management Entity.

3. The environmental monitoring results obtained in the Conservation Reserve would, on the basis of Government's acceptance of CALM's proposal to vest in NPNCA and undertake future management, further set aside the views expressed in the submissions and concurrently support the requirements of the RAMSAR Convention and the Agreements with the Government of China and the Government of Japan in relation to protection of transequatorial migratory waterbirds in danger of extinction and of their environment.
4. It is further recommended that an annual review of the monitoring programmes be undertaken by CALM and that EPA accept the arrangements detailed by CALM in terms of the involvement of the Management Entity with CALM in the long term management of the Conservation Reserve area.

7. Catchment already Under Stress and Proposed Development will add to the Stress (4)
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7.1 SUMMARY OF SUBMISSIONS

The Peel-Harvey catchment is already under considerable stress through the construction of other canal developments in the Mandurah and Yunderup area and dams in the hills. Proposed canal estate would add to this stress.

7.2 RESPONSE TO SUBMISSIONS

The proponent believes that the proposed Harbour City Canal development will not place stress on the Peel-Harvey catchment. On the contrary, it can be demonstrated in this case that the change in land use from rural to canal residential may potentially reduce nutrient inputs to the environment, therefore, resulting in less stress on the catchment and estuary. The Peel-Harvey catchment area encompasses over 200,000 hectares of land area approximately 75% cleared (EPA Bulletin 363, 1988). In the overall context, canal developments make up an insignificant proportion of the predominantly cleared agricultural catchment area and, as such, would place negligible stress on the environment.

More importantly, the proposed Harbour City Conservation Reserve will create opportunities to protect wildlife and waterbird habitats in a clearly controlled and manageable manner.

7.3 RECOMMENDATIONS

1. That the submission be set aside as it is impossible to quantify the stresses (if any) of canal developments and hills dams on the Peel-Harvey catchment, and because the Harbour City proposals will provide in quantifiable terms suitable wildlife habitat areas.

8. No Justified/Demonstrated Need for more Canals in Mandurah (38)

8.1 SUMMARY OF SUBMISSIONS

The most recent canal estate to be constructed in Mandurah (Port Mandurah) has been completed for years and yet not all blocks have been sold. This indicates that there is no justified or demonstrated need for additional canal estates in the Mandurah area, particularly in view of the current recession.

8.2 RESPONSE TO SUBMISSION

There are no canal estates in Mandurah which are currently being marketed to the public. Except for re-sales, no vacant canal lots are available. It is acknowledged that a downturn in re-sales exists, but this is a global problem affecting real estate generally. A resurgence in the property market will equally see demand increasing for canal lots. The Port Mandurah canal development successfully sold every lot in the last three years which have been universally acknowledged as a downturn property market.

Clearly, it would not be economically possible to undertake the whole development as a single stage and therefore the CER has been based on a staged development programme to extend over approximately a 10 year lifespan.

8.3 RECOMMENDATIONS

1. That the submission be dismissed.
2. That the staged development of the Harbour City project be accepted as an appropriate implementation method.

9. Proposal will Destroy the Character of Mandurah (31)

9.1 SUMMARY OF SUBMISSIONS

Many people moved to the Mandurah area in the past because they were attracted to the holiday/informal/fishing township atmosphere of Mandurah. The development of canal estates such as Harbour City will detract from this atmosphere and create a suburban city atmosphere out of character with existing Mandurah and destroy its tourist value.

9.2 RESPONSE TO SUBMISSIONS

The Harbour City proposal has been designed to complement the Mandurah character by providing a high quality canal estate which takes advantage of the aquatic pursuits demonstrated by the general community. The proposed tourist facilities (resort hotel and tourist complex) will enhance Mandurah's tourist potential and attract the associated economic benefits. A brief examination of the changes to the character of Mandurah, which long ago was a seaside resort and has grown to a thriving City, does not support this submission.

This proposal for development is a response to the continuing growth of Mandurah - not a cause of growth. It is well recognised in the Mandurah community that Port Mandurah represents high quality usage of low lying land near the estuary.

Exactly the same submissions were received in terms of objections to the Port Mandurah Canal Development and Waterside Stage 1 Canal Development at the time they were proposed. The results of those developments have been a tremendous boost to the City of Mandurah and a strong input to the local community by way of economic benefits and aesthetic improvement of each of the sites. In itself Port Mandurah Canal Subdivision has created a tourist attraction, drawn more visitors to Mandurah and become a source of attraction for local people taking advantage of the Public Open Space areas adjacent to canals for fishing, crabbing and prawning activities. Many boating enthusiasts utilise the canals for quiet recreational boating activities, visiting friends who live on the canal estate, or enjoying the views of many of the high quality residential homes which have been constructed in Port Mandurah Canal Subdivision.

The community has an opportunity to benefit from this unique development which has the potential to significantly improve existing land values and create long-term employment opportunities, whilst being significantly better in amenity terms compared with a traditional residential development solution.

It is also consistent with current State Government initiatives to propose a railway connection to Mandurah and recognise Mandurah as a satellite centre of Perth Metropolitan Area.

9.3 RECOMMENDATIONS

1. Recognition be given to the huge potential for boosting the tourism industry in Mandurah by construction of a five-star resort tourist hotel and a tourist retail precinct modelled along the lines of Pier 39 Fishermans Wharf in San Francisco and a similar concept to that utilised in Challenge Boat Harbour, Fremantle. As evidenced in Fremantle there is a huge draw card for visitors to the City of Fremantle (in particular on weekends) to enjoy the food and beverage driven tourist retail precinct.
2. The additional inflow of visitors to the City of Mandurah will cause a boost in associated retail sales activities for all existing traders in mainstream Mandurah and in the Mandurah Forum Shopping Centre.
3. Recognition be given to the multiplier effect to the cause of a creation of a growth in tourist activity in particular establishment of a five-star resort hotel which will bring overseas, interstate and intrastate visitors to the City of Mandurah for a short term stay accommodation thus giving a significant boost to the retail turnover for the City of Mandurah.
4. The holiday/informal/fishing township atmosphere of Mandurah has changed considerably over the last ten years. Recognition should be given to the fact that a growth in establishment of marinas and canal based residential lots will increase the numbers of boats in the Peel Inlet and boost the utilisation of the estuary channel and the proposed major Government development of the Mandurah Marina Complex adjacent to the Mandurah Off-shore Fishing Club.
5. Recognition should be given to the fact that Harbour City will in no way create a suburban city atmosphere, in fact, creation of a residential canal water frontage environment is very complementary to the emerging character of the City of Mandurah in terms of being an aquatic recreation based tourist attraction in the State of Western Australia.
6. That the submissions be set aside on the basis they incorrectly identify the actual character and atmosphere of the City of Mandurah and ignore the significant boost to the tourism industry for the City of Mandurah through the construction of a further canal estate with tourist retail and resort hotel precinct.

10. Unacceptable Aesthetic Impact (61)

10.1 SUMMARY OF SUBMISSIONS

A high density canal estate at this location would detract from the natural views from the Mandurah Traffic Bridge and destroy the visual character of the estuary mouth. It is an inappropriate and unacceptable form of development at this location.

10.2 RESPONSE TO SUBMISSIONS

The location of the Harbour City Project site has been recognised for potential canal developments by various Government authorities (DPUD, EPA (System 6), and the City of Mandurah) since 1979. The environmental impacts, including visual impacts, for the Harbour City site have previously been assessed (JHC, 1982) and given environmental approval (DCE 1982). An environmental approval for a similar canal development presently exists over the land, and the opportunity to consider alternative land use is limited, given that an expectation for a canal and related development has existed since 1982. The only other form of development at this location would be single residential development, which would have a more significant visual and environmental impact.

The Mandurah Traffic Bridge has a speed limit of 80 km/hr and takes approximately 8-10 seconds to cross, in a motor vehicle the viewshed is absolutely negligible. The traffic bridge also has a walkway for pedestrians/cyclists underneath on the north side. There are no views whatsoever of the subject land from this walkway as they are blocked by a 3 metre concrete bridge span.

The Harbour City proposes to cede to the Government free of cost, 23% of the development site as Conservation and Foreshore Reserves (total area 44.8 hectares) to remain in their natural state for conservation purposes. This will blend the proposed canal development into the surrounding environment and together with the expected growth of buffer zone vegetation, landscaped public open space areas and private domestic gardens, will result in minimal visual impacts.

10.3 RECOMMENDATIONS

1. That the submission be dismissed in that the Harbour City proposal offers a development option which positively contributes toward the visual character of Mandurah.
2. That the proponent will submit a landscape design to the City of Mandurah prior to canal construction which illustrates the blending of the proposed Harbour City development into the surrounding environment.

11. Development just an Economic Excuse to Destroy a Valuable Area (15)

11.1 SUMMARY OF SUBMISSIONS

Developers are taking advantage of the area by buying land at a relatively cheap price and reaping maximum profit by proposing a densely populated canal oriented urban estate in which as many lots as possible will be created and sold for extremely high prices.

11.2 RESPONSE TO SUBMISSIONS

The submission is not based on the reality of the market place. The same point could have been made by others when the objector's land was in fact being considered for urban development, however development companies such as Esplanade (Mandurah) Pty Ltd are extremely responsible developers who are mindful of the need to undertake the development to a very high standard which is sympathetic to environmental requirements and commitments. The Company stands by its Port Mandurah development, which was heralded generally as a top quality, sensitive canal development. If land is not released for "urban" development in the Perth Metropolitan and near areas, extreme pressure will be placed on Government to meet the needs of the ever-growing population. This development proposal is a response to the existing growth of Mandurah - not a cause of growth.

Additionally, the State Government is about to announce plans to extend a railway to Mandurah, which can only be economically justified if areas like Harbour City are allowed to urbanise. The subject land has been earmarked for "urban" development, and has had an environmental clearance for a similar canal development, since 1982.

Over 50% of the subject land will be consumed in the Conservation Reserve, POS and Canal Waterway area. The balance of land will be developed generally to R20 density, consistent with current Government planning policy.

11.3 RECOMMENDATIONS

That the submission be dismissed.

12. Long-term Effect of the Dawesville Channel is Unknown at present. Should wait until it is Constructed (49)

12.1 SUMMARY OF SUBMISSIONS

Long-term side effects of the Dawesville Channel, such as increased flooding and therefore more frequent inundation of salt marsh (samphire) areas, and subsequent vegetation response to this change, will not be known until after the Channel has been completed. There should be no more developments of this nature until the long-term effects are known, eg. increased flooding and associated impact on waterbird habitats, effectiveness of flushing and associated nutrient control within the Estuary.

12.2 RESPONSE TO SUBMISSIONS

Detailed assessment on the predicted effects of the Dawesville Channel indicate that a change in tidal range and not a general increase of the estuary water level is most likely. This will be of most benefit to the southern section of the estuary where greater tidal range differences will result in dry samphire flats becoming more frequently inundated, thereby providing a greater wet samphire environment for bird utilisation. The distance of the project site from the Dawesville Channel will mean a marginal change in tidal range to the subject land and therefore, will not significantly affect the vegetation types.

Modelling studies on the effects of the Dawesville Channel (Tong, 1985) in the "Peel Harvey Estuarine Study" (Department of Conservation and Environment, Bulletin 195, July 1985), predict that tidal range differences in summer and winter will be 0.05 metres and 0.25 metres respectively in the vicinity of the proposed Harbour City development. The effects on bird habitat of Dawesville Channel changes (ie. lowering average winter water level) may provide more useful habitat for bird life in areas such as the Creery Lagoon that is currently flooded during winter. In addition, the negligible change in summer tidal range due to the Dawesville Channel will maintain the vegetation in an environment to which it is presently adapted.

The actual effects of the Dawesville Channel will not be known for several years; however the environmental safeguards proposed by the Harbour City development and isolation of the Conservation Reserve will assist the preservation of vegetation and maximise the area's attributes as a wildlife habitat.

Given that the proponents have accepted an additional commitment to monitor changes to the Conservation Reserve and have regard to these as part of the staged construction of the Reserve, it would seem logical that the effects of the Dawesville Cut on the site can also be monitored in the long term (eg. 10 to 15 years, being the life of the project).

From the best available professional advice, the effect of the Dawesville Cut to the northern reaches of the Peel Inlet will in fact be minimal and have been overstated by the objectors, especially in view of the fact the subject land is adjacent to the direct ocean linkage of the Mandurah Inlet Channel (2.5kms) and is already subject to the full tidal range of the ocean.

12.3 RECOMMENDATIONS

1. That the submission be noted.
2. That the commitments set out in the CER be revised to clearly contain a requirement for the proponent to monitor the effect of the Dawesville Cut with respect to the project site.
3. Subject to discussions with relevant agencies (eg. EPA, CALM, etc.) the results of the monitoring studies be reflected in modifications (as necessary) to the management plan(s) for the staged development of the Conservation Reserve.

13. What was considered Environmentally Acceptable 10 years ago by the EPA should be reviewed in the Context of Other Developments which have occurred in the area since then, as well as the Increased Ecological Understanding (34)

13.1 SUMMARY OF SUBMISSIONS

Although a canal development was assessed at this location as part of the Waterside Mandurah Canal Estate (Stage 2) by John Hollands in 1982 by the EPA as an Environmental Review and Management Programme, this should not prejudice the assessment of a new canal proposal at the same site in 1992. Other developments of this nature have been constructed in the Mandurah area since that time and the cumulative impacts of these should be taken into consideration. Further, there has been an increase in the understanding of the ecological importance of the area in the intervening 10 years.

13.2 RESPONSE TO SUBMISSIONS

The Waterside Mandurah Canal Estate (Stage 2) ERMP by John Hollands in 1982 was the highest level of formal assessment and which addressed the development proposal at the same site. It was deemed by the EPA to be environmentally acceptable without a sunset clause. The proponent undertook an additional formal assessment based on changes to the John Holland design and determination of the development line. This was in the form of a combined Planning/Environmental document (Harbour City CER) which addresses the planning considerations, environmental significance and potential impacts of the Harbour City development proposal. The CER reflects the increased ecological understanding during the past 10 years by drawing extensively on recent studies and surveys relevant to the development site and the Peel-Harvey system in general.

In the context of other canal developments in the area, it has been demonstrated that the existing canals' water quality is primarily governed by the source water (ie. Mandurah Channel). The cumulative impacts of canal developments are therefore mainly due to visual impacts which have been mitigated with appropriate landscaping and buffer zone establishment.

If the EPA was not aware of the environmental consequences of the development of a Canal Estate on the land and was not confident in the ability of the Esplanade (Mandurah) Pty Ltd to assess the potential impacts, it is considered highly likely that the EPA would have sought a much higher level of assessment compared to a CER. The submission assumes that the CER that has been prepared has had no regard to the changes that have occurred in environmental assessment since the ERMP was approved.

The CER does take into account all of the relevant information necessary; otherwise it is unlikely that the EPA would have released the document for public comment.

13.3 RECOMMENDATION

That the submission be dismissed as the CER has addressed all of the developments that have occurred in the area as well as the increased ecological understanding that has developed since the last ERMP was undertaken, which is recognised by the proponents as being relevant to a different canal design.

14. Urban Subdivision will Increase Recreational Pressure on the Wetlands and Adjacent Waterway (12)

14.1 SUMMARY OF SUBMISSIONS

Once urban development within the area takes place there will be increasing public pressure on the wetlands which would result in the removal/destruction of any remaining wetlands.

14.2 RESPONSE TO SUBMISSIONS

The proponent believes that recreational pressures on the wetlands due to the proposed subdivision will actually decrease when compared to the recreational impacts which presently exist over the development site. Uncontrolled access to the samphire flats by four wheel drives, motorbikes, crabbers etc has caused considerable damage to the wetland areas. The management and isolation of the proposed Conservation Reserve will remove these impacts to the long term benefit of the receiving environment.

Due to the expected increase in population and boat ownership associated with the canal development there will be an increase in use of the adjacent waterways. This is not expected to be a problem due to the expanse of the Mandurah Channel and the variety of options available for directional boat travel.

14.3 RECOMMENDATION

1. That concerns as presented be dismissed however, the proponent will endeavour to increase public awareness regarding the recreational impacts on the Conservation Reserve and Foreshore Reserve as well as the nearby Creery Islands. This will be accomplished with the formulation of an education brochure together with appropriately placed signage.

15. Development/Increased Boating will put Pressure on Native Plant/Animal Species in the Area Through the Introduction of Pests, Weeds etc. (7)

15.1 SUMMARY OF SUBMISSIONS

Development of the kind proposed would increase human pressure on Creery Island which would inhibit waterbird breeding and feeding and so defeat the purpose of retaining the area as a Conservation area. The increased number of people using boats attracted by the development would be tempted to land on the proposed Creery Island Conservation Reserve and disturb wildlife. Proposed development would also inevitably attract an increased number of exotic weeds and pests (including domestic pets) which will detract from the existing conservation value of the area.

15.2 RESPONSE TO SUBMISSIONS

The proponent believes that the Harbour City Project will not inhibit waterbird breeding and feeding on the Creery Island. Creery Island has considerable separation from the proposed development which has been enhanced with the Conservation Reserve and associated vegetation. The shallow tidal waters surrounding the Creery Island inhibits access from the water and discourages human use. The Conservation Reserve also possesses shallow tidal water (southern boundary) and a hostile, rock pitched wall (northern boundary) which also limits access. It is considered that the majority of people attracted to the wildlife on the Conservation Reserve and Creery Islands would also be aware of the importance of isolation and be unlikely to disturb the wildlife.

The physical separation offered by the canals and the vermin proof fence will ensure weeds and pests will not become established in the Conservation Reserve.

Any urban expansion in the Mandurah Region will result in increased human pressures on the surrounding water environment. The underlying objective behind mitigating the effects of human induced environmental impacts is through pertinent environmental management. The isolation and conservative management strategies proposed for Conservation Reserves and Creery Marshes areas will ensure their protection and long term sustainability as a balanced natural system.

Mandurah is one of the most popular places in WA to live. It is particularly popular with retired people or those planning retirement. This demand for housing makes it one of the fastest growing areas of the State. Carefully planned, environmentally sensitive developments must be in place to ensure that Mandurah's unique attractiveness and lifestyle is not destroyed.

15.3 RECOMMENDATION

Given the generally isolated nature of the Conservation Reserve, it is considered unlikely that the impacts referred to will occur and as such, the submission has no real foundation and should therefore be dismissed, bearing in mind that increased residential growth in the Region will bring with it a natural growth of recreational usage of the Mandurah waterways.

16. Cost of Maintenance of Proposed Development will increase Financial Burden on Existing Ratepayers (4)
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16.1 SUMMARY OF SUBMISSIONS

The proposed ongoing funding mechanism is inadequate and lacks specific management details. Other residents within the Mandurah Shire would inevitably have to pay increased rates to pay for the maintenance of this canal estate.

16.2 RESPONSE TO SUBMISSIONS

The proponent has spend considerable time in researching and developing a management system to satisfy both State and Local Government authorities for the long term management of the artificial waterways, foreshore and Conservation Reserves.

The proposed management system has been properly assessed by the agencies concerned who believe that it is an appropriate model which minimises the costs to Government and Local Government. There will be no additional rates burden on existing ratepayers due to the proposed imposition of Specific Area Rating.

16.3 RECOMMENDATION

That the submission be dismissed as the proposed management system will ensure that management of the estate and artificial waterways will be able to be financed so they do not create a financial liability on either the State Government or the City of Mandurah.

17. The Development will Encourage the use of Mosquito Control Pesticides and therefore, add to Estuary Pollution (17)

17.1 SUMMARY OF SUBMISSIONS

The Creery Wetlands are at present a rich and productive wetland ecosystem which supports abundant insect life, including mosquitos. Residents living in the proposed canal estates would demand heavy spraying of the samphire areas with insecticides to control mosquito populations which will degrade the pollute the Creery wetlands.

The mosquito breeding cycle is closely related to the feeding and nesting habits of the waterbirds. Use of pesticides should therefore take into consideration the possible side effects on waterbirds.

Mosquito control measures may also involve mechanically digging shallow channels to the Estuary across samphire areas to improve flushing and drainage. This would have an additional impact on the conservation value of the samphire.

17.2 RESPONSE TO SUBMISSIONS

The proponent recognises the fact that the Creery Wetlands are a rich and productive ecosystem with the preservation of the most valuable ecosystem components forming the proposed Conservation Reserve. The temporary waters and small isolated pools of the samphire flats provide favourable conditions for mosquito breeding.

The proponent also recognises that mosquito populations must be managed in a manner consistent with maintaining a valuable ecosystem food source whilst ensuring that plague proportions will not constitute a nuisance or health problem (ie Ross River virus).

Physical mosquito control methods such as channelling to remove mosquito breeding sites, improve access for natural predation of mosquito larvae by fish populations and provide a long term pest management solution with the least environmental impacts.

The samphire flats are quite resilient and it is expected that any impacts of physical modification for mosquito control will be of a temporary nature.

The proponent does not advocate the use of insecticides to control mosquito populations and with the removal of the majority of mosquito breeding sites in the proposed development area, does not consider it necessary to employ chemical control methods.

In the event that mosquito populations and subsequent complaints become excessive, regardless of physical control methods, then the Harbour City management entity will investigate alternative mosquito control options recommended by the Mosquito Control Review Committee and undertaken according to PIMA and EPA requirements. The use of insecticides will only be used as a last resort on the Conservation Reserve. Waterbird monitoring will examine waterbird populations, movements and behaviour in order to access any potential impacts on the effects of nearby insecticide use. It must be recognised that the Health Department of WA, in conjunction with the City of Mandurah,

have been spasmodically applying "Abate" in the area for several years prior to peak mosquito breeding periods. No adverse effects on waterbirds have been noted during the research and survey periods.

The whole of the property is sprayed as part of the Health Department of WA Mosquito Control Programme and responsibility for this programme must be retained by the Health Department.

The proposed isolation and management of the Conservation and Foreshore Reserves will provide a protected environment which is expected to attract a greater proportion of waterbirds. It is considered that the increased waterbird populations will naturally control mosquitos to a point where it may not be necessary to employ artificial forms of mosquito control.

17.3 RECOMMENDATIONS

1. That the submission be noted and that the proponent, in consultation with the EPA will formulate an Integrated Pest Management (IPM) programme addressing the alternatives to mosquito population control in the event that physical control methods alone will not be sufficient.
2. Should the use of chemical mosquito control by insecticides eventuate, the Management Entity will ensure that the Conservation Reserve will only be sprayed as a last resort and will monitor the effects of nearby spraying on waterbirds in the Conservation Reserve and submit the results to the EPA as part of the annual monitoring report.

18. Water Quality within the Canals will be Unacceptable (29)

18.1 SUMMARY OF SUBMISSIONS

Water quality within the proposed canals may become unacceptable due to a variety of factors including inadequate flushing rates, weed accumulation blown in from the adjacent Estuary (as has occurred at the existing Waterside Mandurah canal development north of the proposed site in recent years) particularly as the canal estate entrance faces south west in line with the prevailing wind, heavy metal contamination from proposed boat ramps, and poor water quality already existing within the adjacent natural waterway. The site is also in an area of reduced tidal scouring and the design of the canals would not allow for the complete flushing of nutrients to the Ocean on a daily basis, which would exacerbate existing eutrophication problems.

Smells generated by rotting algae/weed/poor water quality will become unacceptable to residents living in the proposed estate. This may lead to pressure being brought to bear on the Peel Inlet Management Authority to remove the algae. The use of mechanical harvesters in the area will lead to the further destruction of samphire areas.

18.2 RESPONSE TO SUBMISSIONS

The water quality in the proposed canals is heavily influenced by the flushing action occasioned by the close proximity to the Estuary mouth and ocean interface.

Detailed assessment on the water quality aspects of the Harbour City Canal Estate (Kinhill, Riedel & Byrne) indicate that the water flushing characteristics of the canals will result in favourable water quality. This will be further enhanced by dredging of the Mandurah Channel and construction of the Dawesville Channel which are current projects. The water quality benefits of facing the canal entrance in a south-westerly direction (wind mixing, flushing etc) easily compensates for the less likely occurrence of floating plant material entering the canals.

The high concentration of heavy metals experienced at Waterside Mandurah public boat ramp is due to the poor flushing characteristics associated with its present location (ie most further removed from the canal entrance). The Harbour City boat ramp is located near the canal entrance which takes full advantage of maximum flushing and therefore should not experience elevated levels such as those at Waterside.

The poor water quality of the adjacent natural waterway is largely a seasonal occurrence which is expected to be alleviated through appropriate catchment management and the construction of the Dawesville Channel.

Five yearly water quality monitoring results for Waterside Mandurah Stage 1 (Le Provost, 1991a) and annual water quality monitoring results from Port Mandurah Stage 1 (Le Provost 1991b) indicate that water quality within the canal developments is totally governed by the source water (ie Mandurah Channel). This combined with the predicted improvement of estuary water quality due to catchment management/Dawesville Channel/Mandurah Channel dredging and detailed water quality assessment for Harbour City Canal Estate suggests that estuarine and canal water quality problems (ie

eutrophication/algal blooms) will be less likely in the future. This realistic scenario will negate the use of mechanical harvesters to remove algae from the samphire areas of the Creery wetlands and will therefore not lead to the destruction of samphire areas.

The original objectors to Port Mandurah claimed water quality would be a disaster. The predictions for flushing by the Marine Engineers estimated 3-5 days for a complete cycle. The monitoring results prove complete water exchange every 12-18 hours. The water quality has been excellent, but totally reliant on the quality of the source water in the Mandurah Inlet Channel.

18.3 RECOMMENDATIONS

1. That the submission made by objectors is not supported by the comprehensive assessment undertaken by Kinhill Riedel and Byrne - Consulting Engineers, which clearly indicates that the water quality in the Harbour City project will be acceptable matching similar standards to the Port Mandurah Canal Estate. As such, the submission has no foundation and should be dismissed.
2. The proponent, as outlined in environmental commitments, shall monitor the performance of the proposed canals and submit the results in the form of an annual environmental monitoring report to the EPA.
3. In the event that considerable wind blown material enters the canals through the canal entrance, the proponent will investigate appropriate methods of control. Implementation of control measures will be subject to approval by the EPA and PIMA (refer Commitment No 70).
4. The proponent has committed to further intensive modelling of water flushing exchange by Kinhill Riedel & Bryne prior to construction of Stage 1.

19. Development will Restrict or Prevent Existing Public Recreational Access to the Area (22)

19.1 SUMMARY OF SUBMISSIONS

Development would further reduce the amount of area available adjacent to the Peel Harvey Estuary currently available for passive recreation. The creation of a navigation channel (canal estate entrance) would also bisect and so create an obstacle to the public use of an area of foreshore which is currently a popular prawning, crabbing and fishing site within close proximity to the centre of Mandurah. Access would also be restricted by the establishment of a retail area. Residents of the canal estate may object to general public using the foreshore for these recreational activities and may eventually lead to the Council prohibiting these activities in the area. Bushwalkers and birdwatchers would also be denied complete access to areas of most interest to them.

There is no discussion on public access (Dual Use Paths/cycleways) and parking facilities for public wanting to gain access to the foreshore reserve within the CER.

19.2 RESPONSE TO SUBMISSIONS

The environmental benefits of providing a Conservation Reserve which reduces the area available for passive recreation is in principle, supported by government and the majority of the general public. Unfortunately, passive recreation in an unmanaged situation, commonly attracts active forms of recreation (eg four wheel drives, motorcycles etc) which can adversely affect sensitive environments such as the samphire flats.

The proponent believes that the setting aside of a managed Conservation Reserve will discontinue the current degradation of the samphire caused by active recreation and provide a valuable wildlife sanctuary to the benefit of present and future generations of both animals and people.

The public will retain access to the Foreshore Reserve which is capable of supporting prawning, crabbing and fishing activities in an area within close proximity to the centre of Mandurah.

Access will not be restricted by the establishment of a retail area and canal residents cannot object to the general public using the Foreshore Reserve as it is a designated Public Open Space area (the closest resident is approximately 80m from the Reserve boundary and some 200m removed from the closest area likely to attract such recreational activities).

Bushwalkers and birdwatchers will have complete access to the Foreshore Reserve and can gain access to the Conservation Reserve through groups organised to study the site through the Management Entity under the direction of CALM.

Cycleways, dual use paths and public parking facilities are proposed to be provided within the estate and will be planned in consultation with the City of Mandurah. All distributor roads, particularly the distributor road fronting the canal estate, will contain a dual use path along the canal edge.

The property is presently in private ownership which is a factor overlooked by the objectors. Technically, the public has no legal access to the area.

More importantly, there appears to be no unanimity in public opinion on what they really see as important. Some want total public access whilst others are campaigning for the isolation of the land and its conservation on environmental grounds.

The Harbour City project concept suitably addresses the needs for each and provides clear planning proposals and management solutions.

19.3 RECOMMENDATIONS

1. That the submission be dismissed as the Harbour City project provides an adequate balance of public access/restricted public access to serve the needs of the area as well as the protection of the environment.
2. The proponent, as part of its public education programme, will erect appropriate signage outlining the objectives of the Conservation Reserve, conditions of access to the Reserve and the environmental benefits on the proposed management of that Reserve.
3. That controlled public access to the Conservation Reserve be considered as part of the preparation of the associated Management Programme which will be formulated in close liaison with CALM, PIMA and the City of Mandurah.
4. That appropriate public access be planned as part of the development of the proposed Foreshore Reserve north of the Canal Estate inlet channel.

migratory birds. Once the conservation and foreshore land is ceded to the Crown it will then be bound by the terms of the Ramsar Convention.

It should be noted that it is generally acknowledged that the subject land contains 12-13% of the productive samphire marsh in the Peel-Yalgorup system, not 25% as proposed in the submission by CALM.

The proponent understands that the effects of the Dawesville Channel cannot be fully evaluated until its construction is completed. It should be noted however, that information based on specialist sub-consultant assessment has been included in the CER and incorporated in the determination of conservation and foreshore areas and the availability of waterbird habitat. In summary, the effects of the Dawesville Channel will mean in terms of likely impact on the Conservation and Foreshore Reserve, that the predicted variation in tidal ranges will result in greater productive samphire during summer and a more exposed and easily utilised samphire area in winter.

While addressing the waterbird issues in detail, it is apparent, due to the general lack of available relevant information, that the CER has not adequately covered other faunal aspects such as small mammals and reptiles and their relationships to the vegetation. The proponent intends to undertake an additional study of the terrestrial fauna on the development site and will investigate methods of achieving a high rate of relocation to nearby sites with similar vegetation complexes.

The proponent supports CALM's rationale, and future role in the conservation and foreshore areas and believes concerns on the viability and management of proposed reserve areas can be resolved through the EPA's assessment of the CER and through consultation with relevant government bodies (ie CALM, PIMA, EPA).

CALM has also noted that the Waterways Commissions "The Significance of Mosquito Breeding Areas to the Waterbirds of the Peel Inlet, WA" has identified the samphire area of the highest waterbird conservation significance which the Redbook and Conservation Reserve boundary dissects.

It should be noted however, that the area of highest waterbird conservation significance identified in the WWC Study is based on a survey site (No 26) where the survey was conducted.

However, this high waterbird conservation area does not coincide with a Casuarina/Melaleuca woodland vegetation complex persisting on a slightly elevated portion of the samphire flat. We refer to a separate report lodged by Ninox Wildlife Consulting who undertook the survey work during 1988 and 1989 on behalf of Waterways Commission. The Harbour City development also proposes to establish a similar vegetation type along the entire northern fringe of the Conservation Reserve. This will compensate for the partial loss of Casuarina/Melaleuca woodland and create additional roosting sites within the waterbird habitat of the Conservation Reserve.

This issue has previously been raised by the Chairman of PIMA and subsequently discussed with EPA officers and at that time a conclusion was reached that the area locally known as "Casuarina Island" and shown on the following plan, had limited environmental value when compared with the more highly productive samphire flats

resulting in an agreement that the Project Structure Plan be publicly released generally in accord with the System 6 Redbook line.

The proponents investigations on the significance of the samphire flats drew upon this and many other relevant wildlife surveys which indicate the justification of the System Six Red Book line and the Harbour City Conservation Reserve boundary line and as such, it is still believed to be the most appropriate Development Line.

The proponent welcomes CALM's offer to provide advice and information regarding mosquitos and wetland conservation issues to be discussed in a brochure for prospective buyers.

The proposal will employ low impact physical control measures (ie channelling) consistent with techniques advocated by the Mosquito Control Review Committee but does not promote blanket use of controlled spraying of pesticides for mosquito control. In the event that it is considered necessary to spray for mosquito control, the proponent will formulate an integrated Pest Management (IPM) programme. Spraying will be avoided in the Conservation Reserve area and monitoring will be conducted in order to assess the effects of spraying on waterbird populations and the estuary.

The staged dewatering process was generally described in Section 4.5.21 with potential impacts examined in Section 11.4 of the CER. The manner and timing of discharge waters will be carried out to the satisfaction of the EPA and PIMA as outlined in page 21 of the CER. It is pointed out that the CER acknowledges the full impacts of dewatering in the sensitive Peel Harvey environment and have in principle agreed that these should be managed. However, at the subdivision stage and prior to construction, it will be necessary for the proponents to comprehensively quantify the actual components and timing of the proposed dewatering programme.

The method of stormwater disposal provides direct discharge of stormwater from roofs into the canal system and discharge of any possible nutrient loaded water via soakwells into appropriate drainage traps. Stormwater from all roads and paved surfaces will be passed through suitable grease/silt traps to remove possible contaminants prior to discharge into the canal waters. This system has been successfully utilised in the Waterside Mandurah and Port Mandurah developments which is evident by the 5 year monitoring programme (LeProvost Environmental Consultants) which has shown that the water quality of the canals is almost totally dependent on the source water (ie the Mandurah Channel). This, combined with the commitment by the proponent to educate all landowners on conservative fertiliser (slow release forms) and water usage will further minimise nutrient input into the environment. It is expected that the resultant nutrient input into the environment from stormwater drainage will not be significantly different from that attributable to the pre-existing samphire flats and as such will have no deleterious effects on the remaining samphire or marine fish species.

2.3 RECOMMENDATIONS

1. That as part of the Conservation and Foreshore Reserve Management Plan to be formulated by CALM in liaison with the proponent, that a requirement be specified to monitor the effects of the Dawesville Channel as necessary. Funding of the ongoing maintenance and monitoring of the Conservation and Foreshore Reserve be met from the Management Entity Reserve Account which is to be established by the City of Mandurah.
2. The proponent will undertake an additional study of the terrestrial fauna over the development site and investigate methods of achieving a high rate of relocation to nearby undeveloped sites with similar vegetation complexes and in particular to the Conservation Reserve where possible.
3. Should it be required by the Health Department of WA (because the low impact physical mosquito control methods (ie channelling) is inadequate) that the use of chemical pesticides is eminent, the proponent will formulate, in conjunction with CALM, an Integrated Pest Management (IPM) programme, to the satisfaction of EPA and PIMA, prior to such measures being implemented. Spraying of the Conservation Reserve should be employed as a last resort and monitoring of waterbird populations shall be undertaken should spraying be necessary.
4. The proponent shall submit a detailed plan (to the satisfaction of the EPA), at the subdivision stage but prior to construction works commencing, addressing aspects of discharge waters resulting from the staged dewatering process. Aspects to be covered relate to storage capacity of dewatering ponds, estimated volume and composition of effluent discharged into the estuary and the duration and extent of the discharge plume.

3. NATIONAL PARKS AND NATURE CONSERVATION AUTHORITY

3.1 SUMMARY OF SUBMISSION

*Amendment No 183
City of Mandurah District Zoning Scheme 1A
Harbour City Canal Estate
Consultative Environmental Review*

I thought I should comment that as the samphire flats which would be impacted by this proposal clearly have environmental significance, especially in relation to the conservation of water birds, it would be appropriate if, on these grounds, the area could be added to the conservation estate. While much of the fringe of Peel Inlet will be conserved, it would be an advantage if this fringe could be as broad as possible where wetlands such as this samphire flat occur. We would be pleased to have any area of the samphire flat which is protected, vested in this Authority and managed for conservation.

3.2 RESPONSE TO SUBMISSION

The proponent recognises the environmental significance of the samphire flats particularly in relation to waterbirds. The most productive samphire area utilised by local and migratory waterbirds will be ceded to the Crown as a Conservation and Foreshore Reserve. We refer you to the attached report from Ninox Wildlife Consulting.

CALM has identified the NPNCA as the vesting body for the Conservation and Foreshore Reserve to be managed for conservation purposes by CALM. The proponent supports the proposed vesting arrangements and will assist CALM in this matter.

3.3 RECOMMENDATIONS

1. That the EPA supports the proposition made by CALM and the NPNCA that the proposed 44.15 hectare Conservation Reserve and the 3.75 hectare Foreshore Reserve be transferred free of cost to the Crown.
2. The Conservation Reserve be vested in the NPNCA and managed by CALM with ongoing maintenance funding being provided from the Management Entity Reserve Account.
3. The Foreshore Reserve be transferred free of cost to the Crown and vested in the City of Mandurah.

4. DEPARTMENT OF MARINE AND HARBOURS

4.1 SUMMARY OF SUBMISSION

The Department of Marine and Harbours having the technical and managerial capability have identified the following matters pertaining to the Harbour City Canal Estate proposal which require attention.

1. *Waterway depth: At 4.3.1.3, Figure 5, 4.3.11.1, Figure 11, and possibly elsewhere, a datum of 0.4 metres below AHD is used in the discussion of navigation and mooring depth adequacy. This datum is incorrect - there is a well known published datum of 0.756 metres below AHD which applies to the Sticks area (and seawards) of the Mandurah waterway. All discussions on mooring and channel depth adequacy must be assessed on this corrected datum. When this is done, the depth of the proposed channels does not comply with DPUD Policy 1.8 section 6.2.1 for the nominated design boat.*
2. *Canal Slope: At 4.3.1.1, Figure 5 and 11, and possibly elsewhere, a relatively steep bottom slope of 1:5 has been proposed. Elsewhere, it is indicated that the soil forming this slope could be fine grain silts and muds which are unlikely to be stable at this slope. Until such time as detailed tests and design studies confirm that there is sufficient coarse-grained soil to make these batters stable at the suggested slope, it is not possible to accept that the canal widths (and therefore the subdivision) as proposed are adequate. The datum error of (1) above exacerbates this problem.*
3. *Group Housing Jetties: The proposal to build marina-style piers for group housing (4.3.11.2) will only be accepted if they are associated with a single strata-type corporate entity for each licensed jetty. Informally shared jetty structures are not acceptable to this Department.*
4. *Drainage into Canals: The several drainage pipes mentioned in 11.5.2.2 as entering from each private property could well be incompatible with the need for bank stability in (2) above. The details of these items will need to be carefully designed and built, and even more carefully supervised.*
5. *Water Quality: The discussion at 11.5.2.3 is based on the flushing discussion of Appendix 1 Section 3.3.3 which pertains to a winter condition of high daily salinity variation and which in Table 3.1 has a 35%/day density flushing of total water. The Section 3.3.2 suggestion of 14% per day flushing when density currents were at their lowest would seem to be a more appropriate number to use. Since there are calm periods in these summer comments, section 3.3 may not have given a proper lower bound for water exchange in, say, the 5 day period during which algal problems can develop.*
6. *Development Levels: In section 3.5.2 the various allowances nominated are for a still water surface. There are some locations, such as the properties on the canal adjoining the conservation reserve, where wave attack can be anticipated, and where the sloping frontage will cause "runup". An allowance of 0.3 metres has*

been used in the past, and this needs to be acknowledged. Fortunately, this can be fitted within the 0.5 metre safety margin, and the nominated 2.5 metres above AHD remains acceptable. This level should be more specifically described as the required floor level of "accommodation" buildings, since there is no need for jetties, ramps, sheds or pergolas to be at this height - they can tolerate being covered by water at perhaps the 1:10 year recurrence level. In current planning parlance, these latter items are included in the definition of "development", as are earthworks and retaining walls.

7. *Monitoring of Sediments: In regard to 3.9.2, particular attention (and monitoring sites) should be given to the marina and the boat ramp area.*
8. *Appendix 2 Management: It is not yet clear that the proposal for long term management will be acceptable to either local or State Government. If it is possible to establish a "Management Entity" as suggested, it is probably that details other than those nominated in this Appendix will be negotiated. The levels and timing of funding will have to be properly determined, and non-standard lots such as the Town Centre will have to give a special contribution. The experience of the Gold Coast City Council has little relevance to Mandurah because of differences in soils, hydrology, tides, and inter-government responsibilities, and the scale of development.*
9. *Compliance with DPUD Policy 1.8: The Draft of the above policy which is currently under review within State Government bodies contains some anomalies and errors, and is likely to be slightly changed - for example, as discussed in (6) above, ground levels needs not be above the 1:100 flood levels. It is noted however that the proposed Amendment of the City of Mandurah Town Planning Scheme as listed in Part 5 are not in accordance with Appendix 1, particularly in regard to building setbacks from the canal frontage, and retaining walls near the canal boundary. In these matters, we strongly support the application of Appendix 1, in view of the proposed type of canal wall.*

These matters were discussed with Marine and Harbours who have issued a further response to the BSD Consultant Response set out in 4.2 below, the letter is reprinted for convenience as follows:

*BSD Consultants Pty Ltd
BSD House
1 Sleaf Road
Applecross WA 6153

Attention: Mr J A Kotula - Director

Dear Sir

Re: MANDURAH HARBOUR CITY CANAL ESTATES CER

I acknowledge your letter dated 29 June 1992 providing further information and comments on our letter of 28 May 1992 addressed to the Environmental Protection Authority. In relation to the points discussed, I confirm our position, as follows:

1. Waterway Depth:

I have checked the average percentage of time during which the tidal level would be higher than -0.4AHD and accept Kinhill Riedel and Bryne's figure of 98%. This is a reasonable assessment of "Mean Low Water", as nominated in DPUD Policy DC1.8.

The low water datum of -0.756AHD quoted in my earlier letter is the low water chart datum used for recording water depths in the Ocean at Fremantle. The low water datum of -0.4AHD is equivalent to the lowest astronomical tide level at the Mandurah Fisherman's Jetty. The lowest astronomical tide at your proposed canal estates is expected to be similar to that level.

I acknowledge that the Port Mandurah and the Waterside Mandurah canal estates were both based on a 10m design vessel and a design channel depth of -2.7AHD.

Having reviewed the situation, as above, I now accept that the proposed channels generally comply with DPUD Policy DC1.8 Section 6.2.1. However, in view of the risk of siltation at junctions between the canal systems and the Mandurah Channel, I believe that during the detailed design stage you should look at increasing the design channel depth to -3.0AHD in this vicinity.

2. Canal Slope:

I accept your assurance that the Department's concern about maintaining the minimum design channel width can be overcome during the detailed design stage. If further investigations demonstrate that design changes are needed, I confirm that the measures required to improve stability without reducing the design channel width may include an increase in the canal wall depth, change of the canal slope or the use of granular or stabilised materials on the canal slopes.

3. Group Housing Jetties:

We have agreement.

4. Drainage into Canals:

We have agreement.

5. Water Quality:

I agree that further modelling during the detailed design phase should enable you to determine those measures which are necessary to ensure acceptable water quality is attained at all stages of development. Based on these results, you will need to make a commitment to amend the canal design, as necessary, to ensure acceptable water quality is attained.

6. Development Levels:

We have agreement.

7. Monitoring Sediments:
We have agreement.

8. Appendix 2 Management:
I agree with your statements in relation to this matter, and confirm that the Department is prepared to give "in principle" support to your management concept. The Department is actively seeking to reach agreement with the City of Mandurah on an appropriate arrangement for ongoing management of artificial waterways which does not involve State Government funding.

9. Compliance with DPUD Policy DC1.8:
The Department's concerns are overcome if you agree to design the canal wall to accommodate any additional loading from buildings at the minimum rear setback, and if the proposed setbacks are acceptable to DPUD.

I hope that these further comments make our position clearer, and do not provide an obstacle to your current application for rezoning. I have arranged to FAX a copy of our exchange of correspondence to Ms Eve Bunbury at the Environmental Protection Authority.

Yours faithfully
Mike Paul
Director Engineering
July 1, 1992"

4.2 RESPONSE TO SUBMISSION

1. Waterway Depth:

A value of -0.4 metres AHD has been used as a datum to establish navigation and mooring depth adequacy. This "datum" is based on a 98% confidence limit for tidal levels and was sourced from investigations carried out by Kinhill Riedel and Byrne (refer copy of correspondence dated February 14, 1992 tabled at the above meeting - further copy attached). It is considered that this "datum" adequately covers requirement 6.2.(a).(i) under DPUD Policy 1.8 specifying that the depth of clear navigation section be provided "at mean low water". To reiterate information contained in the CER, the canal depth of -2.7m AHD is derived as follows:

Low tide (98% confidence limits for tidal levels)	-0.4AHD
Draft of 10m design vessel	1.8m
Under keel clearance and siltation allowance	0.5m
	<hr/>
	-2.7m AHD

The depth of -2.7m AHD is considered to be conservative, in that the draft depth of 1.8m is in excess of the DPUD Policy DC1.8, Section 6.2.(a) recommending a draft depth of 1.6m for design boat lengths of between 8-10m. Further, Kinhill Riedel and Bryne's investigations (refer correspondence), suggest that an extreme low water level of -0.6m AHD could apply to the estate, which, in conjunction with the DC1.8 recommended draft depth of 1.6m would still give sufficient depth in the navigation channel.

Finally, it is our understanding that the depth provided at this estate is in excess of that provided in the Waterside Estate and that the use of the 98% confidence limit for tidal levels was used at the Port Mandurah Estate which was based on a design canal depth of -2.7m AHD.

In summary, it considered the Department should have no concerns relating to the proposed depth of -2.7m AHD.

2. Canal Slope:

The Department's concerns regarding the canal side slopes of 1 in 5 are noted. However, it should be pointed out that the information presented in the CER is of a concept nature and is therefore only preliminarily representative of the final design slopes and depth of canal wall structures respectively. The Proponent is committed to carrying out a full analysis and design of the slopes and canal wall embeddings, with this process including detailed geotechnical investigation and analysis, structural analysis and design and input from the marine consultant.

The client's geotechnical consultant has indicated that the preliminary stability analysis for varying underwater slopes gave a factor of safety in excess of 1.5 for slopes of 1 vertical to 5 horizontal for a retaining wall depth of 3.75m below AHD. The analysis was based on those parameters obtained in the investigation and used in the design of the canals for Waterside Mandurah Stage 1 development. In the event that detailed investigations at Harbour City indicate that parameters used in the preliminary analysis are inappropriate, then alterations will be necessary to the concept as depicted to ensure stability. These alterations would not necessarily require the change of canal widths since they can be provided within the widths proposed. Measures to improve stability would include an increase in canal wall depth, change of canal slope (without affecting navigation) or by use of granular or stabilised materials to canal slopes.

The final structural solutions will be the subject of further detailed investigation and design, all to the satisfaction of the Department of Marine and Harbours. It is suggested that the Department's request for the need for detailed investigations and studies at this stage is unnecessary since it is considered that these do not pose an impediment to the concept as provided. The need to carry out these works at the detailed design stage is however noted.

3. Group Housing Jetties:

Noted.

4. Drainage into Canals:

Noted.

5. Water Quality:

The Department's comments are noted. The Proponent and the Marine Engineering Consultant are currently liaising with the EPA regarding water quality. The Proponent has acknowledged that further modelling will be carried out to ensure acceptable water quality is attained at all stages of development.

6. Development Levels:
Noted.

The Proponent notes the Department's concerns regarding level of jetties and ramps to facilitate boat access and shall incorporate these within the final designs. It is noted that levels for backyards, roads etc would not necessarily be designed at 1:100 year level, but in accordance with lower return periods depending on function. This latter matter will be taken up with the local authority at time of detailed design.

7. Monitoring of Sediments:
Noted.

8. Appendix to Management:

The Proponent acknowledges the Department's concerns regarding this matter, however, all matters referring to management have been extensively detailed and documented by the Proponent in his liaisons with the City of Mandurah, Waterways Commission, PIMA and the Department.

The State Government has instructed the City of Mandurah that it must assume responsibility for long term management of artificial waterways.

The Proponent has proposed a management scheme to the satisfaction of the City of Mandurah which is to be incorporated in the Scheme Text and will have the full force of law. The Management Entity proposal was vetted by Council's solicitor prior to initiation of the rezoning amendment. All that is requested of the Department is to make available its expertise and support the concept of attending Committee meetings as required. There is no financial impact on the Department and further, in a meeting with the Minister for Transport Mrs Pam Beggs on February 26, 1992, support in principle, for the Management Structure was indicated by the Hon Minister. At this stage of the rezoning (advertising), we are seeking support in principle, from the Department.

9. Compliance of DPUD Policy 1.8:

The Department's concerns regarding the amendment to the City of Mandurah Town Planning Scheme as listed in Part V are acknowledged.

The current position regarding this matter is to allow rear setbacks of not less than 4.0m, with an average of 6.0m. The canal wall shall be designed to accommodate any additional superimposed loading from buildings at the minimum rear setback.

The variation on canal guidelines and to R Codes, arises from the fact that the Harbour City development proposes to create smaller canal lots (ie approximately 500m²) as opposed to previous canal estate lots which ranged from 700-800m² and are based on 9 metre setbacks. The issue of potential additional loading will be addressed as part of the engineering design for the canal walls.

The issues raised in the Department of Marine and Harbours original submission to the Harbour City proposal have been discussed by BSD staff with the Department's Director of Engineering, Mr Mike Paul. In this regard, a revised

submission will be forwarded to the EPA by the Department which properly reflects the Department's concern with respect to canal design parameters.

4.3 RECOMMENDATION

1. That recommendations set out in the Department of Marine and Harbours initial submission be reviewed in light of the revised submission which has been received from the Department of Marine and Harbours and which consistently supports the above listed responses to the submission.

5. DOLA SUBMISSION

5.1 SUMMARY OF SUBMISSION

In consideration of the planning and environmental assessment of the proposed Harbour City development, DOLA wishes to bring to attention the following points.

- *DOLA acknowledges the proposed vesting of the conservation and foreshore reserves with the City of Mandurah.*
- *The question of the tenure of the canal waterways has not been addressed. Clarification is required with regard to the manner in which it is intended to set aside the canal waterways, the responsible body and the ongoing management responsibilities.*

5.2 RESPONSE TO SUBMISSION

Having regard to the more recent decision of CALM proposing the transfer of the Conservation and Foreshore Reserves to the Crown on a free of cost basis and vesting of the land into the NPNCA, it is suggested that the reference to the City of Mandurah as originally proposed in the CER, is no longer appropriate, being a point accepted by the proponent.

The artificial waterways are also to be transferred on a free of cost basis to the Crown with the ongoing maintenance and water quality issues being the responsibility of the Management Entity which is proposed to be established and controlled by the City of Mandurah. This long term management solution is more particularly outlined in Appendix 2 of the CER

5.3 RECOMMENDATION

1. That submission be received and noted in accordance with the response set out in point 5.2.

6. AUSTRALIAN NATIONAL PARKS AND WILDLIFE SERVICE

6.1 SUMMARY OF SUBMISSION

International Treaties

The principal concerns of ANPWS regarding the proposed development are in relation to Australia's obligations under international treaties. Australia is a party to three international treaties which are relevant to this case.

Australia has bilateral agreements with the Governments of Japan and China for the protection of migratory birds. Under the Japan-Australia and China-Australia Migratory Birds Agreements (JAMBA and CAMBA respectively), Australia is obliged to protect certain migratory bird species and their important habitat areas. Australia is also a Contracting Party to the Convention on Wetlands of International Importance (Ramsar Convention).

In Australia, these treaties are implemented through State and Territory legislation by the relevant nature conservation agencies in each State and Territory. The Australian National Parks and Wildlife Service has responsibility for co-ordinating implementation nationally. Despite this "delegation" of responsibility to the State and Territory Governments by the Commonwealth, it is the Commonwealth which is the Contracting Party and thus has ultimate responsibility for meeting obligations imposed by the treaties.

The Peel-Yalgorup System was listed as a Wetland of International Importance under the Ramsar Convention in 1990. The proposed Harbour City development area lies immediately adjacent to this wetland and as such there is potential for significant environmental impacts on the Ramsar site. While the Ramsar Convention places a number of obligations on Contracting Parties, the principal expectation is that sites, once listed as internationally important, will be managed in a way that protects the ecological characters for which they were recognised. Any action that results in a deterioration of these ecological characters is considered in violation of the Convention.

The Peel-Yalgorup System qualified as a Wetland of International Importance because it satisfied Criteria 1, 2(d), 3(a) and 3(c) as described by the Convention. You will note that it is the regular use of the area by large numbers of waterfowl (waterbirds) which bestows special ecological importance on the site. The CER similarly notes (p77) that a consultant's report indicated that up to 25% of all the birds in the Peel Inlet can be found on or adjacent to the land subject to the Harbour City Development proposal at any one time.

In reference to the Ramsar Convention, the CER states "... it should be noted that the convention excludes land that is in private ownership and therefore does not directly apply to the subject land" (p75). This statement is incorrect. The Ramsar Convention does not exclude privately owned land from inclusion within Wetlands of International Importance and in Australia there are a number of sites that do. In this case it was a decision of the Western Australian Government to not include any private land in the nomination for the Peel-Yalgorup System. However, such action does not diminish the responsibility of the

Western Australian Government to ensure that any action taken on land adjoining a Ramsar site does not impact adversely on the Wetland of International Importance.

In the CER it is also suggested that the waterbird populations will adapt to a greater level of disturbance, both during and after the construction phases. It should be noted that in the event that a site becomes less suited to waterbirds, Australia would be expected to re-assess the Ramsar listing of the site as well as justify the action taken to the Governments of both China and Japan, as prescribed under the respective Migratory Birds Agreement. Of particular relevance here is Article 4.2 of the Ramsar Convention which relates to compensatory measures required in the event that the boundaries of a Ramsar site are restricted. Under Article 4.2, additional nature reserves for waterfowl and for the protection of an adequate proportion of the original habitat would be required.

Buffer Zone

The EPA System 6 Green Book referred to in the CER recommended that there be a foreshore reserve of approximately 500m wide along the southern shoreline of the Harbour City site. The Peel-Harvey Estuary was identified as probably the most important estuary in the south-west of Western Australia for waterbird conservation. The Creery Marshes were identified as being important for up to 25 species of migratory birds included in the Annexes to JAMBA and CAMBA. The Samphire flats and marshes were considered to represent important vegetation complexes in the area which have a restricted occurrence and are important for Eastern Curlew and Whimbrel.

Subsequent reports (the Kirke report and the Draft Peel Region Plan) also indicated that an area corresponding to that recommended in the EPA System 6 Green Book (ie. 500m wide) be included within a foreshore reserve. The subject is considered to be of high conservation value because it comprises a significant area of samphire (representing approximately 13% of the tidal area of salt marsh in the Peel-Harvey Estuary) and intertidal shallows which support large numbers of waterbirds and in particular migratory wader species.

The current Harbour City proposal provides for a conservation zone of approximately 200m wide along the southern shore of the subject area. In the light of the findings of the EPA System 6 Green Book, the Draft Peel Region Plan and the Kirke Report, the proposed conservation zone would appear to be inadequate to maintain the ecological integrity of the site. The inadequacy of the proposed conservation zone is likely to result in a significant deterioration in the ecological value of the whole Creery marshes area.

Mosquito Control

The current proposal indicates that mosquito control will be undertaken by mechanically digging shallow channels from Peel Inlet to increase the frequency of tidal inundation of the samphire flats to improve flushing and drainage. While it is recognised that this action could reduce mosquito breeding areas, it is also likely to have a significant negative impact on the high conservation value of samphire flats. Further assessment needs to be undertaken prior to implementation of what could be a significant reduction in the suitability of the area to the bird species for which it is vitally important.

Monitoring

I direct your attention to Article 3.2 of the Ramsar Convention which refers to the expectation that Contracting Parties will monitor the ecological character of Listed sites as a safeguard against adverse impacts from "technological developments, pollution or human interference."

The various monitoring procedures proposed for this development appear to be of insufficient duration and, in relation to wildlife, superficial in nature. Many of the possible effects on the estuary and the waterbirds will only become evident through monitoring over a ten or fifteen year period. If the 'user pays' principle is to be invoked, the proponents should be required to dedicate far greater resources to monitoring a wider range of environmental parameters over a minimum period of ten years.

6.2 RESPONSE TO SUBMISSION

The proponent is aware of its obligations to international treaties and conventions, and believes the proposed isolation and management of the Conservation and Foreshore Reserves meets the treaties' collective inventory of ecological standards designed to protect waterbird habitat.

Although the privately owned Harbour City site is not part of the Peel-Yalgorup System nominated for protection under the Ramsar Convention, it is in the proponent's best interests to ensure the Conservation Reserve and Foreshore Reserve proposed for a waterbird sanctuary are viable, with self-sustaining ecosystems. This will enable a smooth transition of Conservation and Foreshore Reserves to public ownership and the compliance with Ramsar obligations.

In terms of the Harbour City project's environmental integrity, CALM, which is the State Agency for management of conservation reserves and protection of their dependent wildlife, has clearly indicated that whilst it is prepared to accept the management of a greater area of Conservation and Foreshore Reserve to that currently proposed, it has also supported the proponents proposals for the current Reserve and has not specifically argued that insufficient land area has been provided by the proponents.

The discussions with CALM officers have indicated that relatively minor extensions to preserve the "Casuarina Island" and adjoining lagoon within the Conservation and Foreshore Reserve would fully satisfy CALM's requirements having regard to the State's obligations to the Ramsar and other relevant international treaties.

The proponent has acknowledged this and is prepared to consider some variation to the boundaries of the Conservation and Foreshore Reserve to satisfy the suggestion made by CALM and previously the Chairman of PIMA.

The concept suggested in the ANP and WS submission that the "development line" should reflect the larger buffer zone requirements set out in the Kirke 1986, System 6 Green Book, Draft Peel Region Plan does not:

- a) have regard to the fact that each of these lines are relatively arbitrary;

- b) that Government will have to acquire and manage the extensive reserves proposed in these studies
- c) acknowledge the great practical difficulties to be confronted by CALM who would most likely be the Management Authority to control public usage to the land which could result in the area becoming further degraded
- d) justify the substantial land take which the proponent believes would become an onerous condition and would seek compensation from the State Government. The State, under this scenario, would also be responsible for the long term management of the conservation area. The resultant development opportunity on the balance of the land would only realise a "dry" lot subdivision which would be a no win option for either party whereas the current proposals are a win/win solution for all parties.

Waterbird populations are extremely tolerant and adapt to greater levels of disturbance, particularly permanent features of noise and movement which appear to be perceived by waterbirds as part of the background environment. An example is the foreshore area of the Swan River near the Narrows Bridge commonly utilised by migratory waterbird species. The area possesses considerable disturbance in the form of Freeway traffic, regular speed boat movements, heavily used cycleways and Public Open Space, which has not detracted from its continued annual usage by migratory waterbirds.

The proponent considers that the site will not become less suited to waterbirds and therefore will not require additional nature reserves to be established for waterbird habitat. Ongoing monitoring of waterbird populations will indicate the suitability or otherwise of the Conservation and Foreshore Reserves as a waterbird habitat.

The proponent realises the significance of the development site in terms of vegetation complexes and waterbird dependence. The Harbour City conservation area generally follows the most recent EPA System 6 Red Book conservation line which was adopted from the System 6 Green Book after consideration of public submissions and pending development approvals over the site. The System 6 Red Book Recommendation C50, which is still valid and relevant today, was reinforced by extensive assessment of the site's vegetational, hydrological and geological characteristics by the proponent which verified the adequacy of the conservation reserve as an ecosystem able to maintain ecological integrity. As such, it is considered that function of the Conservation Reserve will not result in deterioration in the ecological value of the whole Creery Marshes area.

The proponent believes that the proposed use of shallow channels to control mosquito breeding sites, as advocated by the Mosquito Control Review Committee, provides a management option with the least environmental impacts on the conservation area. The precise location and construction details of the proposed shallow channels will be further assessed prior to implementation of the mosquito control programme. This will be done in close liaison with the EPA and PIMA in order to determine a management solution which minimises negative environmental impacts.

The environmental monitoring programme procedures proposed for the Harbour City development adequately address the necessary components of the environment likely to be impacted upon by the construction and operation of the project.

This target-specific approach alleviates the necessity of collecting excessive quantities of irrelevant data which hampers the evaluation of development related impacts. This approach is favoured by the EPA and the final monitoring programme procedures and reporting requirements will be assessed by the EPA accordingly. It should be noted that monitoring and environmental performance standards feature strongly in the proponent's environmental commitments, which are likely to become conditions of approval should the proposal be considered environmentally acceptable.

With respect to waterbird monitoring, the proponent is prepared to refine aspects of the monitoring programme relating to waterbird use of the conservation reserve. The timing and structure of ongoing waterbird surveys will be formulated in liaison with relevant and state government authorities (CALM, EPA) and interest groups (RAOU).

6.3 RECOMMENDATIONS

1. That the EPA reaffirm the acceptability of the System 6 Red Book C50 Recommendation and its direct relationship to the Harbour City project.
2. That the Harbour City development line as currently described in the CER be accepted by the EPA as reflecting the area required to provide a sustainable environment solution.
3. That the proponent undertake a commitment to further assess the mosquito control programme prior to the implementation of physical control methods.
4. That the monitoring programmes outlined in the CER and added to by virtue of the response to submissions as set out in this response be accepted and approved by the EPA.

7. ROYAL AUSTRALASIAN ORNITHOLOGISTS UNION

7.1 SUMMARY OF SUBMISSION

The Royal Australasian Ornithologists Union is an organisation which focuses on birds and which promotes research, appreciation, conservation and education.

As the Creery Marshes are an important site for waterbirds and especially for trans-equatorial migrants which are the subject of international agreements, the RAOU (WA) is very concerned about the fate of the area. The project is not only adjacent to the marshes (p77, CER) but involves destruction of a considerable part of the marsh. It is noted that about 7% of the total Peel-Harvey Estuary samphire is to be destroyed by the development, and that at least one site found to be of high significance by Ninox Wildlife Consulting will be destroyed (p76, CER). The others will be changed and their future value cannot be predicted. It must be stressed that because birds do not use an area all the time does not mean that it is not of high significance to their overall survival. Also it is unlikely that use of the samphire area by night was ever checked. The original EPA System 6 Green Book Line was chosen using the best information available to that time, and all subsequent data points to the high conservation value of the Creery Marshes. Consequently, in view of the above, the RAOU (WA) would much prefer retention of the samphire area.

However, our organisation does commend the peninsular design of the proposed conservation reserve, as well as the design features such as the vermin proof fence. If the development is to proceed, we would be particularly concerned that Recommendations 43-51 (CER) be implemented at a very early stage, and that strict guidelines be laid down for the construction process so as to minimise disturbance to the habitat that is to be reserved.

It is important that the workforce be instructed appropriately and given sufficient information so that they can best protect the reserve area. This is important because the reserve certainly does not look impressive in the conventional sense. Our organisation does agree with the proponents on the need for education of the residents about how to minimise impact on the environment, and the importance of the conservation reserve. We would be prepared to assist with this aspect if requested.

The RAOU (WA) is pleased that annual reporting of waterbird use of the conservation reserve is planned. The report should be based on at least four recording sessions per year, and a minimum of three during the period when the trans-equatorial waders are present.

In view of the importance of the area for birds, the RAOU (WA) would prefer that the Department of Conservation and Land Management retain some input into the long-term management of the conservation reserve.

7.2 RESPONSE TO SUBMISSION

The proponent believes that the area proposed and the isolation and management of the Conservation Reserve area meets the obligations of international migratory waterbird

agreements. It is considered that the retention and protective measures proposed for the most productive, waterbird-utilised area will offset the loss of infrequently inundated samphire area of relatively less significance, resulting in minimal impacts to waterbird habitat.

The CER (p76) does not state in any way that a high significance waterbird site will be destroyed. We further refer you to a more specific report published by Ninnox Wildlife Consulting which is attached to this document.

The original EPA System 6 Green Book line was chosen using the best information available at that time. However the subsequent Red Book line was formulated in consideration of additional information received during the Public Review Period and supersedes the original Green Book recommendations.

The RAOU (WA)'s commendment on the proposed conservation reserve design is acknowledged and the proponent confirms that Environmental Commitments (43-51) will be implemented at an early stage in order to minimise disturbance of waterbird habitat.

Annual reporting of the Conservation Reserve's waterbird usage is acknowledged in the format indicated, and the proponent is also grateful for the organisation's offer of assistance in the preparation of educational material. CALM has now indicated that it wants to be involved in the long-term management of the Conservation and Foreshore Reserve. The proponents now also propose to relocate the Vermin Proof fence so that the entire Conservation and Foreshore Reserve area south of the projects inlet channel can be set aside and protected for conservation purposes. Additionally, the proponents now propose to fence off the entire Conservation Reserve area in conjunction with the first stage development to ensure that the public is excluded from the area and construction equipment and materials are kept from the samphire areas which are to be protected in the Conservation Reserve.

7.3 RECOMMENDATIONS

1. That the proponent fund compilation of annual reports by RAOU in conjunction with the management programme by CALM on the waterbird usage of the Conservation Reserve which takes into account recording sessions to include the presence of trans-equatorial waders.
2. That the proponent additionally commits to modifying the location of the vermin proof fence so that a greater area of land is set aside and protected and that as an interim measure, the entire Conservation Reserve be fenced at the time Stage 1 is approved at a point 10 metres south, parallel to the entire northern boundary of the Reserve and its prolongation to Wanjeep Road.

8. PIMA RESPONSE

8.1 SUMMARY OF SUBMISSION

The Waterways Commission wishes to advise that it has no objection to the proposal as outlined in the CER under the following conditions:

- 1. That all development is set back from the boundary of the Waterways Protection Precinct as defined in the Peel Inlet Management Programme 1992, and the land south of the boundary is ceded to the Crown free of all costs and encumbrances.*
- 2. That before recommending approval of the project the EPA seek expert independent advice about the water exchange model and calculations to ensure water quality in the canal estate meets acceptable standards. Particular emphasis should be placed on the need to confirm the efficiency of water exchange between the Mandurah Inlet Channel and a canal system of the length, width, configuration and orientation of the proposed development.*

The EPA should set standards to ensure problems similar to those which have arisen in Waterside Mandurah Stage 1 do not occur. These problems have arisen because accumulations of micro and macro algae and other organic material becomes trapped, rots and sinks into the sediments of the canals. During this process the stench of the rotting material causes a significant nuisance and distress to residents. It should be noted that this organic material accumulates as a result of prevailing winds, behaves as a solid and is not influenced by the water exchange described in the CER.

Water quality in the canals should not be lower than that of the adjoining entrance channel.

- 3. The approval of the proposal and associated rezoning must be conditional upon the developer, City of Mandurah and Department of Marine and Harbours entering a deed of agreement as outlined in Section 5.2.6 of DPUD Policy No. DC1.8 to provide for long-term funding of the management of the artificial waterway.*
- 4. PIMA is of the view that the proposed development layout, particularly in respect to canal widths, will result in a congested artificial waterway. Canal design must have regard to design vessel and the Policy for Jetties and Mooring Envelopes within artificial waterways (see DPUD Policy No. DC1.8 Section 6.2.4) as well as environmental factors such as water quality and the management of algal wrack and other floating debris.*
- 5. Any approval to proceed should be conditional upon the provision of a pump-out facility within the first stage of the development.*
- 6. Should the EPA find that the development may proceed, the proponent be reminded of the obligation to obtain relevant licences under the Waterways Conservation Act prior to commencement of any work on site.*

8.2 RESPONSE TO SUBMISSION

The boundary of the Waterways Protection Precinct is not consistent with the EPA's System 6 Recommendation C50 Red Book boundary and the proponent's development line. The land south of the proponent's/EPA System 6 boundary is proposed to be ceded to the Crown free of cost and encumbrance.

The release in 1979 by PIMA of its Peel Inlet Management Program made specific comment about the Harbour City Project land. A colour photocopy of the structure plan has been extracted and incorporated with this report. Extracts of the specific recommendation appended to the structure plan are as follows:

- E1 "To incorporate Creery and Channel Islands Reserve C8185 and the abutting portion of mainland to act as a buffer to proposed adjacent developments. To be a B Class Conservation of Flora and Fauna Reserve vesting in Western Australian Wildlife Authority. Water area enclosed by the islands and the mainland buffer to be aquatic reserve administered as an integral part of the reserve".
- U10 "Allow residential canal development and urban development only within the samphire flat area generally in accordance with guidelines in Section 10 and T.9".
- UC1 "Recommend early implementation of Mandurah Town by-pass Road to reduce congestion and pollution in the town and to improve the general amenity of the area by shifting through traffic away from areas under intensive pressure".

As clearly identified in the structure plan, the recommendations for a buffer zone are consistent with the Ninox Wildlife Consulting Report in that inter-tidal zone is to be reserved for preservation of waterbird habitat and shall act as a buffer to the more important waterbird habitat being the Creery Lagoon and the balance of Creery and Channel Islands. Further, the reserve proposed is almost identical to the System Six Red Book Report 1983 Conservation Area proposal and all of the studies generated independently for Government and for the proponent has supported the System Six Red Book Report proposal for a Conservation Reserve.

PIMA's proposed Waterways Protection Precinct has, unlike the Harbour City project development line, not been justified in terms of need or environmental sustainability and appears to be a relatively arbitrarily defined boundary which does not readily conform to any easily definable environment fact other than it contains all of the wet and less productive inland samphire areas but closely matches a line which reflects a changed vegetation regime.

The "PIMA" line, if accepted by the EPA, would have a significant economic impact upon the Harbour City project without greatly adding to the project's environmental sustainability.

Any suggestion that the land be ceded free of cost to the Crown will also need to be fully reassessed in economic terms but on face value, would appear to be an onerous condition given that on past experience, in other developments fronting the Peel Harvey Estuary, proponents in the main have only been required to cede 50 metres for foreshore reserve purposes. In the Harbour City project, a 130-250m wide Conservation and Foreshore

Reserve, totalling 44.8 hectares and representing 23% of the total gross area of the land is to be provided.

Clearly discussed in the response to submission, ie: the Waterways Commission Memorandum to PIMA (appended to the responses to the CER) has been an examination of the fundamental errors occurring in the Waterways Commission Memorandum. The information and site survey reports from Ninox Wildlife Consulting published in the Waterways Commission Report on the Significance of Mosquito Breeding to Waterbird Habitats 1990 has been misinterpreted and incorrect labelling of survey sites has occurred. We understand the Waterways Commission have written directly to the EPA acknowledging the errors in this report. We have requested that the Waterways Commission give a written acknowledgment that the correct factual information is contained in the supplementary Ninox Wildlife Consulting Report to BSD Consultants dated July 1992. The area of waterbird habitats as defined within map 3 of the WWC memorandum to PIMA incorporating 47.9 hectares are clearly factually incorrect when one considers the survey site plan provided by Ninox. It is clear that the inter-tidal zone is the most important area for waterbird habitat and further that the survey site areas incorporated much of the Mandurah Inlet Channel and Creery Lagoon. The WWC map 3 showed 47.9 hectares with the incorrectly labelled sites extending well into the area of the subject land. This is clearly wrong and has been acknowledged by WWC direct to EPA.

The proponents have conclusively shown the System Six Red Book Report is correct in its assessment of the high significance waterbird habitats being included in Conservation Reserve.

Extending further from the incorrect information contained in the WWC Memorandum, has been the publication of the Waterways Commission Peel Inlet Management Authority Management Program 1992 which assessment of the subject land has clearly been based on incorrect information. The judgements made by PIMA have been made in the light of incorrect environmental information particularly with regard to the waterbird habitats study conducted by Ninox Wildlife Consulting for the Waterways Commission in 1988 and 1989.

Of real concern if the PIMA line is accepted is:

- a) how will public access be controlled/managed? It is only likely to be achieved by fencing which may still permit access of feral and domestic animals given that the proponent will have no other alternative but to consider a dry lot residential subdivision over the balance of the land.
- b) Government will be responsible for upgrading and maintaining the enlarged area at a time when Government funds are extremely limited.
- c) Government will most likely be required to pay for the land, as the developer will have a claim that the Government, through the auspices of the EPA in 1982, environmentally approved the land for canal development and in 1982 defined the full extent of the Conservation and Foreshore Reserve which is reflected in Recommendation C50 - System 6 Red Book. The proponent would be justified in issuing a compensation claim against the Government if a distinct departure from previous approvals and the System Six Red Book report was entertained.

- d) It will not be possible to provide a natural isolation of the area as currently proposed in the Harbour City project and therefore the conservation area under the PIMA proposal, whilst providing a larger conservation area, is likely to be more difficult to manage with a result that it will not be as effective as the area provided in the Harbour City project. It appears that the Waterways Commission is swayed by the concept of a greater area of less controllable land to be managed by Government as opposed to a slightly reduced land area proposed in the Harbour City project but one which is fully controlled and managed at no cost to the Government.

A detailed specialist report on the marine and water quality aspects of the proposed Harbour City development was undertaken by Kinhill Riedel and Byrne (Appendix 1). This together with water quality monitoring for the Waterside Mandurah (LEC 1991a) and Port Mandurah (LEC 1991b) canal estates, indicates that water quality within the proposed Harbour City canals will be determined almost exclusively by the quality of the source (Mandurah Channel) water.

With respect to the Waterways Commission's reference to the accumulation of organic material and its solid-like behaviour as a result of prevailing winds, this is addressed in Environmental Commitment 70 which states that the Waterways Manager will immediately employ any corrective action required to maintain water quality and aesthetics to the high standard required by the proponent and Government agencies. The Waterside Mandurah Stage 1 algal problem referred to could have been averted if the Waterways Manager, namely PIMA, had acted appropriately and expeditiously. This will not be a problem in the Harbour City project as a full time, on the spot manager will be put in place to rectify any problems which may arise.

The long-term funding of the management of the artificial waterway involves contributions from the developer and canal estate landowners (Appendix 2 of CER). It is considered that the funding arrangements for the artificial waterway provide a viable management solution which will not impede the rezoning and environmental approval of the Harbour City proposal.

The proposed canal widths are entirely consistent with DPUD Policy No. DC1.8 and take into account environmental factors such as water quality and the management of algal wrack and floating debris. In this instance, the Harbour City project fully complies with the Policy. As mentioned earlier, the canal water quality is primarily governed by the source water. Algal wrack and floating debris will be regularly controlled by the Waterways Manager as previously mentioned regarding Environmental Commitment 70. The sillage pump-out facility will be constructed with the first stage of the Harbour City development and the proponent will obtain the relevant licences under the Waterways Commission Act prior to commencement of any work on site.

8.3 RECOMMENDATIONS

1. That the Harbour City development line as currently described in the CER be accepted by the EPA for the reasons set out above.
2. That if Recommendation 1 above is not accepted by the EPA, that further negotiations be undertaken with the proponent to reach an acceptable compromise.
3. That the EPA acknowledge the acceptability of the proponents "Management Entity" concept as being an appropriate long term manager of the Projects Artificial Waterways.
4. That the proponent adhere to environmental commitments 15, 16, 28, 29, 30, 31, 53, 55, 69, 70, 75, 76 and 83 regarding canal water quality and the management of algal wrack and floating debris.
5. Environmental commitment 62 be amended to read:

"The proponent will install a boat sullage pump out facility within the boat servicing component during construction of the first stage of the Harbour City development."

9. Waterways Commission Memorandum to PIMA

9.1 SUMMARY OF SUBMISSION

The PIMA submission was seven (7) pages long and has been summarised below.

The PIMA outlines the background of the Harbour City development site, including the Waterside Mandurah ERMP Stages 1 and 2, the PIMA's adoption of the Waterways Protection Precinct (similar to EPA's System 6 Green Brook Recommendation) and the EPA's System 6 Red Book Recommendation (similar to the Harbour City development line) which was a result of the EPA's "Report and Recommendations" of Waterside Mandurah ERMP (Bulletin 126, 1982).

The submission then refers to the current Harbour City development proposal by Cedar Woods Limited with reference to the 24 hectares of Samphire Marsh proposed for conservation.

The conservation significance of the project site is discussed in terms of the studies and reports which support:

EPA System 6 Green Book (1981), Kirke Report (1986), Draft Peel Inlet Management Programme (1990) and Draft Peel Regional Plan (1990);

and oppose

EPA System 6 Red Book (1983), Public Works Department Limit of Development Line (1984) and the Initial Harbour City Concept Line) PIMA's preferred Waterways Protection Precinct boundary.

International Waterbird Treaties such as the "Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat" and migratory waterbird protection agreements with Japan (JAMBA, 1981) and China (CAMBA, 1986) are also referred to. The Peel-Yalgorup System nomination for the Ramsar Convention does not include privately owned land but does include the adjoining portions of the Creery Marshes in Crown ownership which are to be conserved to the best of the Governments ability.

Specifications in the JAMBA and CAMBA Agreements require that "Each Government shall endeavour to take appropriate measures to preserve and enhance the environment of birds protected under the provisions of the Agreement. In particular it shall:

a) seek means to prevent damage to such birds and their environment.

Bird surveys on the samphire flats between November 1988 and December 1989 recorded 9 species covered by JAMBA and CAMBA while the Kirke Study undertaken in 1986 recorded 26 of these species in the Mandurah Inlet Channel Wetlands which include the subject land.

A number of EPA/Department of Conservation and Environment publications, Fisheries and Wildlife Department Waterbird Surveys, Ninox Wildlife surveys on behalf of the Waterways Commission recognise the significance of the Peel-Harvey estuarine system as an important waterbird habitat.

During the Ninox surveys a total of 62 waterbird species comprising 26,758 individual birds were identified. Three of the survey sites (Nos 25,26 and 27) are located in the area proposed for development contained 38 species representing 12% of all birds counted. The survey site areas cover 47.9 hectares and include a significant part of the Harbour City development site.

The significance of the loss of 50 hectares of seasonally inundated samphire flats has been understated in the CER and is not consistent with the results of the Ninox Wildlife report. In addition, it fails to recognise the complementary role and importance of the samphire in the estuarine ecosystem (eg productivity, nutrient recycling, ecosystem food source).

Difficulties have arisen because there is no existing mechanism to fund the long term management of artificial waterways in Western Australia. PIMA has resolved to oppose any future canal development proposal until the issue is resolved. DPUD's "Policy No DC 1.8 - Procedures for approval of artificial waterways and canal estate" provides the mechanism to deal with this issue whereby the developer, the City of Mandurah and the Department of Transport must enter a deed of agreement to provide for long term management of canal estate waters.

Cedar Woods Limited has prepared a proposal for public discussion which would involve the formation of a "Management Entity" to raise necessary funds to manage the canal system and supervise management works. The entity would include representatives of Council, landowners, PIMA, DMH and the developers. This proposal is a significant attempt by the developer to address the long term management issue which has created difficulties on other artificial waterways. However, this arrangement would create considerable difficulties if it is widely used because a separate management entity would have to be established for each artificial waterbody, placing a considerable drain on staff resources of the WWC and other government instrumentalities.

A large part of PIMA's financial and labour resources are taken up removing nuisance algae from shallow water and beaches near populated areas like Novara and Coodanup. The CER recognises that algae may be blown or drift into the canal system and outlines a number of proposal to deal with the issue.

However, the CER does not recognise that the Creery Marshes already contain large quantities of algae which can produce offensive odours during summer. At present, the presence of this algae does not create social difficulties because residential development is set well back from the waters edge and prevailing winds tend to assist in easing the problem. When this proposal is implemented, houses will be constructed within 200 metres of the Creery lagoon and located directly in the path of the south-westerly breeze.

The smells from Creery lagoon will almost certainly result in strong pressure for PIMA to undertake work to remove algae. Due to the inaccessibility of the Creery Lagoon, the use of tractors to remove algae from these areas would be most destructive to samphire and would have a significant impact on waterbird habitat. The PIMA would resist pressure to

undertake this type of work as it believes the Creery Wetlands should not be subject to mechanical disturbance.

Developments near the waterways close to Mandurah are gradually changing the appearance of the City. The Harbour City proposal will have a major impact on the view as seen to the south of the new Mandurah Traffic Bridge. This change would continue the insidious process which destroyed much of the natural values of the Swan Estuary. This is exactly the process the Chairman of the EPA has criticised the planning process of perpetuating.

9.2 RESPONSE TO SUBMISSION

The proposed Harbour City development generally adopts the EPA's System 6 Red Book Recommendation C50 as the appropriate boundary to enable the most productive and ecologically important component of the development site to be reserved for conservation purposes.

The Waterways Protection Precinct boundary outlined in Peel Inlet Management Programme (1992 - yet to be released) represents ostensibly the System 6 "Green Book" Recommendations. It is important to stress that:

- a) The PIMA line is one of a number of different development lines which exist. The CER correctly defines all of these, and concludes that the System 6 Red Book line is the most appropriate development line as it affects the Project Land.
- b) Appropriate wording exists in the PIMA document to allow variations to occur as part of the formal assessment of this CER. Therefore there is no strict need to comply with the PIMA line if the ecological values of the samphire can be protected by some other, equally appropriate line (eg System 6 Red Book line).
- (c) The System 6 Red Book is the pre-eminent document and in discussions with EPA staff, it is clear that there is an expectation that the System 6 Red Book recommendation C50 is the preferred minimum standard for the protection of samphire areas.

The PIMA submission incorrectly states that the samphire marsh proposed for conservation purposes only amounts to 24 hectares. In reality, the Harbour City development concept involves the reservation of 44.8 hectares of samphire marsh for conservation purposes.

The conservation significance of the samphire marsh is well documented in the CER and justification for adopting the proposed Conservation and Foreshore Reserves area is based on sound ecological understanding of the requirements necessary to manage and maintain a viable conservation area for the long term sustainability of its inherent wildlife.

The proponent recognises the importance of Creery Marshes as a regional waterbird habitat and as stated in the JAMBA and CAMBA agreements is "taking measures for the management and protection of the migratory birds and their environment." This and other agreement criteria will be achieved with the establishment of a managed sanctuary to preserve and enhance the current unmanaged, degraded samphire environment.

Although the privately owned site is not subject to Ramsar obligations, through State Government Policy initiatives most of the conservation considerations and objectives of the Convention have been properly met by the proposed isolation and management of the area most utilised by migratory birds. The proposal is to cede to the Crown the most used habitat area (ie. Conservation and Foreshore Reserves) in accordance with the EPA's System 6 Recommendation C50 which will then be bound by the terms of the Ramsar Convention.

The proponent does not dispute the significance of the Harbour City development site as a waterbird habitat as indicated by Ninox survey sites 25,26 and 27 which contained 12% of all birds counted. The Waterways Commission Memorandum also suggests that the three survey site areas cover 49.7 hectares and include a significant part of the Harbour City development site. It should be noted that the majority of the survey site area will be contained in the proposed Conservation and Foreshore Reserves area to be protected and managed to the benefit of waterbird populations.

It is clear from subsequent meetings with WWC and tabling of the latest Ninox Wildlife Consulting Report, that WWC are in agreement with the most recent information supplied by Ninox in relation to their 1988 and 1989 waterbird habitat site survey. In the first instance, the WWC Memo contains map 3 which incorrectly labels Site 25 transposing it with Site 27. Therefore an intermediate significance site has been transposed with a high conservation significance site, this error is acknowledged by WWC in writing direct to EPA.

A separate discussion of the WWC Memo has been included in the supplementary report on Resolution of the Waterbird Habitat Conflict included with this document.

However, it is very clear that the 47.9 hectare area defined by WWC and shown on map 3 is factually incorrect and survey sites have been very loosely plotted onto a small scale plan and very little concurrence with the correct information provided by Ninox is apparent. It is clear that over 45% of these waterbird significant survey sites are within Creery Lagoon and the Mandurah Inlet Channel, those sites that are within the subject land have in the majority been encapsulated in the Conservation Reserve and the Foreshore Reserve. The information provided by WWC is fundamentally erroneous and has resulted in judgements being formed by PIMA which in reality have relied upon incorrect information. This has also affected the January 1992 publication of the Peel Inlet Management Authority Management Program.

According to WWC the significance of the loss of seasonally inundated samphire flats calculated by WWC to be 50 hectares has been acknowledged in the CER. A review of this aspect by BSD Consultants relying on current aerial photographs suggests that the Harbour City proposal actually involves the loss of only 36 hectares of seasonally inundated samphire. Ninox Wildlife Surveys provide a valuable insight into waterbird usage of the Harbour City development site and the Peel-Harvey system in general. However, it would be inconceivable for the proposed development to adopt an arbitrary development line based on incorrect WWC information in preference to the widely recognised and more accurately defined development line contained in Recommendation C50 of the EPA's System 6 Red Book.

The significance of the samphire flat in terms of its contribution as a nutrient sink, biological filter and faunal habitat are referred to in Section 10.6.1.11 of the CER, however, a detailed assessment was not undertaken within the scope of the CER as it was considered unnecessary. This point is generally acknowledged by the lack of specificity contained in the EPA's Guidelines.

The proponent spent considerable time in researching and developing a management system to satisfy both State and Local Government authorities and believes a viable long term management solution for the Harbour City Canal Estate proposal has been achieved. Esplanade (Mandurah) Pty Ltd considers its lead role in defining an equitable long term management solution will streamline future artificial waterways management by providing a sensible approach which prospective waterway managers can easily adopt to their particular development. A separate document on management has been attached to this report.

Subject to government accepting the independent Management Entity approach as proposed by the proponents, it is clear that if the concept is extended to other projects that the concerns raised by PIMA could be easily managed by:

- a) arranging all Management Entity meetings for the various projects where such is agreed, on a single day with agreed time slots so that a time managed solution is promoted; and
- b) reviewing the operation of the "Management Entity" approach after say a 2 year operation to gauge whether a "changed operation" is necessary or in fact desirable.

Given that government and local government each want to reduce their respective management roles and financial responsibilities, it is important to recognise that the proponents long term management solution provides a real alternative which should be accepted by the whole Government.

The problem of removing nuisance algae from the Peel Harvey Estuary is a task which utilises PIMA's financial and labour based resources. The proponent believes that the algal problems and subsequent mechanical control measures referred to by PIMA are unlikely to eventuate due to consideration of the following:

Short term (1-3 years)

1. The Harbour City proposal is a staged development with initial stages far removed from the algal problems associated with the Creery lagoon and Creery island.

Longer term (4-15 years)

2. The Dawesville Channel, dredging of the Mandurah Channel and apparent reductions in nutrient loads in the Peel Harvey catchment will significantly improve water quality in the estuary, thereby reducing the occurrence and/or duration of algal blooms.

In view of these developments, it is unlikely that the concerns raised by PIMA will eventuate in the future evidenced by the best available technical data.

The visual impact of the proposed Harbour City development will be managed with the provision of functional buffer zones, landscaping amenity and the retention of 23% of natural fringing vegetation on the development site within the proposed Conservation and Foreshore Reserve. It is expected that the growth of landscaping and establishment of vegetation in domestic gardens will further blend the proposed development into the background environment.

Further, the arguments raised about the views to the south of the Mandurah Traffic Bridge are questionable. In the first instance, vehicles travelling at 80 km/hr traverse the bridge in approximately 8 seconds and this is regarded as a limited viewshed. Secondly, the Traffic Bridge has a walkway on its northern side which has a 3m high concrete span blocking any views to the subject land.

Notwithstanding these facts, it should be further acknowledged that the Harbour City Project site has previously had an environmental approval which is technically still current today. We are therefore not dealing with a "green fields" site that is for the very first time now being considered for canal development purposes.

In regard to the processes which destroyed much of the natural values of the Swan Estuary referred to by the Chairman of the EPA, the proponent believes that the natural values associated with the development site will be retained and form an integral part of the Harbour City proposal. It is important to stress that the Harbour City project is environmentally sustainable and is making a considerable contribution to the protection of the natural environment. We believe therefore that PIMA's comments in this respect are unfounded.

9.3 RECOMMENDATIONS

1. That the EPA acknowledge that the proponents, in reviewing the various studies and surveys culminating in a wide variation of possible development lines have properly assessed the available information and have concluded in the CER with the fact that notwithstanding all these lines, that what is recommended in the CER takes into account the natural values of the environment and protection of the most valuable waterbird habitat, especially with consideration of the more recent report from Ninox.
2. That whilst the CER acknowledges the general importance of the seasonally inundated samphire areas as a bird breeding area, surveys undertaken by Mike Bamford and Ninox as part of the CER consultancy suggested that the area did not constitute a highly significant waterbird habitat and reflected only opportunistic use by waterbirds during irregular seasonal flooding.
3. That the EPA acknowledge the disruptive error contained within the PIMA submission stating that the Harbour City project was only ceding 24 hectares of samphire marsh, when in fact, 44.8 hectares is proposed. Furthermore, this gross error appears in turn to accentuate other points made in the submission, including incorrect labelling of sites and extremely misleading plotting of waterbird habitat survey site areas..

4. That the EPA support the proponents long term management approach for the artificial waterways management, as set out in the CER and should it be utilised in other future projects, that the responsible agencies involved in the process develop a suitable modus operandi.
5. That the EPA acknowledge the significant environment advantages which will result from:
 - a) the Dawesville Cut; and
 - b) clearance of the sandbar at the Estuary mouthwhich will:
 - i) improve the overall water quality in the Peel Harvey Estuary;
 - ii) potentially reduce the occurrence of algal blooms and its associated problems.
6. Recognising that the proponent is committed to providing a high standard development which will maximise the project blending into the surrounding development with appropriate landscape design and buffers and as such is considered to be a more acceptable development in environmental and aesthetic terms.
7. That the EPA acknowledge that the overall effect of providing a peninsular design Conservation Reserve with proper vesting and management funding, limited access to all parties and vermin-proof fencing; represents a significant upgrading of the overall value of the subject land as a waterbird habitat.
8. The creation of the Conservation Reserve as described in (7) above is an appropriate method by which to create a natural bird sanctuary to be preserved in perpetuity as a Community Resource.

Appendix 2
Proponent's list of commitments

12 ENVIRONMENTAL COMMITMENTS

The proponent will undertake to abide by all commitments made in this document for the management of the proposed Harbour City development. With respect to environmental performance, the project will be operated and maintained in accordance with the guidelines established in the three management programmes detailed in Section 11 of this report. The proponent seeks environmental approval for the whole Harbour City Project and it is intended, as outlined in Construction Details (Section 4.5.1), to follow a staged development approach designed to address environmental, economic and market driven factors. The environmental commitments listed below apply progressively to each stage of the project and will be incorporated into the Project Agreement to be established between the proponent, State and the City of Mandurah.

The commitments have been categorised into:

Pre-construction

During construction

Post-construction

and are numbered individually for easy reference and auditing purposes.

12.1 Pre-Construction

- (1) Final details of canal construction methods and timing will be agreed with the EPA and PIMA for licencing prior to implementation.
- (2) Further soil surveys will be carried out prior to construction. Cut and fill operations for site earthworks will be monitored and an engineering construction programme relating to cut and fill operations and import and export of fill will be provided to the satisfaction of the City of Mandurah and EPA.
- (3) The proponent will further consult with WAWA and the City of Mandurah to determine groundwater usage (to be drawn from the Leederville Formation) within the development.
- (4) Prior to construction commencing on each stage, baseline monitoring of groundwater will include:

- an initial survey of local domestic bores and any WAWA or City of Mandurah bores in the vicinity of the subject land;
 - establishment of a series of observation bores to supplement areas where existing groundwater bores are not available;
 - quarterly monitoring of salinity and water levels within observation and domestic bores for up to 12 months prior to construction; and
 - observation of the position of the saltwater/freshwater interface.
- (5) The detailed design and construction of the drainage system will be carried out to the satisfaction of the City of Mandurah.
- (6) The construction and operational workforce will be drawn from the Mandurah region.
- (7) The proponent will comply with the provisions of the *Aboriginal Heritage Act 1972-1980*.
- (8) High visual amenity will be provided in the design of the development.(11)All residential and commercial land within the proposed development will be filled to a minimum floor level of 2.5m AHD.
- (9) Currently the proponent is investigating a series of barrier systems to prevent algal blooms entering the canal waterways. This research will include investigation of the feasibility of an air jet barrier system.
- (10) The design building level for residential and commercial development within the canal estate will be set at 2.5m AHD to accommodate high water levels associated with the potential Greenhouse Effect and flood events.

12.2 During Construction

- (11) Throughout the During Construction phase in each Stage, the proponent will submit a report every 3 months to the EPA identifying those environmental commitments adhered to during this period.
- (12) All residential and commercial land within the proposed development will be filled to a minimum floor level of 2.5m AHD.
- (14) The canal waterways will be excavated to a depth of -2.7m AHD.

- (15) Excavation and dredging of the canal waterways will be undertaken in a closed system to prevent turbid water from entering the Mandurah Channel.
- (16) Excavation of the canal waterways will be accomplished using conventional land-based earthmoving equipment wherever possible. Bank slopes will be placed at gradients of 1:4 to ensure stability of the adjacent land areas. The entrance will be excavated using standard earthworking equipment and if necessary a floating cutter-suction dredge or an approved equivalent.

Dewatering

- (16) Dewatering fluids will be pumped to settling ponds to remove suspended solids prior to discharge to the Mandurah Channel via controlled drainage lines. Dewatering fluids will not be discharge into the samphire flats of the conservation and foreshore reserves.
- (17) Domestic groundwater bores in the vicinity will be monitored during dewatering operations to determine whether any lowering of groundwater levels occurs. Should domestic bores run dry as a result of the dewatering on the subject land, the proponent will fund excess water bills for the irrigation of affected gardens from the Mains supply until such time as the aquifer is restored.
- (18) Reinforced concrete retaining walls will be constructed to provide stability for waterfront lots.
- (19) The sides of the entrance canal will be stabilised with limestone breakwaters.
- (20) The canal wall abutting the conservation reserve and boulevard style road will be stabilised with limestone rock pitching.
- (21) The proponent will undertake any dredging or other works necessary to maintain navigable depth in the canal waterways during the operational period.
- (22) The level of ground vibration in the vicinity of construction activity and in adjacent residential areas will be monitored, particularly at the commencement of works, to set parameters and modify work patterns and equipment types if necessary.

- (23) Construction traffic will access the subject land from Mandurah Bypass Road.
- (24) Working hours will be restricted to between 7.00 am and 6.00 pm Monday to Saturday in accordance with approvals to be granted by the City of Mandurah in order to minimise disturbance to residents.
- (25) Dust emissions will be monitored. If a dust nuisance is detected, then the necessary watering or mulching of exposed surfaces will be undertaken to alleviate the problem.
- (26) Liaison with the City of Mandurah will ensure that construction noise, traffic, vibration and dust emissions do not create excessive disturbance to local residents. Management techniques and modified work patterns will be adopted if necessary.
- (27) The development will be provided with reticulated scheme water.
- (28) All drainage discharging into the canal waterways (from roads and other paved surfaces, boat ramps and boat servicing area) will be passed through suitable grease/silt traps to remove any contaminants. The drainage traps will be regularly serviced to ensure effective trapping of contaminants.
- (29) Canal lots will be graded downwards towards the waterways with a porous spoon drain provided above an agricultural drain adjacent to a walkway parallel to the canal walls to prevent direct discharge to the canal waterways and provide for groundwater infiltration.
- (30) In private lots, provision shall be made for a drainage trap with an overflow pipe directly to the canal waterway to provide for individual owners piping roof water direct to canals. This will be a closed system for roof water only. Other runoff from lots, ie paths, lawns and gardens, shall be drained into soakwells onsite.
- (31) Adequate clearance between culvert and bridge soffits and the water surface will be provided to allow any wind blown debris to pass through and minimise restriction of wind driven water circulation.
- (32) The sides of the culverts and bridges will extend to the full depth of the canals to avoid restriction of density driven currents which will provide significant mixing and flushing of canal waters.

- (33) The development will be provided with a reticulated sewerage system which will be designed and constructed in accordance with WAWA requirements, including inbuilt safeguards to prevent the input of sewage effluent to the waterways in the event of system failure.
 - (34) The access points to the subject land will be fenced and appropriately signposted during construction.
 - (35) All roads and pathways created within the development will be designed and constructed to Main Roads Department standards.
 - (36) The detailed design of the land based components of the development will retain as many existing trees as possible.
 - (37) The minimal channelling techniques recommended by the Mosquito Control Review Committee (Chester and Klemm 1990) will be utilised in the conservation reserve to minimise disturbance to samphire whilst creating greater areas of tidally inundated samphire habitat.
 - (38) Landscaping of the development will utilise indigenous and/or salt tolerant vegetation wherever practical to reduce the impact of habitat loss.
 - (39) Stands of existing trees will be retained within the development wherever possible.
 - (40) Public open space areas and streetscapes will be landscaped with indigenous flora and/or salt tolerant species.
 - (41) The Mandurah Bypass Road frontage will be landscaped with a dense buffer of native trees.
 - (42) The conservation reserve will be separated from residential development by a canal waterway with a limestone rock pitched treatment along the reserve edge to prevent boat landings.
 - (43) Planted groups of indigenous trees will be provided along the edge of the conservation reserve to screen the conservation reserve from the development to reduce night-time light spill into the reserve.
- Excavation and Dredging
- (44) A fence to prohibit public access and domestic pets or vermin will be constructed across the peninsula connecting the conservation reserve to the south-eastern corner of the subject land.

- (45) Appropriate signage explaining the purpose of the conservation reserve would also be erected at this point.
- (46) Public access to the foreshore reserve from boats will be discouraged by providing a limestone rock pitched edge along the canal waterway on the north side.
- (47) Weed growth will be removed from the conservation reserve to enable recolonisation of affected areas by samphire.
- (48) Clumps of *Casuarina obesa* and *Melaleuca raphiophylla* will be planted along the wall edge of the conservation reserve to provide visual amenity and shelter, screening and perches for waterbirds.
- (49) The trunks and main branches of several of the trees to be cleared from the canal estate development area will be placed in the conservation reserve to provide perching places for waterbirds.
- (50) All rubbish will be removed from the conservation area and wheel ruts will be filled and levelled.
- (51) It is proposed to dig shallow channels extending inland from the Peel Inlet shoreline into the conservation reserve to increase tidal inundation and drainage of the samphire flats in order to reduce the mosquito breeding characteristics of the conservation reserve and improve the value of the site to waterbirds, particularly during the summer months. Any such channels would be undertaken to the requirements of the Mosquito Control Review Committee, PIMA and the EPA.
- (52) The following mosquito management options are proposed within the development area of the subject land:
- site filling to remove existing breeding sites; and
 - land contouring and drainage system design to ensure that new breeding sites are not created within the development.
- (53) The limestone breakwaters at the entrance to the Mandurah Channel will be aligned to collect any floating algal wrack that may enter the canals. Algae accumulating along the foreshore, on the entrance canal breakwaters or within the canals will be manually removed and disposed of off site.

- (54) During construction, groundwater monitoring data will be obtained and assessed according to WAWA and EPA requirements and a report prepared for submission to these authorities.
- (55) Measurement of flushing will be conducted for each stage of the canals following construction.
- (56) Dual-use pathways will be provided along the foreshore reserve and through the development to link various components of the development.
- (57) Public parking areas will be provided to enable public access to the foreshore, public open space areas and boating and commercial facilities.
- (58) Navigation aids will be provided to the satisfaction of the Department of Marine and Harbours within and adjacent to the canal waterways.
- (59) A two lane public boat ramp and parking facilities for car and trailer parking will be provided.
- (60) Public parking areas will be provided at the boat ramp and within the commercial centre, shopping area and resort hotel complex.
- (61) Boating facilities will include:
- pens within Mariners Cove adjacent to the commercial centre for temporary and permanent mooring of boats plus associated boat servicing requirements;
 - boat chandlery and servicing area; and
 - boat fuelling facilities.
- (62) The proponent will install a boat sullage pump-out facility within the boat servicing component of the Harbour City development.
- (63) Signs will be provided at the public boat ramp and at the boat servicing area, providing information about minimum size of catchable fish and crustacean sizes, bag limits and net requirements.
- (64) Any waste material generated during construction will be disposed of at the Mandurah landfill site in accordance with standard City of Mandurah requirements.
- (65) Physical opening of the canal system to the Mandurah Channel will occur when the two water bodies are at the same level and assisted by flow controlled pipe links until water levels are equal.

- (66) A Landscape Master Plan for the Project land will be developed and implemented by the proponent for an operational period of one year, following which responsibility will be with the Management Entity proposed to manage the entire development (Appendix 2). Maintenance of landscaping during this time will include mowing, weed removal, irrigation and replacement of dead plants.

12.3 Post-Construction

- (67) During the first 5 years of the Post-Construction phase, the Management Entity will submit annual reports to the EPA outlining adherence to environmental commitments. After this 5 year period, triennial reports compiled by the Management Entity will be submitted to the EPA in order to assess on-going compliance with environmental commitments.
- (68) Groundwater bores will be prohibited in both canal and dry lots of the development.
- (69) With respect to the constraints imposed by the quality of the source water (Mandurah Channel), water quality within the canals will be maintained to meet the criteria set down in Schedules 2,5,7,8, and 1 of Bulletin 103 (DCE 1981).
- (70) The canal waterways will be inspected regularly by the Waterways Manager and any corrective action required to maintain water quality and aesthetics to the high standard required by the proponent and Government agencies will be implemented immediately.
- (71) The canals will be surveyed upon completion to ensure that they conform to the design depth. Additional surveys will be conducted after the first, third and fifth years of operation of each stage to determine whether sedimentation of the canals has occurred.
- (72) An educational brochure will be distributed to all landowners containing information about landscaping and fertiliser usage as well as drainage management with the aim of minimising nutrient input to individual lots and therefore the waterways.

- (73) Information regarding mosquito populations within the Mandurah region and the health implications with respect to Ross River Virus will be provided to landowners and prospective buyers in the form of a pamphlet which has been developed by the Health Department.
- (74) During marketing of the estate, the developer will ensure that all land owners are advised of the importance of the conservation reserve and their consequent responsibility to ensure its protection.
- (75) Water quality within each stage of the canals will be monitored for three years in accordance with the programme described in Section 11.5.7.3, commencing at the time the canals are permanently connected to the Mandurah Channel or adjoining stage. Following three years of monitoring, the programme will be subject to review. The parameters to be monitored include:
- chlorophyll 'a' (surface and 0.5m from bottom of water);
 - dissolved oxygen (surface and 0.5m from bottom of water);
 - orthophosphate (surface and 0.5m from bottom of water);
 - inorganic nitrogen (surface and 0.5m from bottom of water);
- (76) Water quality monitoring will be undertaken in conjunction with the existing programme for Port Mandurah Stage 1.
- (77) Following construction of each stage, groundwater monitoring in the vicinity will include:
- quarterly monitoring of salinity and water levels within observation and domestic bores for one year;
 - biannual monitoring of salinity and water levels within observation and domestic bores for a further two years; and
 - observation of the new position of the saltwater/freshwater interface.
- (78) Groundwater monitoring results will be reported on an annual basis and the programme for each stage will be subject to review following three years of operation.
- (79) Canal sediments will be monitored on an annual basis for three years prior to review. The parameters to be monitored are as follows:

- pesticides in the vicinity of stormwater drainage discharge pipes following the first winter rains;
 - petroleum hydrocarbons in the vicinity of the boat ramp and boat servicing facilities in summer when boat usage is at a maximum; and
 - heavy metals (copper, zinc, cadmium, tin, lead and chromium) in the Mariners Cove complex where boat usage will be most concentrated.
- (80) The stability of the foreshore and entrance canal at the confluence of the canal waterways with the Mandurah Channel will be monitored by site inspection on an annual basis.
- (81) The condition of the canal walls including the rock pitched treatment along the boundary of the conservation reserve and the entrance canal breakwaters will be monitored by site inspection on an annual basis.
- (82) Canal wall and channel stability monitoring programmes will be developed and will commence within one month of practical completion of each stage and continue for five years.
- (83) Contingency plans for potential water quality problems associated with fuel and oil spills or algal blooms, maintenance of navigable waterways, restoration of storm or flood damage and operation of the stormwater drainage and sewerage systems will be documented in an Emergency Procedures Manual.
- (84) In the event that extreme storm or flood events cause damage to the foreshore and conservation reserves, funds will be available via the Management Entity/Waterways Manager to ensure repairs and maintenance can be undertaken if required.

FURTHER COMMITMENTS TO THOSE ALREADY LISTED IN THE CONSULTATIVE ENVIRONMENTAL REVIEW

- Study of terrestrial animals
- Removal of all existing vegetation where necessary from site during construction phase to prevent re-release of biomass nutrients.
- Education program to increase public awareness on the role of samphire vegetation in the estuarine environment.
- Formulation of an education brochure and positioning of signage for wetlands protection and waterbird habitat protection.
- Additional computer modelling of canal flushing and water quality by Kinhill Riedell and Byrne prior to construction of Stage I.
- Establish a committee prior to construction commencing with one representative each of the City of Mandurah, CALM, RAOU, PIMA, the Developer and Ninox Wildlife Consulting to devise a practical waterbird research program and appropriate funding levels.
- Developer to re-adjust all domestic bores surrounding subdivision upon final construction of all stages.

20. Development should not Proceed until a Referendum on Canal Development has been Undertaken (2)

20.1 SUMMARY OF SUBMISSIONS

The Mandurah City Council has had a policy for the last 5-6 years that no rezoning of land would be initiated to incorporate canals without a referendum of all the ratepayers within the City being undertaken first. This policy should be applied to this development proposal.

20.2 RESPONSE TO SUBMISSIONS

The City of Mandurah has recently resolved to require a referendum after finalisation of the various planning and environmental processes. This is obviously a sensitive matter, however, it is stressed that the public has a number of opportunities namely during the rezoning and environmental processes to make submissions. This is not a consideration for the Environmental Process.

20.3 RECOMMENDATION

That the submission be dismissed as it is a matter for the City of Mandurah to consider.

21. City of Mandurah is Unsuitable to take over role of "Waterways Manager" (2)
--

21.1 SUMMARY OF SUBMISSIONS

The City of Mandurah is a local authority with no expertise in waterway management and is therefore unsuitable for this role.

21.2 RESPONSE TO SUBMISSIONS

The management system which is proposed to be applied to the Harbour City Estate will involve the "Management Entity" in being responsible for the day to day management of the artificial waterways under the direct control of the Local Authority.

Notwithstanding this, the State Government has argued that Local Authorities should be held financially responsible for the management of artificial waterways and that such management be a collective between a Local Authority, Department of Marine and Harbours, PIMA etc.

The proposed Management Entity will have representation from the City of Mandurah, PIMA, Marine and Harbours etc and therefore, the "best of both worlds" will occur within the Harbour City project. A separate submission on the Management Structure and Funding has been presented to the EPA with this document.

21.3 RECOMMENDATION

That the submission be dismissed as the developer has given undertakings that address the matters raised.

22. Development is Contrary to Motion passed by Mandurah City Council in April 1990 that no Canal Development in this Area Should Proceed (9)
--

22.1 SUMMARY OF SUBMISSIONS

City of Mandurah passed a resolution in 1990 to have the land included within the proposed development resumed as a regional park. Proposed development is contrary to this resolution.

22.2 RESPONSE TO SUBMISSIONS

This resolution is not binding on the proponent as the proponent has submitted a fresh application to the City of Mandurah which the Council has in turn agreed to support and to initiate the rezoning and environmental processes.

22.3 RECOMMENDATION

That the submission be dismissed as it is not a matter relevant to the consideration of the CER given that the City of Mandurah has resolved to initiate the rezoning process.

23. Impact of Flooding as a Result of Greenhouse Effect is not Adequately Considered (10)
--

23.1 SUMMARY OF SUBMISSIONS

Increase in sea levels may permanently flood the low lying proposed foreshore reserves. The foreshore reserve as described within the CER does not make allowances for this. If the proposal does proceed, an area of higher land should be included within the reserve to provide an adequate resource for waterbirds in the future.

23.3 RESPONSE TO SUBMISSIONS

To date, there is no convincing evidence that Relative Sea Level is rising on a global scale. The world scientific community is at present engaged in extensive research in order to determine more precisely the effects of the accumulation of greenhouse gases. Until confident predictions of sea level and climatic change are available, the proponent believes it is appropriate to design canal structures which allow for a sea level rise of approximately 30 cms.

The Foreshore and Conservation Reserves range from 0.0 to 1.0m above AHD (ie mean sea level) . Assuming sea level rise of 30cms it is likely that approximately 40% of the Conservation Reserve and 30% of the Foreshore Reserve will be inundated for 50% of the time. This would result in 27.2 hectares of the total Reserve area being available for bird utilisation and therefore the need of additional reserve area on higher ground is not necessary.

23.3 RECOMMENDATION

That the submission be dismissed as the CER properly determines the known affects of the Greenhouse Effect on the Harbour City project.

24. Employment Benefits of the Development Proposal are only Temporary (2)

24.1 SUMMARY OF SUBMISSIONS

Employment benefits of the development proposal are only temporary.

24.2 RESPONSE TO SUBMISSIONS

The employment benefits of the development proposal involves the temporary employment of approximately 550 people per annum during the pre-construction and construction period as well as permanent employment for 400 people during the post operation period. These figures do not accommodate the multiplier effect of new residents in the local economy.

Contractors employing tradesmen and machinery operators for construction of canals will be instructed that wherever possible, local labour is to be given employment priority. A large number of locals were employed on the Port Mandurah project. Local building companies have been responsible for 70% of housing construction to date at Port Mandurah.

The multiplier effect throughout the local economy is predicted at 28% which flow-on will be considerable to building and landscape suppliers, local tradesmen and service companies, designers, architects, jetty construction and boating supplies. Additionally, 1,250 potential households will each introduce approximately \$12,000 per house per annum consumer goods spending.

The proponent is committed to drawing the workforce from the local community where possible and envisages the project will constantly create employment on an ongoing basis.

24.3 RECOMMENDATIONS

1. That the submission be dismissed as the Harbour City development, once approved, will alleviate some of the social problems associated with Mandurah's high unemployment rate.
2. That the proponent be required to commit to employ locally whenever possible and within reason to fill places in the construction team.

25. Inadequate Assessment of Alternative Sites/No Development Option (3)

25.1 SUMMARY OF SUBMISSIONS

The proponent's assessment of viable alternatives and "no development" option have not been adequately considered and the CER reads as an advocacy document for the development proposal.

25.2 RESPONSE TO SUBMISSIONS

The assessment of the alternatives, including the "no development" option, was considered according to EPA guidelines and the proponent considers that available options were adequately covered given the scope and nature of the development proposal.

Advocacy for the Harbour City proposal was ascertained upon evaluation of the opportunities and constraints of various alternatives which in the final analysis justified the preferred option. This was considered to be a reasonable approach given the site previously has an EPA approval for a canals development.

25.3 RECOMMENDATION

That the submission be dismissed as it does not have regard to the matters set out in the CER or the fact that the EPA has previously approved an ERMP for a similar development on the land.

26. Impact on Fisheries within Estuary (13)

26.1 SUMMARY OF SUBMISSIONS

A major source of the fishery food chain will be destroyed as small animals, insects and plant matter washed from the samphire area provides an important food source for adjacent fish nursery grounds in the Estuary.

26.2 RESPONSE TO SUBMISSIONS

The most productive samphire area will be retained as a Conservation Reserve and continue its ecological function as a food source for fisheries. It has been revealed in fish population monitoring that the canals provide a valuable habitat for juvenile fish species which find refuge from predation in the protected waterways. This harbouring effect is expected to contribute toward increasing adult fish populations to the benefit of commercial and recreational fishing purposes as well as the estuarine ecosystem.

26.3 RECOMMENDATION

That the submission be set aside as recent monitoring of canal estates has indicated that juvenile fish have found protection in canal environs and the most productive areas of samphire marsh in the inter-tidal zone are to be retained.

27. Impact on Aboriginal Sites (1)

27.1 SUMMARY OF SUBMISSION

Site of the proposed development may contain Aboriginal sites including graves and camping sites important to Aboriginal people living in the area before European colonisation.

27.2 RESPONSE TO SUBMISSION

According to the Department of Aboriginal Sites there does not appear to be any recorded archaeological or ethnographical sites of significance on the proposed development site. Nevertheless, the proponent will undertake all relevant surveys and submit appropriate findings to the Department prior to commencing construction works on the Harbour City project site.

27.3 RECOMMENDATION

1. That the submission be received and noted.
2. Commitment No 7 requires the proponent to comply with the provisions of the Aboriginal Heritage Act 1972-1980.

28. Long Term Management Issues Inadequately Addressed (1)

28.1 SUMMARY OF SUBMISSION

The "Management Entity" as described within the CER does not provide enough detail or adequately address the long term management of the estate and adjacent canals. Issues such as water quality monitoring, on-going land management and involvement by resident members of the proposed estate needs to be addressed in more detail.

Procedures for monitoring wildlife as described in the CER are also considered to be superficial and insufficient. The proponents should be required to monitor the effects of the proposal on wildlife within the area, including a wide range of environmental parameters, for a minimum of 10 years.

28.2 RESPONSE TO SUBMISSION

The "Management Entity" comprises of representatives from the City of Mandurah, Department of Marine and Harbours, Peel Inlet Management Authority, the Developer and Canal Estate Landowners. The proponent spent considerable time in researching and developing a management system to satisfy both State and Local Government Authorities and believes a viable long term management solution for the Harbour City Canal Estate proposal has been achieved.

The water quality monitoring programme is designed to focus on the time of year most prone to poor water quality and target the aspect of the proposed Harbour City development most likely to produce adverse environmental impacts should they arise. The monitoring results will be compared with the relevant standards in order to assess the longer term environmental/hygienic performance of the Harbour City canals. This approach of canal water quality monitoring is supported by the EPA who will make recommendations and/or place conditions on the precise nature of the monitoring programme.

The ongoing land management is similar to most subdivisions in that it requires the City of Mandurah to manage the Public Open Space areas of the development. The management of the Conservation Reserve will draw upon the expertise of various government authorities and interest groups (CALM, PIMA, EPA, RAOU) who have offered their knowledge to assist in the development of a suitable management plan.

The monitoring of wildlife waterbirds and other small mammals and reptiles will be undertaken as part of an additional pre-construction study which the proponent has agreed as an additional commitment. It is expected that such a study will be completed with a 1 year survey being undertaken within 12 months of the first stage project construction commencing, followed by a second survey 5 years thereafter. The results of the surveys are to be forwarded to CALM and the EPA for each Agency's information and guidance.

28.3 RECOMMENDATIONS

1. That the points made in the submission regarding wildlife monitoring be noted.
2. That the proponent be required to commit to undertaking wildlife surveys as part of the environmental monitoring programme.
3. That the funding for the environmental monitoring programme be provided for by the "Management Entity's" Reserve Fund.
4. That the commitment by the proponent as part of the Management Entity to funding of the RAOU annual surveys and further research in the Conservation Reserve be recognised.

29. Inadequate Details of Boat Service Facilities (9)

29.1 SUMMARY OF SUBMISSIONS

Details including sullage pump out facilities, boat launching ramps, navigation channels, width of canals and mooring layouts have not been adequately addressed in the CER.

29.2 RESPONSE TO SUBMISSIONS

Sullage pump out facilities and width of canal are illustrated on Figure 4 and navigable channels, mooring layouts and boat ramps are discussed in Section 4.3 and 4.4 of the CER respectively. A more detailed layout will be submitted as part of the final subdivision design by the proponent.

Adequate information has been prepared to allow the rezoning and environmental processes to be completed and relevant development conditions determined.

29.3 RECOMMENDATIONS

1. That the submission be dismissed.
2. That the proponent details the location and design specifications of the fuel supplies, sullage pump out facilities and boat launching ramps, to the satisfaction of the EPA, prior to the commencement of construction of Stage 1 of the proposal.

30. Construction Impacts Inadequately Assessed (19)

30.1 SUMMARY OF SUBMISSIONS

Details including dewatering techniques, timing of earthworks, dust control and possible blasting operations have not been adequately addressed within the CER. For example, no details are included which describe the discharge of water as a result of dewatering activities, supposedly into the Estuary and consequent impact on Estuary water quality (turbidity plumes etc.). There is also no discussion on the location of silt ponds for the settlement of water prior to discharge into the Estuary. This issue is particularly important in view of the staged construction timetable.

30.2 RESPONSE TO SUBMISSIONS

The proponent considers that the construction impacts have been addressed in adequate detail as outlined in the EPA Guidelines.

Dewatering techniques were generally described in Section 4.5.2.1 with potential impacts examined in Section 11.4 of the CER. As also mentioned in the CER (page 21) the manner and timing of discharge waters will be carried out to the satisfaction of the EPA and PIMA.

The timing of earthworks is largely dependent upon the environmental and planning approval processes. Canal excavation will take place in a closed system (page 84) and hence turbid water will be contained.

Dust control in the form of stabilisation by dust suppressing agents has been addressed in the CER (page 22) in a manner consistent with the nature of the earthworks and its relationship with the surrounding environment.

The possibility of blasting operations is yet to be determined. The proponent will employ up-to-date soil removing techniques and has a clear preference for removal by machinery with dewatering. The proponent has previously demonstrated the successful management of excavation and dewatering during construction of Port Mandurah Canal Estate Stage 1. The same environmentally responsible approach will be adopted to the construction of the proposed Harbour City Canals development to ensure construction related impacts are minimised. It is highly unlikely that any application for approval of blasting would be subsequently lodged with the EPA.

30.3 RECOMMENDATION

That the submission be noted and as the matters referred to are more related to the development phase the proponent will submit a more comprehensive schedule addressing dewatering and earthworks timings, and relevant dust control measures prior to seeking the necessary approvals required from all relevant Government agencies.

31. Groundwater Monitoring Inadequate (9)

31.1 SUMMARY OF SUBMISSIONS

Construction of the canals may impact on water quality within local bores adjacent to the construction site, ie. bores which currently have fresh water may become saline as has happened in the past following construction of Waterside Mandurah Stage 1. The proposed groundwater monitoring programme as described within the CER does not provide enough detail and is therefore inadequate.

31.2 RESPONSE TO SUBMISSIONS

The groundwater monitoring programme (pages 110 and 111) is based on an extensive hydro-geological assessment of the proposed Harbour City development site by Dames and Moore. (See pages 83, 102 and Appendix 5).

Preliminary calculations indicate that water levels in domestic bores in the Dudley Park area may experience temporary water declines of 0.5-3m, although in the long term the Harbour City development is not expected to adversely affect the water quality and quantity of nearby domestic bores. A separate additional report on groundwater monitoring and control of effects on groundwater by specific construction techniques has been lodged with this report.

31.3 RECOMMENDATIONS

1. That the concerns raised by objectors be set aside as the proponents have provided comprehensive advice on groundwater issues sufficient to enable the EPA to assess the development as presented.
2. The proponent has committed (Commitment No. 77) to undertake groundwater monitoring at each stage of development over subsequent 3 year periods.

32. All Estuaries should be Protected and Remain Undeveloped (2)

32.1 SUMMARY OF SUBMISSIONS

The development would have an unacceptable impact on the Peel-Harvey Estuary. Estuaries are a 'National Heritage' which should be preserved and retained in public ownership and control.

32.2 RESPONSE TO SUBMISSIONS

The purpose of this environmental assessment is to demonstrate that the proposed development will not produce unacceptable impacts on the immediate environment and the Peel-Harvey Estuary. The Harbour City proposal is committed to preserving and ceding to the Crown the Conservation and Foreshore Reserves totalling 44.8 hectares. This will ensure public ownership and control of the Reserves which may potentially become part of the 'National Heritage.'

Notwithstanding this, the submission does not have regard to the practicality of the State Government to acquire all of the land all of the land surrounding the estuary that is proven to be of high conservation significance. The proponent is in fact providing 44.8 hectares of land free of charge to the State Government and the people of WA. The Harbour City proposal achieves a good result for the community without the community having to pay for it.

32.3 RECOMMENDATION

That the submission be dismissed, as the Government does not have the financial means to acquire all of the lands referred to, and to single out the Harbour City project site would create an undesirable precedent. The potential for impacts on the Peel-Harvey Estuary has been addressed adequately.

HARBOUR CITY CANALS ESTATE

RESPONSE TO PUBLIC SUBMISSIONS IN FAVOUR OF THE DEVELOPMENT

1. Canal Development for the Site Already Approved (18)
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1.1 RESPONSE TO SUBMISSIONS

The proponent acknowledges that the Harbour City development site has already been given environmental approval for a similar canal development. The Waterside Mandurah Stage 1 and 2 ERMP 1982 and subsequent EPA Report and Recommendations (Bulletin 126 December 1982) verifies this fact.

1.2 RECOMMENDATION

That the submission be received and noted and be further considered by the EPA in determining its support for the Harbour City Project CER.

2. There will be Adequate Conservation Reserves for Waterbirds and POS in line with System 6 Redbook Recommendations (34)
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2.1 RESPONSE TO SUBMISSIONS

The Conservation and Foreshore Reserves component of the proposed subdivision results in a total of 44.8 hectares of land (22.7%) being set aside for environmental purposes. The proponent recognises the significance of the Reserve area in terms of waterbird habitat and acknowledges its consistency with System 6 Redbook Recommendation C50.

2.2 RECOMMENDATIONS

1. That the submission be acknowledged and accepted by the EPA.
2. That the commitment by the proponent to cede 44.8 hectares of land free of charge to the Government, well in excess of the 38.3 hectares identified in the System Six Red Book Report, be recognised by the EPA.
3. That the EPA recognise the substantial funding committed by the proponent to the long term management of the Conservation Reserve.

3. Council Referendum in 1988 Already Indicated Public Support for Canal Proposals in Mandurah (1)

3.1 RESPONSE TO SUBMISSION

The proponent acknowledges the resultant public support for canal proposals in Mandurah as indicated in the 1988 Council Referendum. The proposed Harbour City Canal Estate development may therefore be considered a land use still widely accepted by the Mandurah residents even though there has been a tightly orchestrated campaign by a handful of people who have been trying to discredit the project in a very organised way.

3.2 RECOMMENDATION

That the submission be received and noted.

4. The Proposed Harbour City Development will Create Employment Opportunities for Local People in the Short and Long Term (26)

4.1 RESPONSE TO SUBMISSIONS

The Harbour City development is expected to generate approximately 150 jobs associated with the land development and a further 300 tradespeople per annum during construction of canal estate housing. Support office staff to engineers, town planners, contractors, suppliers, transport workers etc will create 100 temporary jobs. In addition, the tourist resort hotel and retail complex will create approximately 400 permanent new jobs. The proponent will draw on the local workforce where possible which will reduce unemployment in the Mandurah area in both the short and long term.

4.2 RECOMMENDATION

It is recommended that the EPA's environmental assessment of the Harbour City proposal takes into account the substantial employment benefits to the local community which will be generated by the project and will assist in reducing the currently above average unemployment in the area.

5. Ideal Location for a Tourist Development, Hotel and Retail and Boat Facilities for Canals (29)
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5.1 RESPONSE TO SUBMISSIONS

The concept of the Harbour City proposal is designed to cater for the exceptional tourist and canal development potential which exists.

5.2 RECOMMENDATION

That the EPA recognise the development potential of the proposed Harbour City project and consider this in the context of the numerous social and economic benefits which will become available to the local community in both the short and longer term.

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|---|
| <p>6. Plan for Harbour City is better than the original John Holland Proposal (eg in terms of water quality, conservation reserves, POS) (3)</p> |
|---|

6.1 RESPONSE TO SUBMISSIONS

The proponent acknowledges the improved design characteristics of the Harbour City proposal and is committed to providing a high quality canal estate development. The proposal is a culmination of intensive investigation into conservation, design and development considerations which have drawn extensively from relevant, up to date information and particularly from the design criteria and structural performance of the Port Mandurah Canal Subdivision which has been of excellent standards.

6.2 RECOMMENDATION

That the information be received and noted.

7. The Proposed Harbour City Development Offers Increased Recreational Facilities (2)
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7.1 RESPONSE TO SUBMISSIONS

The Harbour City development offers a wide range of recreational facilities designed to address the demand for passive and active recreational activities thereby improving the lifestyles of residents and visitors. Facilities include the hotel and retail complex, boating facilities public open space and foreshore reserves.

The canals in their own right will provide a significant recreational facility as many residents will opt for living on a canal lot to be near their boat.

7.2 RECOMMENDATION

That the submission be received and noted.

8. The proposed Harbour City Development involves no ongoing costs to the locals (9)

8.1 RESPONSE TO SUBMISSIONS

This statement is factual. The ongoing costs associated with the Harbour City development will be borne by the canal estate and dry land subdivision landowners. The funds will be managed by the "Management Entity" comprising of representatives from the Mandurah City Council, Department of Marine and Harbours, Peel Inlet Management Authority, Landowners and the Developer. A Reserve Fund will be established to ensure long term funding available for any substantial maintenance task that may arise in the future life span of the Canal Waterways Estate.

8.2 RECOMMENDATION

The proponent recommends that the EPA recognise that the Harbour City project and its artificial waterways will be maintained at no direct cost to the ratepayers of the City of Mandurah or the State Government providing the proposed management system is supported and approved.

<p>9. The proposed Harbour City development will boost available Council Rates (5)</p>
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9.1 RESPONSE TO SUBMISSIONS

The Harbour City development will result in considerable financial gains to the City of Mandurah in the form of additional rates as canal developments usually result in higher rateable values being attracted. The Waterside Stage 1 development provides over \$250,000 in rates to Mandurah City Council annually.

9.2 RECOMMENDATION

That the information be received and noted.

10. The Proposed Harbour City Development Provides Better Control of an Environmentally Sensitive Area (Control of Prawning/Fishing/4WDs) (16)

10.1 RESPONSE TO SUBMISSIONS

The Conservation and Foreshore Reserve areas proposed in the Harbour City development provide a sensible management solution to a presently degraded, unmanaged environment. The future of these important wildlife habitats can be secured for future generations through the creation and conservative management of the Reserves. The Reserves will be ceded to the Crown without cost to be managed in perpetuity under public ownership.

10.2 RECOMMENDATIONS

1. That it be acknowledge that the Harbour City project provides a proper balance between the need to preserve and conserve environmentally sensitive areas, and providing land for public usage.
2. The information be received and noted and support for vesting of the Conservation Reserve in the National Parks and Nature Conservation Authority be determined; coupled with support for ongoing management by CALM.

11. The Proposed Harbour City Development will Provide less Breeding Ground for Mosquitoes (9)

11.1 RESPONSE TO SUBMISSIONS

The canal development itself and the proposed mosquito control techniques for the Conservation Reserve will reduce the breeding sites resulting in the suitable management of mosquito populations.

The proposed mosquito control techniques (ie. physical modification of breeding sites) have been advocated by the Mosquito Control Review Committee and will be undertaken according to PIMA and EPA requirements. The objective of the mosquito control programme is to manage mosquito populations consistent with biological (especially waterbird) and human values causing minimal impacts to the surrounding environment.

11.2 RECOMMENDATION

1. The proponent recommends that the EPA recognise the existing over-population of mosquito species and the proposed control methods which take into account the importance of mosquitoes' co-existence with biological and human users.

12. The Proposed Harbour City Development is an Aesthetic Improvement of the Existing Site (23)
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12.1 RESPONSE TO SUBMISSIONS

The proponent acknowledges the aesthetic improvement offered by the proposed high quality canal development and appreciates the implications in terms of enhancing visual amenity. However, the proponent also realises that visual impacts must be kept to a minimum which will be achieved through the provision of appropriate landscaping and functional buffer zone establishment. The Conservation and Foreshore Reserves, together with the functional Public Open Space areas provide aesthetic focal points which link the proposed Harbour City development to the natural floral and faunal attributes of the project land. In this context, the canal development will blend into the existing environment and enhance the cohesion of development structures and landscape amenity.

12.2 RECOMMENDATION

The proponent will develop a Landscape Master Plan for the project land to be submitted to, and approved by, the City of Mandurah, prior to the commencement of each stage of project construction.

13. Port Mandurah sets an Excellent Track Record for Canal Developments (20)

13.1 RESPONSE TO SUBMISSIONS

The Port Mandurah Canal Estate previously developed by the proponent is an excellent example of a quality canal development which has demonstrated high standards on environmental performance grounds. The same design criteria and environmental objectives of the Port Mandurah development will be applied to the Harbour City development.

13.2 RECOMMENDATION

1. The proponent recommends that the EPA examine the exceptional environmental performance of the Port Mandurah Canal Estate in consideration of the predicted performance of the Harbour City development.

14. The Government Option to Purchase the Land is too Expensive for the State (1)
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14.1 RESPONSE TO SUBMISSIONS

There is a clear understanding from discussions with Government Agencies that the State Government does not have the funds to acquire the land. The most environmentally sensitive land, totalling 44.70 hectares, is proposed to be transferred to the Crown on a free of cost basis which exceeds the System 6 requirements, and managed and maintained at no cost to either the Local Authority or the State Government.

14.2 RECOMMENDATIONS

That the submission be accepted and its contents acknowledged.

1. DPUD RESPONSE

1.1 SUMMARY OF SUBMISSION

DPUD is currently considering an Amendment (No 183 to the City of Mandurah's Town Planning Scheme No 1A which proposes the rezoning of the subject land from "Rural" to "Canal" zone and "Conservation and Foreshore Reserve" purposes.

In previous discussions between Departmental officers and representatives from the developers Cedar Woods Limited, three major issues were identified as needing to be addressed so as to enable this rezoning proposal to proceed for public advertising.

These issues include:

- i) The possible need for Council to undertake a referendum to gauge public opinion on further canal development in Mandurah.*
- ii) Determination of the responsibilities associated with longer term management and maintenance of artificial waterways, including funding arrangements and protective measures against any adverse impacts resulting from the development.*
- iii) Establishment of an appropriate development setback line for land covering the Creery Wetland, taking into account relevant information and advice from the Environmental Protection Authority and Department of Conservation and Land Management.*

Following preliminary examination of the rezoning documents and from discussions held with the City of Mandurah, it would appear that the first two issues have been satisfactorily addressed. However, the question of an appropriate development setback line still remains unresolved and is a matter which requires careful analysis as part of the Authority's formal assessment in conjunction with input from the other relevant Government agencies.

In terms of Planning requirements, the subject land is earmarked "Future Urban" and "Rural C" (Conservation and Recreation) under the Land Use Strategy forming part of the Peel Regional Plan (refer attached copy of Figure 29). The draft Regional Plan indicates that development of the land will depend on the resolution of a number of constraints including the amount of land to become conservation reserve, the environmental impacts of the proposal, the need to maintain public access, water circulation, servicing and flood hazards.

With regard to Commission Policy, the proposed canal development would need to comply with the Statement of Planning Policy (No 2) for the Peel Harvey Coastal Plain Catchment and the "Procedures for Approval of Artificial Waterways and Canal Estates" (DCI.8).

Additional planning matters with the Department will need to examine in further detail as part of its assessment of the rezoning proposal include the following aspects:

- *Distribution and allocation of public open space reserves throughout the Canal estate.*
- *Residential density mix and housing types proposed within the Building Guidelines.*
- *Relationship and impact of retail development on the Mainstream Mandurah (Town Centre) Commercial and Tourist proposals.*
- *Public and pedestrian access to the foreshore reserves and throughout the estate.*

1.2 RESPONSE TO SUBMISSION

The Harbour City development proposal is a combined planning and environmental document seeking the necessary approvals from all relevant agencies. In consideration of the rezoning of the subject land it is necessary for DPUD to take into account environmental advice from relevant government authorities.

To address DPUD concerns, it appears that the main unresolved issue is that of the appropriate development setback line. The proponents determination of the Conservation and Foreshore Reserves and development setback line is based on the ecological, vegetational, hydrological and geological characteristics of the subject land. It is also consistent with the EPA's System 6 Red Book Recommendation C50.

It is imperative given that DPUD is seeking confirmation of the acceptability of the proposed development line, given that PIMA has recommended the adherence of a "different" line, that the EPA confirm the acceptability of the Harbour City proposals for the reasons set out in the CER.

The EPA's lead in respect to this matter will satisfy the needs of other Government agencies and will resolve the concerns of various interest groups who have expressed views suggesting that more extensive areas be set aside.

The four other planning issues set out in 1.1 above which the Department of Planning will need to further consider as part of the rezoning process will not impact upon the environmental process and therefore will be rightfully addressed as part of the rezoning process.

It is important to stress that the Harbour City project has been designed to conform to all relevant DPUD policies and therefore there is unlikely to be any major objection to or significant changes to the Concept Plan.

1.3 RECOMMENDATIONS

1. That the EPA accept that DPUD has acknowledged that:
 - a) Council has recently resolved that it will undertake a "Public Opinion Survey" to gauge community opinion on canal developments following the EPA determination of the CER and the completion of the public submission phase on Amendment 183; and
 - b) that a suitable solution has been proposed for the long term management of artificial waterways which has the whole of Government support, including support from Department of Marine and Harbours and tacit approval by the City of Mandurah in its initiation of the Harbour City Rezoning Amendment.

2. That the EPA continue to support the System 6 Red Book Recommendation C50 line as the most appropriate development line recognising that the CER has clearly justified the environmental significance of the proposed Conservation and Foreshore Reserves. To further arbitrarily extend the Conservation Reserves beyond the System 6 Redbook line will significantly affect the project economics and will not greatly add to environmental sustainability of the project. Further, it would undermine the management funding structure for the Conservation Reserve which is directly linked to the number of lots to be created.

3. In the Harbour City Concept, the Conservation and Foreshore Reserve will be given up free of cost to the Crown and managed by the Management Entity at no cost to Local or State Authorities. More recent discussion with CALM has now resulted in CALM accepting the vesting of the reserves in the National Parks and Nature Conservation Authority, overall management responsibility for the Reserve with ongoing maintenance funding to be provided from the Management Entity Reserve Account. Should the "PIMA line" be considered, the proponent believes that the land take would become an onerous condition and would seek compensation from the State Government. The State would, under this scenario, also be responsible for the long term management of the conservation area. The proponent on the other hand would be left only with a "dry" lot development opportunity over the balance area. This would be a no win option for either party whereas the current proposals are a win/win solution for all parties.

2. CALM SUBMISSION

2.1 SUMMARY OF SUBMISSION

General Comments

The increasing body of scientific knowledge provided in several reports quoted in the CER confirms that the samphire flat is an integral part of the wider "Creery Marshes" and is of high conservation value.

The available areas of wet and dry samphire within the Peel-Harvey estuarine system have significantly decreased in recent years due to development, grazing and human recreational impacts. On the basis of current information, the area of the proposed development is the largest and best developed samphire marsh in the whole estuarine system, and contains over 25% of that vegetation type for the whole system.

Although the area is private property and is excluded from the area listed under the RAMSAR treaty, it is contiguous with this wetland of international importance. The treaty imposes obligations to protect waterbird habitat as much as possible, and to inform the World Conservation Union (IUCN) of any changes in the ecological character of listed wetlands.

The effects of the Dawesville cut cannot be fully evaluated until the cut is completed and therefore the effects on low lying areas are not certain. If higher tides result, the now drier samphire areas would become important roosting sites for wading birds.

The proposal, while addressing the waterbird issues, does not appear to have examined the other faunal aspects such as small mammals or reptiles in detail, and how they relate to the vegetation complexes in the area. The Southern Brown Bandicoot and Pygmy Possum may exist in the drier areas.

Specific Comments

The EPA System 6 Red Book recommended a foreshore reserve to approximately 150-200m along the southern shoreline of the area south of the Mandurah bypass bridge. The Development Line proposed in the CER generally approximates the EPA System 6 Red Book proposal.

CALM welcomes the developer's proposal to cede the samphire flats below the Development Line for a reserve. The samphire area is part of the larger "Creery Marsh" system, including Creery Island, the mainland samphire flats and the lagoon. The intent of the Red Book recommendation was that future management of this system would be largely for nature conservation purposes. For this reason, and because CALM's predecessors were the nominated agency to manage Creery Island and the associated lagoon and tidal flats, it is appropriate that the samphire area ceded by the developer should be vested in the National Parks and Nature Conservation Authority and managed by CALM as an integral part of the Creery Marsh system.

CALM welcomes the proposed involvement of the developer in helping manage the conservation area. However, in the context of the above comments, and consistent with the EPA Red Book recommendations, it is clear that CALM would be the lead agency in the production of a foreshore management plan if it included the conservation area.

In earlier informal discussions with representatives of the proponent, CALM officers expressed some concern about the viability and management of the proposed reserve area. Should any larger area be reserved, CALM would welcome its inclusion in the reserve proposed for vesting in the NPNCA. Although the higher parts of the samphire flat are somewhat degraded, rehabilitation is achievable.

In this context, it is noted that a recent report for the Waterways Commission ("The Significance of Mosquito Breeding Areas to the Waterbirds of the Peel Inlet WA) found that the area of samphire flat, coloured yellow on the attached map, had the highest waterbird conservation significance of 37 sample sites in the Peel Inlet. The Red Book (and proponent's) line goes through the middle of this particular area.

Some further specific comments follow:

- CALM supports the proposal for the developer to produce information brochures for prospective buyers on issues such as living with mosquitoes and the conservation values of the wetlands. The Department would be pleased to provide advice and information for such brochures.*
- The proposal suggests controlled spraying of pesticides and physical alteration of mosquito breeding grounds within the proposed conservation reserve. The mosquito breeding cycle and its relation to the feeding and nesting habits of waterbirds in the area would need to be examined in detail. Excessive pesticide spraying or physical alteration could have a significant effect on waterbirds. Pesticide runoff into the estuary system is also a potential problem.*
- Another issue in the staged dewatering process which indicates the use of silt ponds prior to discharge into the estuary system. The location of these proposed silt ponds and their size needs to be examined in detail and any effect they may have on the proposed conservation reserve considered.*
- Stormwater drainage from the proposed development could also impact on the vegetation of the remaining samphire flats and on the marine fish species, including commonly caught commercial species, which enter the estuary through the Entrance Channel.*

The four points above should be considered carefully during the detailed planning of the development, with close liaison between the developer, EPA and CALM.

2.2 RESPONSE TO SUBMISSION

The proponent acknowledges the significance of the samphire areas as part of the Creery Marshes and wider Peel-Harvey Estuarine system. It is also aware that the privately owned development site is not directly subject to Ramsar Convention obligations, however, all of the conservation considerations and objectives of the Convention have been met by the proposed isolation and management of the area most utilised by